Atomic Transition Probabilities of Sodium and Magnesium. A Critical Compilation

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This compilation is the first in a series of updates to a critical compilation published in 1969 [W. L. Wiese, M. W. Smith, and B. M. Miles, *Atomic Transition Probabilities, Vol. II: Sodium through Calcium*, NSRDS-NBS Vol. 2 (U.S. GPO, Washington, D.C., 1969)]. Atomic transition probabilities have been critically evaluated and compiled for about 11 400 spectral lines of sodium and magnesium (nuclear charge $Z=11-12$, respectively). The cited values and their estimated uncertainties are based on our consideration of all available theoretical and experimental literature sources. All ionization stages (except for hydrogenic) are covered, and the data are presented in separate tables for each atom and ion. Separate listings are given for "allowed" (electric dipole) transitions, on the one hand, and for "forbidden" (magnetic dipole plus electric and magnetic quadrupole) transitions, on the other. In each spectrum, lines are grouped into multiplets which are arranged in order of ascending lower and upper-level energies, respectively. For each line, the emission transition probability A_{ki}, the line strength S, and (for allowed lines) the absorption oscillator strength f_{ik} are given, together with the spectroscopic designation, the wavelength, the statistical weights, and the energy levels of the lower and upper states. The estimated relative uncertainties of the line strength are also indicated, as are the source citations. We introduce a statistical method that we use to estimate these uncertainties for most of the cited transition rates. We only include those lines whose transition rates are deemed sufficiently accurate to qualify as reference values. Short introductions precede the tables for each ion. The general introduction contains a discussion of the principal criteria for our judgments and our method of data selection and evaluation. *© 2008 by the U.S. Secretary of Commerce on behalf of the United States. All rights reserved.*. [DOI: 10.1063/1.2735328]

Key words: atomic spectra; energy levels; ions; line strengths; magnesium; oscillator strengths; sodium; transition probabilities; uncertainties.

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1. Introduction

This is the first installment of an effort to update, revise and expand the reference data tables on atomic transition probabilities[c] for all ionization stages of the elements sodium through calcium. The original compilation was published several decades ago by Wiese *et al.*[125] of the National Bureau of Standards. These data, with updated energies and wavelengths, are also available in the Atomic Spectra Database (ASD).[69] This new tabulation has been undertaken because a vast amount of new material, referenced in the Bibliographic Database on Atomic Transition Probabilities,[70] has become available in recent years, primarily from sophisticated atomic structure calculations. Because this material is so extensive, the new tables will be published in several parts. This first part contains all nonhydrogenic spectra of the elements sodium and magnesium ($Z=11-12$), respectively. Subsequent parts will cover Al to Ca ($Z=13-20$). The quality of much of the data has also increased, particularly for transitions between lower-lying levels.

A large-scale production of data was carried out by members of the Opacity Project[6,73,83] (OP), an international collaboration of about 20 atomic structure theoreticians under the leadership of Seaton during the late 1980's and early 1990's. This project has produced on the order of a million multiplet f values for the spectra of the elements sodium through calcium, excluding the odd-numbered elements phosphorus, chlorine, and potassium. These R-matrix calculations are well suited to mass production but do not, how-

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[c] Throughout these tables we often use the terms atomic transition probability, oscillator strength (f value), and line strength interchangeably, since they all refer to the same underlying physical phenomenon of radiative transitions. We also use the generic term "transition rate" to refer to any or all of the above.

ever, include any relativistic effects such as the spin-orbit interaction. Other important methods have recently yielded data at higher levels of accuracy, albeit for relatively low-lying transitions. These include the extensive calculations of Tachiev and Froese Fischer,[38,86,88,90,97] as well as Hibbert and co-workers.[44,45,57] The critical problem of electron correlation is addressed via a detailed multiconfiguration treatment. As discussed below, other sophisticated methods have also been used, including many-body perturbation theory (MBPT).[39,81] All of these non-OP calculations, while limited to transitions between lower-lying levels, are superior to those of the OP insofar as they include Breit-Pauli terms and thus directly furnish data for individual fine-structure lines.

Unfortunately, experimental data which are sufficiently accurate to sensitively test the best calculated results are usually scarce and are practically nonexistent for highly ionized species. Some emission measurements of relative transition probabilities exist, with uncertainties estimated to be in the range from 5% to 20%. There are also some lifetime measurements available, but for the data considered here the corresponding branching ratios are seldom known to useful accuracy. Our modest use of experimental lifetime data has been restricted primarily to certain low-lying resonance transitions and to certain forbidden transitions.

We describe in Sec. 4 a statistical method for estimating uncertainties when two or more independent sources are available for a significant number of transitions. This method "pools" the relative uncertainties of all the transitions in a spectrum for which data are available from two or more independent sources.

2. Data Assessment

The central issue of a critical data compilation is the uniform critical assessment of the data, since this provides the basis for the data selection and the estimation of relative uncertainties.

2.1. Main Criteria

All data have been reviewed by us with respect to the following four main criteria:

(i) the degree of agreement among the most accurate published results for each transition,
(ii) the authors' evaluation and numerical estimate of their own uncertainties,
(iii) the authors' consideration of the critical factors affecting their results, and
(iv) the degree of fit of the authors' results into established systematic trends and or the reasons for possible deviations.

The first factor has played the dominant role in the present compilation. The degree of agreement is checked for all lines for which more than one accurate independent source is available. This is discussed in detail Sec. 4 below.

2.2. The Critical Factors for the Determination of Atomic Transition Probabilities

The second and third points we have listed among our criteria are the authors' error estimation and consideration of the "critical factors" in the method used. We require that these critical factors are adequately taken into account before any paper is included in this compilation of reference data.

2.2.1. Theoretical Methods

Theoretical approaches have provided the large majority of the data for this compilation. It has been demonstrated many times that extensive treatments of configuration mixing due to electron correlation are necessary in order to obtain reliable results for most atomic systems compiled here. Such demonstrations have come from (a) comparisons with experimental results and with other independent calculations, (b) convergence studies in the calculations, i.e., by the inclusion of more and more interacting configurations, (c) the agreement, or lack thereof, of results in the dipole-length and dipole-velocity representations, and (d) the degree of agreement between the computed level energies (in *ab initio* calculations) and experimental energies. To obtain accurate results, the number of interacting configurations for configuration interaction (CI) calculations to be considered for the lower atomic states must be in the tens and occasionally even in the hundreds or thousands when the degree of cancellation is high. This is especially the case for neutral atoms. Of course, the number of required configurations depends on the accuracy of the basis states. We have utilized only calculations which are based on extensive multiconfigurations, whether CI or multiconfiguration Hartree-Fock (MCHF) or MBPT, to take electron correlations into account in a detailed manner. (CI-type methods are sometimes referred to as "superposition of configurations" methods to emphasize that physical configurations do not, in fact, interact—see, for example, Weiss[121]). Only in the case of alkali-like spectra, which are relatively simpler, have we included semiempirical results (see, for example, Theodosiou and Federman[106]).

Many spectra will contain some levels which are so strongly mixed that even current elaborate treatments may not be adequate. In Na III, for example, terms $2p^4(^3P)3p$ $(^2P^o+^2S^o)$ and $2p^4(^3P)3d$ $(^2D+^2F,^4P)$ are highly mixed due to their proximity. Configuration interaction effects are so pronounced that even the most sophisticated calculations presently available exhibit strong disagreements for transitions starting or ending in levels having such terms.

For the determination of the strengths of individual lines, another critical factor for calculated data is the detailed consideration of relativistic effects, especially the term mixing of the angular portion of the wave functions. The importance of these effects increases horizontally across the Periodic Table. For example, so-called spin-orbit effects are small for alkalilike spectra, important for many F-like levels, and so large for all but the lowest Ne-like levels that these levels are usually not described in LS coupling. Generally speaking, LS coupling becomes less valid for the more highly excited levels. Also, because these are relativistic effects, they tend to increase with increasing Z. Many theorists have calculated individual line strengths in intermediate coupling by inclusion of the so-called Breit-Pauli terms. These calculations are generally computer intensive and approximate to varying degrees. They sometimes yield greater deviations from LS coupling than emission experiments indicate. The OP (Refs. 6, 73, and 83) is restricted to nonrelativistic multiplet data; it is the only data source to which we have applied LS-coupling fractions to obtain individual line data, as described below in Sec. 3.

2.2.2. Experimental Methods

For accurate measurements of branching ratios with emission sources, two critical factors must be considered:

(i) The lines must be emitted from an optically thin layer, i.e., self-absorption must be negligible. For approximately homogeneous plasma layers, small amounts of self-absorption are acceptable provided the optical depth of the observed layer can be sufficiently well determined that an accurate correction may be made.
(ii) Radiometric calibrations of the line signals at various wavelengths must be performed with accurate standards such as tungsten strip lamps to take into account variations in sensitivity of the spectroscopic instrumentation with wavelength.

In emission measurements of relative oscillator strengths within a spectrum, the relative populations of ions or atoms in various excited states must be accurately determined (except when the upper level is the same for the different transitions). For emission sources (plasmas) in partial local thermodynamic equilibrium (LTE), the populations of excited states are distributed according to the Boltzmann population factors.[124] According to well-established validity criteria, partial LTE is readily attained in moderate and high density plasmas, i.e., for electron densities above a certain minimum value. The density of free electrons thus must be determined. In addition, the plasma temperature enters into the Boltzmann factors and must be reliably measured.

In wall-stabilized arcs, the measured plasma conditions are usually such that the existence of partial LTE is readily fulfilled. Emission results for transition rates can be put on absolute scales when the requisite lifetime data are available. Emission data are available mainly for the spectra of neutral and singly ionized atoms.

We have not made extensive use of lifetime measurements on levels with strong decay branches because they are usually dominated by transitions that are well-known theoretically. Where available, we have used the highly accurate lifetime measurements of Träbert *et al.*[107] on levels of ionic species having only forbidden or weak intercombination decay branches. Also, in one case a lifetime was determined by precision measurement of the radiative linewidth of the resonance line of sodium.[72] Precise lifetime determinations have also been made by spectroscopically measuring the C_3 coefficient of the atom's diatomic molecule. For example, two groups have measured the C_3 coefficient of the long-range O_g^- state of Na_2 to determine the lifetime of the $P_{3/2}$ state of Na I.[48,120]

2.3. Selection Procedure

For each transition we use only those data sources which we have evaluated to be the most accurate. For each spectrum we start with lists of literature sources assembled in our NIST data center from our comprehensive database[70] and literature files. We then discard work based on those theoretical or experimental approaches that are superseded by more advanced ones, as discussed above. Further selection of data sources is accomplished by graphical comparison of line strengths for the different sources. We do not include works whose line strengths are consistently in poor agreement with other established work or whose values deviate in a nonrandom way from those of established works.

3. Brief Discussion of the Principal Data Sources

3.1. General Remarks

The sources selected for these tables are almost entirely different from those utilized in the earlier compilation.[125,126] It is therefore appropriate to briefly review the principal contributions and to provide citations to papers where they are more extensively described and reviewed. First some general remarks are in order on the theoretical approaches, which provide the large majority of the tabulated data.

As discussed above, it has long been recognized that in many-electron atoms and ions, the mutual interactions between the atomic electrons—known as electron correlation—is a critical factor for the accurate calculation of transition probabilities.[18,85] Because of this interaction, the wave function of an atomic level cannot generally be accurately described by a single configuration. Thus, more modern atomic structure calculations have usually been carried out in a multiconfigurational framework.

Multiconfiguration calculations approximate the wave function of an atomic state by a linear combination of single-particle product wave functions of related states of the same total angular momentum and parity. For example, the ground term of a Be-like ion, nominally designated as $2s^2\ {}^1S$, is better described as $a_1 2s^2\ {}^1S + a_2 2p^2\ {}^1S + a_3 2s3s\ {}^1S$ + other configurations of $J=0$ even parity which form an ${}^1S$ state, with the a_i's being the mixing coefficients, including relative phases. This multiconfiguration treatment has been successful in reproducing a great many accurate experimental level energies if a sufficiently large number of "interacting" configurations is included.

The quality of the calculations has been estimated by applying the four methods listed in Sec. 2.2. Good agreement between length and velocity forms and between *ab initio* and experimental energies are necessary but not sufficient conditions, and the velocity forms are commonly of lesser quality than the length forms. For tractability considerations mentioned above, because they are useful for intra- but not inter-source comparisons and because velocity results are often not reported, we have made relatively little use of energy and length-velocity comparisons in the present compilation. We report only length values.

Even though we have limited our tabulated data to calculations with extensive treatment of electron correlation, for some transitions, particularly halogenlike and noble-gas-like spectra, sizable differences between different extensive theoretical results remain for all but the strongest transition rates. More experimental comparison material, especially on transitions between higher levels, would be valuable in making more solid assessments of the theoretical data.

In many cases, cited transition rates may be more accurate than we were able to demonstrate by comparing with possibly less accurate results. Such circumstances can only be improved upon by new independent large-scale calculations of high quality.

3.2. The Opacity Project

OP (Refs. 6, 73, and 83) results have been used extensively for spin-allowed electric dipole (E1) transitions, primarily in cases where more extensive calculations were not available. This project was an international theoretical collaboration which was formed in 1984 under the leadership of M. J. Seaton and is now completed. It involved about 20 participating atomic structure theoreticians from research groups in the United Kingdom, France, Germany, the United States, and Venezuela.

This project has produced atomic data via *ab initio* atomic structure calculations for most of the elements H to Ca (hydrogen through calcium, with the exception of P, Cl, and K). In addition to atomic transition probabilities, energy levels and photoionization cross sections have also been calculated. OP calculations cover an extensive range of allowed transitions, essentially comprehensive up to $n=10$ and $l=3,4$. We downloaded the OP data from the Topbase database.[6] Subsequently we identified the OP multiplet levels with individual fine structure lines in the NIST ASD database[2] and used the energies therefrom to calculate the wavelengths of the corresponding transitions. We only considered OP transitions for which both the upper and lower levels are found in this way. The OP includes some far-infrared transitions that we have not included. We note that the OP team has published a book[73] which contains their transition probability data plus selected results on photoionization cross sections, etc.

The Opacity approach differs from the normal CI-type atomic structure calculations insofar as it is based on an approximation that is usually applied to calculate electron-ion or electron-atom collision data—the close-coupling (CC) approximation. For the calculation of oscillator strengths of discrete transitions, this method has been extended to the case of electrons with negative energies, i.e., to captured electrons that undergo bound-bound transitions in the field of a target ion with *n* electrons.

The OP uses a CC expansion to represent the total wave function as a superposition of ionic core and valence-electron wave functions. The ionic core (without the valence electron) is described by a CI method, using either CIV3 (Slater-type orbitals) or SUPERSTRUCTURE codes (effective-charge statistical model potentials). The R-matrix method is used to solve the core plus valence-electron problem in the inner region. It divides the problem into two regions of space, the "inner" and "outer" regions, and requires that the wave functions in these two regions and their radial derivatives match at an intermediate boundary. The outer-region wave function approaches a "Coulomb" solution asymptotically. It is usually evaluated by integrating the asymptotic solutions inward. The numerical approach used to solve the CC integrodifferential equations is based on an R-matrix method developed by some members of the OP team.[83]

The *ab initio* CC expansion method is similar in spirit to, but more sophisticated than, such semiempirical methods as the Coulomb approximation, quantum defect theory, or core-polarization models. Even the latter, for example, must use a short-range cutoff of the potential to simulate the effect of exchange between the excited and core electrons. The CC approach is generally more efficient than variational methods for broad-sweep calculations of transitions involving more highly excited levels. In principle, at least, the assumptions of the CC model become increasingly valid for more highly excited states. (One caveat for obtaining accurate results in this regime is that the CC model must be built on an intermediate-coupled core if intermediate coupling is significant.) This advantage tends to offset the intrinsic fact that binding energies are smaller for more highly excited states. Thus, a fixed absolute error yields a larger relative error, as well as the fact that more basis states often need to be included to obtain the same level of absolute accuracy. Some authors argue therefore that the CC method becomes more accurate than variational methods for more highly excited states because it builds in the effect of highly excited states and the continuum. As a practical matter, it can prove difficult to expand the basis set sufficiently as *n* and *l* increase. The CC method, however, usually cannot practically build in as much correlation between the core and low-excited electron as can full-blown multiconfiguration variational methods. Thus the latter can be superior for calculating transitions involving the lowest-excited levels, for transitions whose strengths are sensitive to partial cancellations in the dipole matrix elements, and, of course, for calculating wave functions for the ion core used in CC calculations. As described below, OP calculations do not include intermediate coupling, which generally becomes more important for more highly excited levels.

It is important to note that in the OP calculations only multiplet data were obtained, and no attempt was made to produce data for individual spectral lines. No relativistic effects are included, including the spin-orbit interaction. LS coupling is a reasonable approximation when the spin-orbit interaction is negligible compared to the Coulomb and other interactions. Still, in using the OP data we have treated this as an approximation like any other and excluded only those transitions whose estimated uncertainties fall outside our limits for reference data. We have estimated the line strengths of the individual fine-structure lines by applying the well-known LS-coupling line strength fractions to the OP multiplet values. We decompose the LS multiplet averages into their LSJ fine-structure components using the following LS-coupling rule:[18,85]

$$S_{\mathrm{LSJ-L'S'J'}} = S_{\mathrm{LS-L'S'}}(2\mathrm{J}+1)(2\mathrm{J'}+1)\begin{Bmatrix} \mathrm{L} & \mathrm{S} & \mathrm{J} \\ \mathrm{J'} & 1 & \mathrm{L'} \end{Bmatrix}^2, \quad (1)$$

where S_{LSJ} is the line strength of the fine-structure line and the curly brackets indicate a $6-J$ symbol. This geometrical factor is a crude approximation, however, except in cases where the deviation from pure LS coupling is very small. In LS coupling, the multiplet line strength is the sum of the line strengths of the individual fine-structure lines:

$$S_{\mathrm{LS-L'S'}} = \sum_{\mathrm{J,J'}} S_{\mathrm{LSJ-L'S'J'}}$$

$$(|\mathrm{L}-\mathrm{S}| \leq \mathrm{J} \leq \mathrm{L}+\mathrm{S};\ \mathrm{J'}-\mathrm{J}=0, \pm 1).$$

We take only line strengths from the OP, using experimental energies to derive wavelengths and to convert line strengths to oscillator strengths and transition probabilities. Only oscillator strengths are published, so we convert these into line strengths by using the same wavelengths as indicated in the original publication.

More recently the Iron Project has been developed (see, for example, Galavis *et al.*[41]). This is an expansion of the OP to include Breit-Pauli terms. To date, these calculations have only been performed for iron-group spectra, with the exception that oscillator strengths for selected transitions of Na III have also been calculated with this method.[5]

3.3. Breit-Pauli MCHF

In contrast to the OP calculations discussed in Sec. 3.2, multi-configuration Hartree-Fock (MCHF) methods are considerably more detailed in that relativistic effects are included. Not only multiplet but also the individual fine-structure lines are calculated. This has been accomplished by including Breit-Pauli terms in the Hamiltonian, in addition to the usual nonrelativistic electrostatic interactions. Thus the line data are produced in intermediate coupling, and intersystem line strengths are also obtained. The normally rather weak intersystem lines are more difficult to calculate, and the uncertainties are correspondingly higher. Also, in contrast to OP calculations, eigenstates are treated individually.

Hartree-Fock and related methods are variational. Extensive MCHF calculations have been performed in LS coupling followed by the configuration interaction of Breit-Pauli (BP) terms to order α^2, including all terms except for the BP orbit-orbit interactions.[38,86–88,90] Numerical radial functions are obtained. In 1999, Tachiev and Froese Fischer[76,86,88,90] began to publish extensive energy levels and transition probabilities for many spectra. As with the CIV3 method discussed below, these computations are generally applied to transitions where the upper level is no higher than $n=3$, $l=2$. Still, in this compilation, these data provide by far the largest source of accurate line strengths. A substantial number of intercombination and forbidden lines are included. The authors have published both length and velocity forms. For this compilation we have only used the former. As of this writing, their web site includes data for the following spectra: Li-like for Li to O, Be-like for Be to Mg, B-like for B to Si, C-like for C to P, N-like for N to Cl, O-like for O to Ca, F-like for F to Ti, Ne-like for Ne to Cr, Na-like for Na to Fe, Mg-like for Mg to Zn plus 12 heavier elements, Al-like for Al to Zn, and Si-like for Si to Zn.

Except when substantial cancellation occurs in the dipole matrix element, we have generally found these computed values to be accurate.

For many of the spectra of lower stages of ionization, Tachiev and Froese Fischer have also published "energy-corrected" (against experimental energies) values for their computed results. We have used these values wherever available, even though the added problem of identification with published experimental levels can sometimes pose a problem, especially for certain neonlike and fluorinelike levels that are highly mixed in LS coupling.

3.4. Configuration Interaction Methods

CI methods use a large number of analytical radial basis functions, for example, Slater-type orbitals. The amplitudes and parametric factors for the basis functions are variationally optimized. Extensive CI calculations with the CIV3 code (CIV3 indicates CI code version 3) have been performed by Hibbert and co-workers[44,45,57] for fairly large sets of transitions between lower-lying levels of many spectra. Applying this code, Aggarwal[3] has also published data for some spectra. While these results generally include only transitions between lower-lying levels, they still typically comprise a few hundred lines per spectrum.

The "nonorthogonal spline" method is another example of the CI approach. We have used the results of the method of Zatsarinny and Froese Fischer[128] for Na-like spectra, which go up to $n=10$. In this method, a MCHF calculation is used to compute the "target ions" and "electron perturbers." These functions are then used in an R-matrix-like fashion, except that there is no R-matrix boundary. Instead, the computation of the Rydberg series entails the diagonalization of an interaction matrix. Account is made for the occurrence of nonorthogonal orbitals. The method is especially advantageous for transitions from high-lying levels.

Except when substantial cancellation occurs in the dipole matrix element, we have generally found these computations to be accurate.

3.5. Many-Body Perturbation Theory

MBPT involves the summation of many diagrammatic terms of increasing order. Each diagram represents a different physical interaction. The group of Vilkas, Gaigalas, Kaniauskas, Kisielius, Martinson, and Merkelis have performed second-order MBPT calculations (see, for example, Gaigalas *et al.*[39]). We have also found these results to be of high quality, though they are only available for the lowest transitions of certain ionic species. Safronova and Johnson have also been producing quality MBPT results for a significant number of lines (see, for example, Safronova *et al.*[81]).

We have generally found these computations to have comparable accuracy to those of higher quality MCHF and CI computations.

3.6. Other Multiconfiguration Calculations

Much more limited data sets resulting from other multiconfiguration calculations of approximately equal—or in some cases even greater—sophistication have also been used when available. These authors are cited in the introductory comments to the various spectra. We have also used calculations of this type for forbidden lines, i.e., for magnetic dipole (M1) and electric and magnetic quadrupole (E2 and M2) transitions.

3.7. Related Atomic Physics Data in Tables

In addition to the transition rates, with each transition we also list the lower and upper-level energies and statistical weights ($g=2J+1$). As a rule, we list the NIST atomic energy levels (AEL) values for the energies which in most cases are based on experimental determinations. We also take the terms and configurations from these sources. The listed vacuum wavelength is equal to the inverse of the difference between the upper and lower-level energies. Air wavelengths are derived from these by dividing the vacuum wavelength by the corresponding index of refraction.[77] ASD (Ref. 69) is a searchable database that integrates the atomic spectra data compiled by NIST. Citations to the energy level compilations and the sources upon which they are based (e.g., Martin and Zalubas[61] for Na and Martin and Zalubas[60] for Mg) are available in the ASD database. ASD also contains a detailed discussion of how the air index of refraction and the number of significant figures are derived for the wavelengths.

4. Estimating Relative Uncertainties of Line Strengths

4.1. Pooling of Relative Uncertainties of the Different Lines in a Spectrum

While similar in spirit, the method we have used to estimate uncertainties of line strengths differs from the method used in previous NIST compilations. An advantage of this new method is that it facilitates a standardized and quantitative approach that relies primarily on the existence of sufficient data. To perform a reasonably thorough analysis, we require in a given spectrum to have two or more independent determinations of transition rate for about ten or more transitions of comparable uncertainty.

Our uncertainty analysis for line strengths relies heavily on systematic comparisons of relative differences among the best available data sources within a given spectrum. The heuristic method described below does not require that the observed variables be random or that they follow any particular distribution. In any statistical comparison of values from different sources, either the different uncertainties should be comparable or, in the other extreme, one measures the uncertainty of the less accurate value(s) against the much more accurate value(s). In the case of assumed equal uncertainties, there is always the chance of overestimating the uncertainty of the more accurate value(s), if there is one.

Briefly, we compute the relative standard deviation of the mean (RSDM) for each transition, based on the data from the different sources available:

$$\mathrm{RSDM} \equiv \frac{s}{\bar{x}\sqrt{N}}, \tag{2}$$

where the sample variance for each transition, s^2, is determined in the usual way:

$$s^2 = \frac{\sum (x_i - \bar{x})^2}{N-1}, \tag{3a}$$

and the arithmetic mean for a sample size N (the number of independent determinations for each transition) is

$$\bar{x} = \frac{1}{N}\sum x_i. \tag{3b}$$

The i summations are over the different utilized data sources for a given transition.

The RSDM of a quantity is a measure of the relative uncertainty of its mean (strictly speaking, the quantity we shall derive is the upper confidence bound, at 90% confidence level, of the RSDM). In order to make quantitative estimates of relative uncertainty, one needs to estimate contributions from uncertainties in both the variance and the mean. Particularly when the number of independent data sources is small, uncertainty estimates of s for individual transitions can be large compared to that of the mean. The "classical" statistical considerations concerning this are discussed in more detail in Appendix A. The mathematical details concerning the RSDM and its pooling will be discussed in Kelleher.[49]

For positive quantities such as transition rates, RSDM's are bounded by 0 and 1, independent of N. It is interesting to note that the RSDM for a sample size of 2 is simply

$$\mathrm{RSDM} = \frac{x_> - x_<}{x_> + x_<} \quad (N=2). \tag{4}$$

That is, the RSDM of two values is equal to half the relative difference between them. Note that this is bounded by 0 and 1 when the sum of the two values is greater than zero.

Because the number of reliable independent sources for a given transition is generally small, usually 1 or 2, we have elected to pool the RSDM of the different transitions with $N \geqslant 2$. We choose a RSDM that exceeds 90% of those obtained for all of the transitions having two or more "selected" data sources. We use 90% because some spectra do not have a sufficient number of transitions with comparably accurate data from two or more independent sources to warrant a more restrictive confidence bound. In actual practice, we plot the RSDM's of the different transition line strengths as a function of their mean line strength. This accommodates the general trend that relative uncertainties increase slowly as the average value of the transition rate decreases. The fitting function we use is

$$\Phi_0(S) = \frac{1}{2}\,\mathrm{erfc}\left[\beta^{-1}\log\left(\frac{S}{S_{1/2}}\right)\right]. \tag{5a}$$

In Eq. (5a), $\mathrm{erfc} \equiv 1 - \mathrm{erf}$ and erf is the error function, an estimate for which is given in Appendix B. In our case, S represents the mean line strength for each transition. $S_{1/2}$ and β in Eq. (5a) are fitting parameters to be determined from the data and are the analogs to the "intercept" and "slope," respectively ($S_{1/2}$ is the value of S when the RSDM envelope curve equals 0.5). $\Phi_0(S)$ has the asymptotic values of 0 and 1. It has a weak monotonic dependence on S and is symmetrical about RSDM=0.5 when plotted against $\log(S/S_{1/2})$.

If systematic errors are present, there is no fundamental reason why the RSDM's must approach zero at asymptotically large values of the line strength S. Hence we add a background term that is only significant for such values:

$$\Phi(S) = \Phi_0(S) + \gamma\left\{1 - \exp\left[-\frac{\gamma}{\Phi_0(S)}\right]\right\}. \tag{5b}$$

The asymptotic background term γ in Eq. (5b) is unimportant except at large S $[\Phi_0(S) < \gamma]$. In contrast to $\Phi_0(S)$, $\Phi(S)$ is not symmetric about RSDM=0.5. In this limit the fit curve $\Phi(S)$ approaches γ, which can be nonzero due to differences in systematic errors that persist for arbitrarily large S. The three adjustable parameters are chosen so that a specified percentage (in our case 90%, excluding outliers) of the transition RSDM's fall below the curve defined by the function. Examples for Na III (lower and higher levels) are shown in Figs. 1–3. These demonstrate clearly that the relative uncertainties as reflected in the RSDM's can be distinctly different for different energy level regions of a spectrum. The same can hold for different data sources. For example, the general agreement is clearly much better between the MCHF and CIV3 calculations (Fig. 2) than between MCHF and OP (Fig. 3). The above function has worked well in fitting the RSDM data for a wide array of spectra. We emphasize, however, that there is nothing fundamental about the functional form of Eq. (5) used in curve fitting for this empirical distribution-free method.

For meaningful pooling of the RSDM's of the different transitions, the relative uncertainties must be reasonably comparable. This means that the different data sources should be comparably accurate (unless one wishes only to estimate uncertainties of the less accurate data source), and that the pooled RSDM's are compatible with the same fit parameters in Eq. (5). Fulfillment of this latter requirement can be checked *a posteriori*. For example, all the data in Fig. 1 appear to be comparably accurate, as do those in Fig. 2. However, the accuracy of the data in Fig. 1 is clearly superior to that of the data in Fig. 2. After making a preliminary fit to the RSDM data, we often find that the transitions from lower-lying energies are significantly more accurate than transitions from higher-lying levels, even after accounting for the average dependence on line strength. This frequently requires us to divide the spin-allowed transitions of a spectrum into two or more subgroups of comparable relative uncertainty. When two such subgroups suffice, which is usually the case, a natural demarcation can usually be found where the energy separation between levels having the same parity and angular momentum is sufficiently close that configuration mixing and/or intermediate coupling becomes significant. An example of such a partition can be seen in Figs. 1 and 2 for the lower and higher transitions of Na III, respectively. Upon occasion we also separately pool the intercombination lines and the forbidden lines. Alkalilike and alkaline-earth-like spectra generally do not benefit from separation.

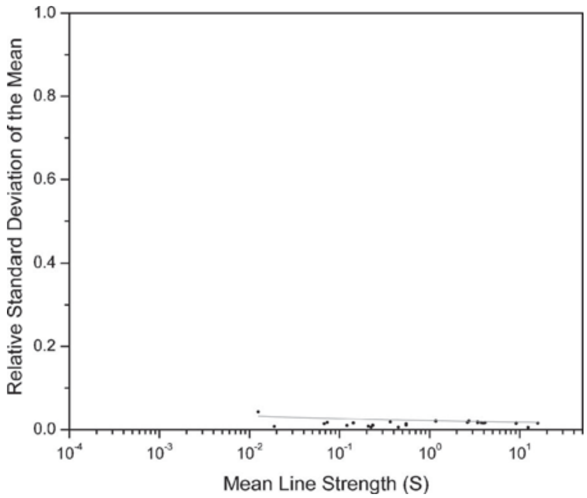

FIG. 1. Relative standard deviation of the mean (RSDM) vs the line strength for the transitions in Na III for which the energy of the upper level is *less* than 415 000 cm^{-1} and which have values listed in both Refs. 90 (MCHF) and 57 (CI). Because there are two data sources, the RSDM for each transition is given by Eq. (4). The curve corresponds to fit values for the parameters in Eq. (5); 90% of the points lie under it. Using the method described in the text, the parameters were empirically found to be $\beta=12$ ("slope" of the curve) and $S_{1/2}=1\times10^{-18}$ ("intercept"), and $\gamma=0.01$ (asymptotic background of the curve). In actual practice, for these data we would extend the ordinate of the graph only to 0.05, but here we extend it up to the maximum value of 1.0 to facilitate comparisons with Figs. 2 and 3. The quality of these data is much higher than in those higher energy level cases, which are plotted in Figs. 2 and 3. Below energies of 415 000 cm^{-1}, same J and parity energy levels are not closely spaced and level "mixing" is not generally important.

We define a quantity referred to here as the "logarithmic quality factor," $Q=-\log(S_{1/2})/\beta$. A typical value for higher quality data for lines from lower-lying upper levels is $Q \approx 1.3$ for the spin-allowed and forbidden lines. The value is higher for simpler spectra ($Q \approx 2.0$ for He-like), and smaller for more complex ions, $Q \approx 1$. OP values of Q ranged form 2.0 for Li-like up to 0.4 for F-like. We found that the values of Q along an isoelectronic sequence for different ions of Na, Mg, Al, and Si were usually quite similar. For a given spectrum, the value of Q is lower for lines from higher-lying upper levels, by a factor of about 1.25 on average for higher quality data and 1.35 for intercombination data; on average, quality factors for forbidden spectra were found to be comparable to the corresponding spin-allowed spectra (lower-

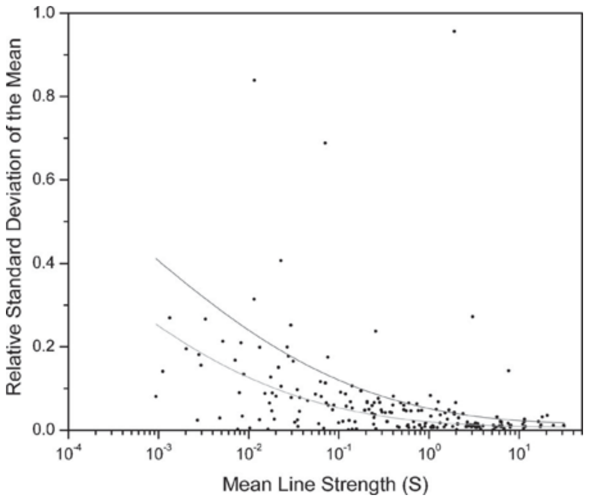

FIG. 2. Relative standard deviation of the mean (RSDM) vs the line strength for the transitions in Na III for which the energy of the upper level is *greater* than 415 000 cm^{-1} and which have values listed in both Refs. 90 (MCHF) and 57 [configuration interaction (CI)]. Because there are two data sources, the RSDM for each transition is given by Eq. (4). The two curves correspond to different values of the $S_{1/2}$ and γ parameters in Eq. (5); 50% of the points in the figure lie under the lower curve, and 90% lie under the upper curve. For these curves, the parameters in Eq. (5) were empirically found to be $\beta=3$ (both curves) and $S_{1/2}=3\times10^{-4}$, and $\gamma=0.01$ for the (upper) 90% envelope curve. Above energies of 415 000 cm^{-1}, same J and parity energy levels are more closely spaced and level "mixing" becomes increasingly significant. Still, the agreement of the MCHF data with the CI data is considerably better than it is with the OP, as seen in Fig. 3.

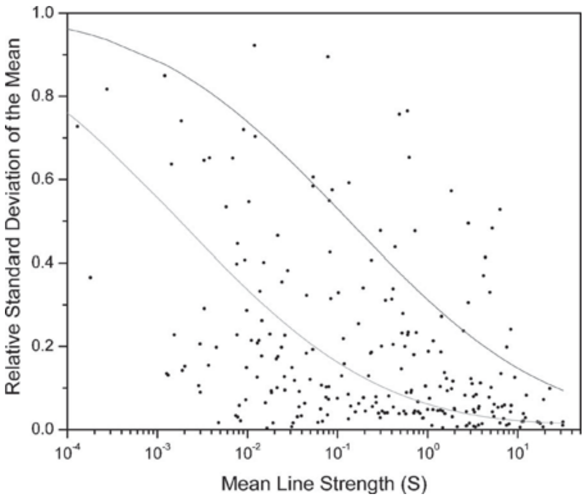

FIG. 3. Relative standard deviation of the mean (RSDM) vs the line strength for the transitions in Na III for which the energy of the upper level is *greater* than 415 000 cm^{-1}. Opacity Project data is included. and which have values listed in both Refs. 90 (MCHF) and 16 [Opacity Project (OP)]. Because there are two data sources, the RSDM for each transition is given by Eq. (4). The two curves correspond to different values of the $S_{1/2}$ and γ parameters in Eq. (5); 50% of the points in the figure lie under the lower curve, and 90% lie under the upper curve. For these curves, the parameters in Eq. (5) were empirically found to be $\beta=2.5$ (both curves) and $S_{1/2}=0.1$, and $\gamma=0.02$ for the (upper) 90% envelope curve. The agreement of the OP data with the MCHF data is considerably poorer than is the configuration interaction data seen in Fig. 2.

lying levels). We often use this quality factor to scale the pooling fit parameters from the lower-lying data to the higher-lying values in the many cases where these latter values are only available from a single accurate source.

Pooling RSDM's of different transitions can offer a significant advantage when the number of different sources for a given transition is small (almost always the case here), and the number of transitions with comparable relative uncertainty is significantly larger than this. Generally speaking, transition rates within a given spectrum are ideally suited to such a treatment because the number of determinations per transition is typically small, but the number of transitions with two or more determinations is usually comparatively large.

The large uncertainty in the SD associated with small sample sizes can be mitigated in favorable cases by pooling of RSDM's of different quantities with comparable relative uncertainties, thereby effectively increasing the number of degrees of freedom. A further advantage of pooling is related to the contributions of nonrandom or systematic errors. The approximations made in computations result in systematic errors. Fortunately, different theoretical approximations often result in qualitatively different errors for different transitions. In such cases, by considering different transitions together we better span the range of errors caused by the approximations. We do not rely on any particular distribution for random or other types of variables.

Also, our heuristic method exploits the fact that we consider here only quantities that are necessarily positive. This constraint offers a particular advantage when estimating *relative* uncertainties, in which case the mean value appears in the denominator. Even when $\bar{x}$ is positive, the proportion of negative random values in the corresponding random distribution can significantly skew the uncertainty estimate unless $s/\bar{x}$ is small. The effect of this can be particularly important when N is small. Quantitative aspects of this are presented in the final portion of Appendix A. Our pooling method also provides a straightforward vehicle for interpolating the estimated relative uncertainty in the many cases where only a single value is available for a given transition rate ($N=1$). Our procedure for doing so is described in Sec. 4.3.

In our experience, plotting the RSDM's of the different transitions vs the value of the line strength usually appears to work quite well in modeling the global dependence of relative uncertainties within a spectrum (or part of it). On average, the relative uncertainty increases monotonically with decreasing line strength. However, this averaging is itself an approximation, for the uncertainties of individual transitions will deviate to varying extents from the average curve. Uncertainties tend to be larger when there is a significant degree of admixture of different basis states, particularly when this leads to substantial cancellation in the radial matrix element between the different components. This cancellation results in a smaller line strength, so that the greater uncertainty associated with it will be accounted for to some extent by modeling the general dependence on line strength. If the relative uncertainty associated with any given partial "cancellation" is substantially greater than the average line strength dependence represented by the pooled curve, this should show up in a RSDM plot as an outlier. We assign lower accuracies to rates of transitions involving a highly mixed level. Such mixing is usually negligible for transitions associated with lower-lying levels; we usually place these transitions in a separate pooling category. Of course, there are many levels for which the mixing coefficients are unknown, especially for more highly ionized ions.

We note that our estimates of uncertainty will be least reliable when the true transition rate is significantly smaller than computed. In this case, the actual uncertainty will likely be higher than predicted by pooling when only one data source is available. For such cases, reasonable estimates of uncertainty can prove elusive for some theoretical measures as well. For example, in special cases in Be I, extremely large uncertainties in oscillator strength due to strong cancellation were not reflected in the length-velocity difference[122] (see the discussion of length vs velocity forms below).

In pooling, it is possible to overestimate the uncertainty of any given transition with a RSDM well below the 90% envelope curve. As described in Sec. 4.3 below, we try to minimize this by checking whether any such trend occurs systematically for similar transitions.

In this compilation we have only attempted to estimate the relative uncertainties of the line strengths. These do not depend explicitly on energy differences between the upper and lower levels, in contrast to the oscillator strength and transition probability, which depend on this difference to the first and third powers, respectively. We use experimental energies to convert line strength to the other two transition rates. Even for the line strength, however, there is an implicit dependence on energy, because of course an eigenfunction depends on its eigenvalue. Generally speaking, the relative uncertainty in the computed energy is far less than that for the line strength. Exceptions can occur, however, especially when "interacting" levels are closely spaced. For example, the percentage error in the energy separation of L_1S_1J and L_2S_2J is equal to the error in the wave function due to this mixing of terms. In our critical evaluation of the line strengths, we attempt to estimate the net uncertainty due to all sources of error, without considering these errors explicitly. This can only be accomplished successfully if the different data sources are independent. While MCHF and CI methods are quite different approaches, they are both variational. Therefore they may not be fully independent and may be particularly sensitive to how well the energy has been calculated. Our working assumption is that by comparing different methods for many different transitions in comparable parts of a spectrum, the net relative uncertainties can still be reasonably estimated.

4.2. Restriction to Data from Certain Authors

Only the data sources rated most highly in our evaluation procedure are used in obtaining the cited average for each transition probability. Assigned weights are either zero or one. It is "nonstandard" statistical methodology to utilize a subset of data for the reported mean (in this case for a specific transition rate) while a larger set is sometimes used for the uncertainty estimate. This introduces a type of bias, but in our case we often wish to deliberately exert such a bias, based on our experience with a wide range of comparison of many transitions over many spectra. As a practical matter it is not often that we have the luxury of deciding which of several available sources we will average. For most reported transitions, particularly those involving more highly excited levels, we have only one data source, and we must estimate its uncertainty based on the relative uncertainties of those other transitions for which multiple authors are available.

If one approach, theoretical or experimental, appears to be clearly better than all others, we have reported only that value of the transition rate. However, to estimate uncertainties, if no other options were available, we have used isoelectronic scaling or compared these values with less accurate data sources. In such cases the cited uncertainties may be overly conservative, but improved accuracy estimates can only be fully justified if a second (or more) independent calculation of equal or superior quality is made available.

This compilation is intended to serve as a table of *reference* data. We have limited the multiplet entries to those that contain at least one transition with pooled RSDM less than 0.50. If any line of a multiplet satisfies this criterion, we keep all the lines of the multiplet. This is responsible for much of the variation in the number of transitions per spectrum. For example, comparatively few transitions of Ne-like spectra had sufficiently small estimated relative uncertainties to satisfy the above criterion.

4.3. Evaluation Procedure

Because the details of our evaluation procedure differ from those of Wiese *et al.*,[125,126] we describe them here in some detail. It entails six steps:

(1) For spin-allowed E1 lines, we use the OP data to generate a multiplet list that is comprehensive for our purposes. We apply LS-coupling rules given above [Eq. (1)] to estimate the transition rates of the individual lines making up each multiplet. We compute a line strength (not explicitly energy dependent) from the OP oscillator strengths and energies. From these line strengths we compute oscillator strengths and transition probabilities using NIST AEL (Refs. 60 and 61) energies (see discussion in Sec. 3.7). We replace the OP published energies with NIST AEL energies and derive wavelengths from the latter.

(2) Collecting data from sources in the ATP bibliography on the NIST physics Web site,[70] we generate tables containing data from all published sources which use advanced experimental or theoretical techniques. Each row consists of data for a given transition (or multiplet average) which includes the lower and upper statistical weights and energies (with their percentage compositions if available) from the NIST AEL tables. We also list the derived wavelength and the published transition rate (transition probability, oscillator strength, or line strength).

(3) For all available lines, we plot the logarithms of the ratios of line strengths from each data source vs the mean value of these sources. Based on the scatter in this plot and our experience with other spectra, we choose those sources with the highest quality data to be included in further analysis. We assign "averaging" ratings to the chosen sources that will be used to obtain a *reported value* for the cited line strength. To arrive at the cited line strength, we average only those sources with the highest rating for that transition.

(4) We take four steps to estimate the *relative uncertainty* of the transition rate for each transition (or, strictly speaking, the 90% upper confidence bound for the RSDM):

  (a) Using the sources selected in (3) above, we plot the relative standard deviation of the mean (RSDM) for each transition vs the mean line strength. Next we construct the envelope curve which will estimate pooled values of upper confidence bounds. The two parameters β and $S_{1/2}$ of the envelope function in Eq. (5) a correspond roughly to the slope and intercept (at RSDM=0.5) of the envelope curve, respectively. To derive the lower curve (see Fig. 2, for example), we choose a starting value for β and then iteratively derive the value of the $S_{1/2}$ parameter for the envelope function to construct a curve under which lie 50% of the RSDM's. We observe the resulting curve to see if it follows the sweep of the data on the plot. If it does not, we change the value of β and rederive the corresponding value of $S_{1/2}$; we continue this process until a satisfactory fit is obtained. To arrive at the 90% curve, we start with the same slope parameter β determined for the 50% curve. Using these values, we iteratively find the intercept $S_{1/2}$ that yields the envelope curve under which lie 90% of the RSDM's for the different transitions (see the upper curve in Fig. 2, for example). If the RSDM points show signs of flattening out at large S, we add the asymptotic value γ by applying Eq. (5b), which then requires some adjustment in $S_{1/2}$. The resulting curve represents the locus of values for the 90% upper confidence bound (UCB), as discussed in Appendix A.

  As an *a posteriori* check, we order the transitions according to their "normalized" RSDM values, i.e., the individual transition RSDM divided by the pooled RSDM for its line strength. We check to see if any subset of these data has systematically lower or higher values than the other data. Except for the simpler spectra such as alkalilike or alkaline-earth-like, we generally find that there are two such subsets, with the more accurate data corresponding to those upper levels of the transition which have lower energies, as discussed above. In the case of carbonlike spectra, we found it worthwhile to divide the data into three upper energy groups. Also, we generally performed separate analyses with and without OP data, the latter being more extensive than some of the other more accurate data sources, and frequently the only data source for higher-lying transitions.

  (b) For the RSDM's that lie outside the 90% envelope curve, we assign this value of relative uncertainty, rather than the pooled value given by the curve. In cases where $N=1$, we use the fit-curve parameters to interpolate the pooled 90% RSDM based on the line strength for that transition. We multiply this UCB by $\sqrt{2}$, owing to the $\sqrt{N}$ dependence of the RSDM and the fact that the large majority of pooled transitions (all of which has $N>1$ independent determinations) have $N=2$. We also check that transitions with $N>2$ (more than two quality data sources) do not have systematically lower RSDM's than cases for $N=2$. Strictly speaking, only RSDM's corresponding to the same N should be pooled, but we seldom find a discernible N dependence in the data.

  (c) For comparison, we make a second estimate of the relative uncertainty that does not involve pooling different transition rates. In this case we apply classical methods to each transition separately. If two or more A-category sources are used in averaging the reported value, the accuracy is estimated by calculating the 90% ($\alpha=0.1$) upper confidence bound ($\mathrm{USB}_{\bar{x}}$) for the sample mean [Eq. (A2) in Appendix A], which we then divide by the mean. (See the discussion in Appendix A; the latter part explains why we do not use the "normal" method for estimating relative uncertainties.) For B and C category lines [as discussed in step (4) above], we only use the calculated $\mathrm{USB}_{\bar{x}}$ value when it is systematically lower than the pooled value within a multiplet. When $N=2$, we usually find that the uncertainty estimated by pooling is lower than the classical estimate (higher accuracy).

  (d) We assign a letter-grade "accuracy" for each transition rate. In Table 1 below we list our assigned correspondence between the estimated 90% RSDM [as determined by (a), (b), or (c) above] and the published letter indicating the accuracy (Acc):

TABLE 1. Correspondence between accuracy and estimated relative uncertainty

Acc	Relative uncertainty of mean line strength at 90% confidence level[a]
AA	⩽0.001
A+	⩽0.01
A	⩽0.03
B+	⩽0.06
B	⩽0.10
C+	⩽0.15
C	⩽0.25
D+	⩽0.30

TABLE 1. Correspondence between accuracy and estimated relative uncertainty—Continued

Acc	Relative uncertainty of mean line strength at 90% confidence level[a]
D	$\leqslant 0.50$[b]
E+	$\leqslant 0.70$
E	$\leqslant 1$

[a] There is a 90% probability that the relative standard deviation of the mean *line strength* is equal to or better than the cited value. Uncertainties in oscillator strengths and transition probabilities may be somewhat higher when the uncertainty in the transition wavelength is significant; see Table 2 for the wavelength dependence of these quantities.

[b] To be compiled; a multiplet must have at least one line with an accuracy of D or better.

(5) We order the multiplets, keeping only those in which at least one fine-structure transition has a 90% RSDM less than 0.5. The ordering is made according to the following priority list (first items listed have highest priority; the lowest value of each factor, such as configuration sequence, is listed first).

(a) Ordering of multiplets: configuration sequence of lower level, following the sequence in the NIST AEL listings; configuration sequence of the upper level, term sequence for these configurations, respectively; the multiplicity of the upper level.

(b) Ordering of lines within multiplets: the LS-coupling line strength factors (discussed next) and (operative only if these are the same) the AEL sequence number for the lower and upper levels, respectively. The two LS-coupling factors are determined by the following rules for LS multiplets. A: The transitions with the largest J's are the strongest. B: When $\Delta L = \pm 1$, the strongest lines have $\Delta J = 1$, weaker are $\Delta J = 0$, and $\Delta J = -1$ are quite weak; when $\Delta L = 0$, the $\Delta J = 0$ lines are stronger than the $\Delta J = \pm 1$.

For the allowed lines, we merge the different groups whose relative uncertainties have been evaluated separately, including the group of intercombination lines. Finally we assign sequential multiplet numbers and generate a wavelength finding list.

5. Arrangement of the Tables

In order to facilitate finding lines by wavelength in each spectrum, we first provide a finding-list table ordered by increasing wavelengths with their corresponding multiplet number.

We have maintained essentially the same setup of the earlier critical compilations of atomic transition probabilities, since a sampling of a large number of users indicated preference for this format. In addition to the spectroscopic information given for each spectral line, we list the transition probability for spontaneous emission A_{ki} and several equivalent expressions, the estimated accuracy and citations to the sources from which the transition rate was derived.

As described above in step (5) in Sec. 4.3, the main tables are grouped according to multiplets and ordered according to the published sequence of their energy levels. We first cite the multiplet "No," which is an arbitrary sequence number unique to the table. Provided at least one transition in a multiplet has an estimated accuracy of D or better, we list all individual lines within each multiplet unless the transition rate or energy level data were unavailable. We first list the principle configuration for the lower and upper levels, and then the terms in the most apt coupling scheme.

We present two wavelength columns. The first "λ" column lists air wavelengths for lines in the near ultraviolet, visible and near infrared spectra ($2000\ \text{Å} < \lambda < 20000\ \text{Å}$); the index of refraction was computed from the formula given in Peck and Reeder.[77] The second gives the vacuum wavelength. Wavelengths are derived from the most recent NIST AEL energy level data. A "cm^{-1}" in this column indicates that a vacuum wavenumber (i.e., in cm^{-1}) rather than a wavelength is listed; this is done for infrared lines above 20000 Å. Square brackets around a wavelength indicate that the energy of either the upper or lower level used to deduce the wavelength is uncertain to an unknown degree because of the following: (a) The energy of one transition level has a value which is not well known with respect to the other level of the transition. For example, the absolute energy scale for excited ^4P levels is sometimes not experimentally established with respect to the ^2P levels. In this case wavelengths of the associated intercombination lines will be in brackets. (b) The assignment of one or both of the transition levels is uncertain. (c) The energy of one or both of the levels was calculated *ab initio* and its accuracy is uncertain.

Next we list the lower and upper energies and statistical weights ($g = 2J + 1$, where J is the quantum number for the total orbital angular momentum). We have expressed the atomic transition rates in four different ways because different user communities have different preferences. Thus, in addition to the transition probability for spontaneous emission A_{ki}, we present the (absorption) oscillator strength f_{ik} as well as the line strength S and $\log g_i f_{ik}$. The conversion factors between the tabulated quantities A_{ki}, f_{ik}, and S are listed in Table 2 (which is derived from a table in Shore and Menzel[21]), applying the current values of the fundamental constants.[67] For the numerical conversions between different transition rates, we have used the vacuum wavelengths listed in the tables, which are usually derived from experimental energies.

The material for each spectrum is subdivided into a main table for allowed (electric dipole or E1) transitions and a smaller separate table for forbidden lines. Electric dipole intercombination (intersystem) lines are forbidden only in pure LS coupling and are listed under allowed transitions. Forbidden lines include magnetic dipole (M1), electric quadrupole (E2), and magnetic quadrupole (M2) transitions. For these, the columns containing f and $\log gf$ are omitted since the oscillator strength is rarely utilized for forbidden lines. When both M1 and E2 transitions occur at the same wavelength, the total line strengths can be obtained by adding the magnetic dipole and electric quadrupole line strengths. Most authors who have carried out recent calculations for S and A_{ki} for E2 transitions follow a definition for S(E2) given by Cowan[18] and others. Since this appears to now be the preferred definition, we follow this convention. This is reflected in the change of the conversion factor from that given in an earlier NIST compilation.[125,126]

The accuracy in the "Acc" column has the following meaning (as stated above): There is a 90% probability that the RSDM line strength is equal to or better than the value cited. The basis for this is discussed in Sec. 4 above and in Appendix A. Roughly speaking, it is also indicative of the relative uncertainty of the mean. The cited "letter" accuracy can be put on an absolute scale via Table 1 above. Uncertainties for oscillator strengths and especially for transition probabilities can be higher due to uncertainties in the wavelength. Table 2 shows the wavelength dependence of these quantities, which increases for higher multipole transitions. Typically such uncertainties are significant only for wavelengths upwards of 10 000 Å.

"LS" in the "Source" column indicates that the line data have been approximated by applying LS-coupling fractions [using either Eq. (1) or the listed values in Allen[1]] to a published multiplet value. LS is used in those special cases where one level in a transition is not designated in LS coupling, but it has a "unique J," such that there is no other level with the same J and configuration with which it can mix via relativistic interactions.

Multiplet averages are given only if all the E1 fine-structure members of the multiplet are listed. For the energy levels, the multiplet g value (lower and upper levels) is the sum of g's for the unique levels involved in the transition (i.e., each level is counted only once). The cited energy is the g-weighted average of each of the unique levels in the multiplet. The multiplet wavelength is determined from these energies. The multiplet line strength is the sum of the individual fine-structure line strengths. The oscillator strength and transition probability are derived from the line strength according to Table 2.

TABLE 2. Conversion factors for transition rates

$$g_if_{ik}=(R_\infty/2\pi\alpha^3\mathrm{c})(g_kA_{ki}/\sigma^2)=1.499\,193\,8\times10^{-16}g_kA_{ki}\lambda^2;\quad g_if_{ik}=-g_kf_{ki}$$

Type	g_if_{ik}	g_kA_{ki}	Parity change?	Selection rules
E1	$\frac{1}{3\alpha}\left(\frac{\alpha\sigma}{R_\infty}\right)S_{\mathrm{E}}^{(1)}$ $303.755\,68\ S/\lambda$	$\frac{2}{3}\alpha\pi c\sigma\left(\frac{\alpha\sigma}{R_\infty}\right)^2 S_{\mathrm{E}}^{(1)}$ $2.026\,126\,9\times10^{18}\ S/\lambda^3$	Yes	$\Delta J=0,\pm1$ (no $0\leftrightarrow0$); $\Delta M=0,\pm1$ (no $0\leftrightarrow0$ if $\Delta J=0$)
M1	$\frac{\alpha}{12}\left(\frac{\alpha\sigma}{R_\infty}\right)S_{\mathrm{M}}^{(1)}$ $4.043\,850\,4\times10^{-3}\ S/\lambda$	$\frac{1}{6}\alpha^3\pi c\sigma\left(\frac{\alpha\sigma}{R_\infty}\right)^2 S_{\mathrm{M}}^{(1)}$ $2.697\,350\,0\times10^{13}\ S/\lambda^3$	No	Same as E1
E2	$\frac{1}{240\alpha}\left(\frac{\alpha\sigma}{R_\infty}\right)^3 S_{\mathrm{E}}^{(2)}$ $167.902\,21\ S/\lambda^3$	$\frac{1}{120}\alpha\pi c\sigma\left(\frac{\alpha\sigma}{R_\infty}\right)^4 S_{\mathrm{E}}^{(2)}$ $1.119\,950\,0\times10^{18}\ S/\lambda^5$	No	$\Delta J=0,\pm1,\pm2$ (no $0\leftrightarrow0$, $0\leftrightarrow1$, or $1/2\leftrightarrow1/2$); $\Delta M=0,\pm1,\pm2$
M2	$\frac{\alpha}{960}\left(\frac{\alpha\sigma}{R_\infty}\right)^3 S_{\mathrm{M}}^{(2)}$ $2.235\,255\,0\times10^{-3}\ S/\lambda^3$	$\frac{1}{480}\alpha^3\pi c\sigma\left(\frac{\alpha\sigma}{R_\infty}\right)^4 S_{\mathrm{M}}^{(2)}$ $1.490\,971\,4\times10^{13}\ S/\lambda^5$	Yes	Same as E2
E3	$\frac{1}{37\,800\alpha}\left(\frac{\alpha\sigma}{R_\infty}\right)^5 S_{\mathrm{E}}^{(3)}$ $47.140\,897\ S/\lambda^5$	$\frac{1}{18\,900}\alpha\pi c\sigma\left(\frac{\alpha\sigma}{R_\infty}\right)^6 S_{\mathrm{E}}^{(3)}$ $3.144\,416\,5\times10^{17}\ S/\lambda^7$	Yes	

[a] A_{ki} is the emission transition probability, f_{ik} is the absorption oscillator strength, and g is the statistical weight. R_∞ is the Rydberg constant, α is the fine-structure constant, c is the speed of light, and σ is the energy difference between the upper (k) and lower (i) levels of the transition (R_∞ and σ are in cm^{-1}; c is in cm/s). The line strength $S_{E,M}^{k}$ is the absolute square of the reduced matrix element of the k^{th} multipolar electric and magnetic operator, respectively. The numerical values are based on the 2002 CODATA recommended values of fundamental constants, with the line strength in a.u. and λ the vacuum wavelength in Ångströms.

6. Acknowledgments and Future Plans

It is a pleasure to acknowledge the assistance and cooperation of many colleagues in this field. We would especially like to acknowledge the support and valuable suggestions of W. L. Wiese, as well as his critical reading of the manuscripts. We thank Y. Ralchenko for checking the manuscript and for his extensive help with the ASCII-to-LATEX conversion code, and Donald Morton of the Herzberg Institute of Astrophysics for many valuable suggestions and corrections. Also, in some cases different authors have provided us with the results of their calculations prior to publication, as indicated in the references. Our colleagues from the NIST Atomic Energy Levels Data Center, W. C. Martin and A. Musgrove, have generously furnished us new data and advice on energy levels and wavelengths. Partial support for this work was provided by the NASA Office of Space Sciences, Grant No. W-10,215. We plan to continue this critical compilation work with analogous tables for the elements aluminum through calcium.

7. Appendix A: Classical Statistical Considerations

Uncertainty in the mean. The probability density of random variables follows a normal distribution with mean μ and variance σ^2. The population standard deviation σ is the $1/e$ half-width of the distribution, and as such gives a measure of the spread of possible values of a random variable about the mean. The standard normal distribution represents the probability density as a function of $z=(x-\mu)/\sigma$, i.e., the deviation of an individual observation x from the mean in units of σ. The probability $\Pr(a \leqslant z \leqslant b)$ is the area under the probability density curve between a and b. The standard normal distribution, $\Pr(z_\alpha < z < \infty)$, has a "tail" of area α corresponding to a $100(1-\alpha)$ percentile. This defines the "critical value" z_α. The "one-sided" UCB for the mean value of N normally distributed determinations of a variable is given by the following expression:

$$\mathrm{UCB}_\mu = \frac{\sigma z_{\alpha,N-1}}{\sqrt{N}}. \tag{A1}$$

The "confidence interval" for the mean is given by $(\mu - \sigma z_{\alpha/2,N-1}/\sqrt{N},\ \mu + \sigma z_{\alpha/2,N-1}/\sqrt{N})$. For example, integrating from between critical values $z=\pm 1.96$ yields 95% of the area under the normal density function (or 0.025 of each wing, $\alpha/2$). The value 1.96 is often rounded to 2, and this is the origin of the often-used expression "2-sigma" corresponding to a 95% confidence interval. We can be 95% confident that the mean value of N determinations will fall within the interval $\pm 2\sigma/\sqrt{N}$.

Unfortunately, we do not generally know the values of the mean and variance (μ and σ^2, respectively) of the population. For a finite sample size N of random variables, we can imagine that each determination represents a "sample" from the true distribution. In this way, both μ and σ are estimated by the sample mean $\bar{x}$ and sample standard deviation s, respectively. This introduces the added uncertainty of how well the mean and variance of the sample approximate that of the total population. For small sample sizes, the net uncertainties can be much larger than when the parameters of the population distribution are known. For random variables, $\bar{x}$ and s are statistically independent, so their joint probability density is just the product of both.

Integrating over all values of s/σ yields the Student's distribution, also known as the t distribution. It is a function of z, s, and N; it is broader than the corresponding normal distribution of ($\sigma=s$, except for $N=\infty$, in which case the two distributions are identical. The UCB for the mean of a random variable with a t distribution is

$$\mathrm{UCB}_{\bar{x}} = \frac{s t_{\alpha,N-1}}{\sqrt{N}}. \tag{A2}$$

For the t distribution, which is symmetric about $\mu=0$, the lower confidence bound has the same value with a negative sign. We can be $100(1-\alpha)\%$ confident that the mean of N observations will fall within the interval $(\bar{x} - s t_{\alpha/2,N-1}/\sqrt{N},\ \bar{x} + s t_{\alpha/2,N-1}/\sqrt{N})$. As mentioned in the general text, for a 95% confidence interval with $N=2$, $t_{97.5\%,N-1}=12.7$, vs 1.96 when $N=\infty$. This strong N dependence occurs only for the smallest values of N; for example, when $N=4$, $t_{97.5\%,N-1}=2.78$, relatively close to the $N=\infty$ value. Critical values for different "percentiles" of the t distribution are tabulated in most textbooks on statistics (see, for example, Devore[20]).

If systematic errors (nonrandom bias errors specific to a given determination) are significant, as is often the case, the appropriate statistical analysis can be less straightforward. For the theoretical data we are evaluating, the variation between computed values using different methods/approximations/models are due entirely to systematic errors. Assuming that the systematic errors are unknown, one approach is to treat the results of different independent methods as if they constitute a sample of randomly distributed systematic errors. When N is large (say, 30 or more) this treatment has a solid foundation, thanks to the central limit theorem. When systematic errors dominate, the effective sample size N is the number of independent determinations under consideration. Unfortunately, this number of independent determinations is often small. On the other hand, the t distribution is notoriously robust to deviations from nonrandom variations. Thus, even in the absence of true randomness, one could still estimate confidence intervals by using the critical value for the appropriate t distribution. However, as discussed above, a high penalty is incurred for small N, especially when $N=2$ or 3. In the case of ATP data, N is 1 or 2 for most transitions. For this reason we usually pool the RSDM's of different transitions which have comparable relative uncertainty, as described in Sec. 4 of the main text. When $N \geqslant 2$ for a given transition, we also compare the pooled result with the relative uncertainty estimate obtained using classical methods. This latter method is summarized in the following paragraphs, which considers a more specialized topic than we have thus far: The coefficient of variation.

Uncertainty in the relative standard deviation (coefficient of variation). A natural measure of relative uncertainty intrinsic to a given population is the "coefficient of variation,"

$$K = \frac{s}{\bar{x}}. \tag{A3}$$

K^{-1} follows the "noncentral t distribution" with noncentrality parameter RSDM^{-1} (i.e., $\sqrt{N}/K$). Such distributions are asymmetric and thus the magnitudes of critical values of the 0.95 vs 0.05 confidence levels are different, and both are positive. In our case, we are interested in the upper bound to the uncertainty in the mean of the relative SD, not to the uncertainty in its coefficient of variation. Therefore we consider the UCB at 0.90 rather than the confidence interval between 0.05 and 0.95 for the coefficient of variation. The critical value depends nonlinearly on the value of the coefficient of variation. A simple analytical approximation for the confidence intervals of the coefficient of variation has been published.[115] From this we can write an approximate expression for the UCB of the RSDM as

$$\mathrm{UCB}_K = \frac{K K^U_{N-1,\alpha,\kappa}}{\sqrt{N}}, \tag{A4}$$

where

$$K^U_{N-1,\alpha,\kappa} = \left[\frac{\chi^2_{N-1,1-\alpha}}{N-1} + K^2 \left(\frac{\chi^2_{N-1,1-\alpha} + 2}{N} - 1 \right) \right]^{-1/2}, \tag{A5}$$

$100(1-\alpha)$ is the specified percentile (confidence level) (e.g., ($\alpha=0.10$ for a 90% UCB) and $\chi^2_{N-1,1-\alpha}$ is the critical value of the corresponding χ^2 distribution (tables of which are published in many textbooks on statistics (see, for example, Devore[20]). In our notation we have accounted for the fact that Vangel's[115] definition of α is the complement, $1-\alpha$, of that used above and in the tables we have cited.[35] The first term in the above expansion is just the standard bound one would obtain due to random variation in the sample SD alone. The above versatile approximation is least accurate for small N and large K, but in most cases (except $N=1,2$) it is entirely adequate. Precise results can be obtained via Verrill.[117] As with the t distribution, UCB's are large for very small N. For the coefficient of variation, they can be prohibitively large, as discussed below.

As mentioned in the main text, when $N \geqslant 2$ we make the classical estimate of the upper bound for the RSDM and compare this value with the pooled estimate. In actual practice, we make this estimate by using the first term in Eq. (A2) (and subsequently dividing this result by the mean), rather than the full expression discussed in the previous paragraph. This first term is just the random-variable one-sided UCB for population SD, and the corresponding UCB to the population RSDM is

$$\mathrm{UCB}_{\mathrm{RSDM}} = \mathrm{RSDM} \sqrt{\frac{N-1}{\chi^2_{N-1,1-\alpha}}}, \tag{A6}$$

where the RSDM is the relative SD of the sample mean, as given by Eq. (2). In our case we use $\alpha=0.10$. Roughly speaking, if two or more members of a multiplet (except for singlets) have UCB's which are lower than the pooled RSDM, then we use the UCB as the estimated 90% confidence bound in those cases.

For random variables, the method of noncentral t distributions is generally appropriate for relative uncertainties. Here, however, we limit the discussion to physical quantities that can only be positive. Even when the mean is positive, random distributions allow a finite probability of negative values, increasingly so as σ/μ increases. Because the coefficient of variation involves division by the mean, UCB's can be skewed compared to a population of positive values. This is particularly the case when the confidence interval for the mean μ spans the value zero. For larger K and smaller N, this can be a large effect. If the RSDM$>(t_{\alpha,N-1})^{-1}$, the UCB diverges. For example, when $N=2$, the normal UCB diverges for RSDM>0.0784 for the 97.5% confidence level ($\alpha=0.025$); for other confidence levels it is inversely proportional to α to a close approximation. This problem highlights another advantage of using a distribution-free method to estimate relative uncertainties for small sample sizes. Finally we note that while Bayesian statistical methods (as opposed to the above classical methods) can readily accommodate constraints such as restriction to positive values, applying such methods to the extremely small N problem is generally impracticable.

As described in Sec. 4 of the main text above, we obtain the large majority of our estimates of relative uncertainties by graphically pooling the RSDM's of different quantities. This heuristic method does not rely on distributions.

8. Appendix B: Computing the Error Function

The error function is defined as

$$\mathrm{erf}(z) = \frac{2}{\sqrt{\pi}} \int_0^z e^{-t^2} dt.$$

An efficient numerical recipe for it, accurate to 1.5×10^{-7}, is given by Hastings:[43]

$$\mathrm{erf}(z) = 1 - p \exp(-z^2),$$

where

$$\begin{aligned} p = f(&0.254\,829\,592 + f\{-0.284\,496\,736 \\ &+ f[1.421\,413\,742 + f(-1.453\,152\,027 \\ &+ f1.061\,405\,429)]\}) \end{aligned}$$

and

$$f = \frac{1}{1 + 0.327\,591\,1|z|}.$$

Also, if $z<0$, $\mathrm{erf}(z) = -\mathrm{erf}(z)$.

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10. Na

10.1. Na I

Ground state: $1s^22s^22p^63s\ ^2S_{1/2}$
Ionization energy: 5.139 07 eV = 41 449.4 cm^{-1}

10.1.1. Allowed Transitions for Na I

We have included extensive results from OP,[104] which we found to be accurate for Na-like spectra because spin-orbit interactions are generally unimportant for low-Z alkalilike spectra. Froese Fischer[34] has generated many of the other compiled transition rates, which are the product of nonorthogonal spline CI computations.

The $3s$-$3p$ resonance lines of Na I, also known as the sodium D lines, have received special experimental attention. Two very precise determinations[48,120] of the lifetime have been made via molecular spectroscopy of the Na_2 C_3 coefficient of the long-range O_g^- state. A third precise determination by Oates *et al.*[72] was made from the broadening associated with the radiative decay of the $P_{3/2}$ state of the transition. These values are in excellent agreement.

Filippov and Prokof'ev[28] measured relative multiplet oscillator strengths using the anomalous dispersion method. Morton[68] normalized these values using precisely known lifetimes of the D lines, split according to LS coupling. We use his values to normalize the oscillator strengths in Filippov and Prokof'ev.[28] An "n" in the reference list of the following table indicates relative values that have been independently normalized.

To estimate accuracies, we pooled the relative standard deviation of the mean (RSDM) for each of the lines with transition rates published in two or more references,[28,34,48,68,72,104,120] as described in the general introduction. For this purpose we divided the data into groups with and without OP results. We also used the results of Siegel *et al.*[84] for comparison purposes; these authors employed a single configuration Dirac-Fock method with a core-polarization model. Good agreement was generally found among the different sources including OP ($<10\%$ RSDM for $S>0.01$).

The results of Froese Fischer[34] are considerably more extensive than the values in Froese Fischer,[33] and thus we have chosen to use them in the averaging for transition rates.

10.1.2. References for Allowed Transitions for Na I

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TABLE 3. Wavelength finding list for allowed lines for Na I

Wavelength (air) (Å)	Mult. No.	Wavelength (air) (Å)	Mult. No.	Wavelength (air) (Å)	Mult. No.	Wavelength (air) (Å)	Mult. No.
2490.713	8	4978.541	14	9 872.91	36	12 679.14	31
2490.727	8	4982.808	14	9 873.39	36	12 679.22	31
2512.134	7	4982.813	14	9 961.26	35	12 907.94	43
2512.155	7	5148.838	13	9 961.31	35	12 917.26	43
2543.841	6	5153.402	13	10 289.18	49	14 767.48	42
2543.872	6	5682.633	12	10 295.11	49	14 779.69	42
2593.869	5	5688.193	12	10 566.02	48	14 779.73	42
2593.919	5	5688.205	12	10 572.27	48	15 160.848	54
2680.341	4	5889.950	1	10 671.61	34	15 161.607	54
2680.433	4	5895.924	1	10 671.67	34	16 373.85	41
2852.811	3	6154.225	11	10 672.52	34	16 388.86	41
2853.012	3	6160.747	11	10 740.67	47	16 393.90	53
3302.369	2	7113.036	27	10 746.44	23	16 395.21	53
3302.978	2	7113.203	27	10 747.12	47	17 031.09	30
4341.489	21	7373.23	26	10 749.29	23	17 031.24	30
4344.734	21	7373.49	26	10 834.85	33	17 038.41	30
4390.023	20	7809.78	25	10 834.91	33	18 465.3	29
4393.340	20	7810.24	25	11 190.21	46	18 465.5	29
4419.884	19	8183.255	10	11 197.21	46	18 720.6	52
4423.247	19	8194.790	10	11 381.454	9	18 723.2	52
4494.180	18	8194.824	10	11 403.779	9	19 056.65	63
4497.657	18	8649.93	24	11 489.10	45	19 056.78	63
4541.633	17	8650.89	24	11 496.49	45	19 057.98	63
4545.184	17	9411.866	38	12 304.67	32	19 279.5	62
4664.811	16	9411.911	38	12 304.75	32	19 279.7	62
4668.557	16	9412.203	38	12 306.70	32	19 443.2	67
4668.559	16	9465.92	37	12 311.48	44		
4747.941	15	9465.96	37	12 319.96	44		
4751.822	15	9872.86	36	12 319.98	44		

TABLE 3. Wavelength finding list for allowed lines for Na I—Continued

Wavenumber (cm^{-1})	Mult. No.	Wavenumber (cm^{-1})	Mult. No.	Wavenumber (cm^{-1})	Mult. No.	Wavenumber (cm^{-1})	Mult. No.
4 942.89	76	2 792.70	100	1 407.553	108	593.55	121
4 940.42	76	2 758.056	87	1 407.54	108	562.19	130
4 750.11	61	2 758.036	87	1 407.21	108	561.96	130
4 750.07	61	2 757.706	87	1 363.04	82	554.35	137
4 749.58	61	2 748.88	57	1 363.02	82	554.02	137
4 688.32	75	2 748.84	57	1 346.90	107	533.23	120
4 685.85	75	2 747.55	57	1 346.89	107	528.89	101
4 660.25	60	2 697.41	86	1 332.24	68	528.14	101
4 660.21	60	2 697.39	86	1 329.77	68	519.72	124
4 614.01	66	2 686.95	99	1 329.62	90	494.12	55
4 534.47	74	2 685.66	99	1 329.61	90	494.08	55
4 532.59	22	2 671.05	92	1 328.91	112	491.61	55
4 532.00	74	2 508.92	56	1 286.8	102	476.90	136
4 527.00	22	2 508.88	56	1 286.31	102	476.57	136
4 281.78	40	2 449.85	64	1 188.52	116	430.35	126
4 276.19	40	2 449.83	64	1 187.77	116	429.86	126
4 276.15	40	2 432.38	98	1 150.84	123	428.33	126
4 160.55	73	2 431.09	98	1 099.74	28	427.58	113
4 158.08	73	2 278.53	97	1 099.69	28	365.49	131
4 096.93	51	2 277.24	97	1 094.10	28	356.15	133
4 095.64	51	2 262.09	85	1 090.95	94	330.33	118
3 992.20	59	2 262.07	85	1 089.66	94	329.84	118
3 992.16	59	2 261.58	85	1 089.65	94	295.83	135
3 991.41	59	2 172.23	84	1 034.67	115	295.50	135
3 928.13	72	2 172.21	84	1 033.92	115	276.50	125
3 925.66	72	2 168.31	78	924.99	77	276.01	125
3 851.06	58	2 167.56	78	923.70	77	261.46	139
3 851.02	58	2 143.28	91	911.58	106	260.86	81
3 800.35	65	1 996.39	69	911.57	106	260.84	81
3 800.34	65	1 993.92	69	911.08	106	259.55	81
3 422.19	80	1 993.90	69	893.26	122	254.64	140
3 421.86	80	1 964.51	110	826.30	119	219.96	129
3 346.89	71	1 964.50	110	825.97	119	219.63	129
3 344.42	71	1 904.61	96	821.72	105	212.03	142
3 344.41	71	1 903.32	96	821.71	105	211.79	142
3 315.02	89	1 842.17	50	801.14	111	188.79	134
3 315.00	89	1 839.70	50	791.96	128	188.46	134
3 057.44	88	1 782.766	103	791.47	128	153.77	138
3 057.42	88	1 782.436	103	715.72	93	153.67	104
2 971.66	70	1 706.93	109	714.43	93	153.66	104
2 969.19	70	1 672.19	95	984.92	127	153.54	138
2 933.69	39	1 670.90	95	684.43	127	152.91	104
2 928.10	39	1 504.18	83	660.75	114	134.57	141
2 926.22	79	1 503.41	83	660.00	114	134.34	141
2 925.73	79	1 443.009	117	623.07	132		
2 793.99	100	1 443.34	117	597.88	121		

TABLE 4. Transition probabilities of allowed lines for Na I (references for this table are as follows: 1=Taylor,[104] 2=Froese Fischer,[34] 3=Jones *et al.*,[48] 4=Oates *et al.*,[72] 5=Volz *et al.*,[120] 6=Filippov and Prokof'ev[28])

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})$^{\mathrm{a}}$	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
1	$3s-3p$	$^{2}\mathrm{S}-{}^{2}\mathrm{P}^{\circ}$	*5 891.94*	*5 893.57*	0.000–*16 967.64*	2–6	6.15−01	9.61−01	3.73+01	0.284	AA	3,4,5
			5 889.950	5 891.583	0.000–16 973.368	2–4	6.16−01	6.41−01	2.49+01	0.108	AA	3,4,5
			5 895.924	5 897.558	0.000–16 956.172	2–2	6.14−01	3.20−01	1.24+01	−0.194	AA	3,5
2	$3s-4p$	$^{2}\mathrm{S}-{}^{2}\mathrm{P}^{\circ}$	*3 302.57*	*3 303.52*	0.000–*30 270.7*	2–6	2.74−02	1.35−02	2.93−01	−1.569	A	2,6n
			3302.369	3 303.319	0.000–30 272.58	2–4	2.75−02	9.00−03	1.96−01	−1.745	A	2,6n
			3 302.978	3 303.929	0.000–30 266.99	2–2	2.73−02	4.46−03	9.71−02	−2.050	B+	2,6n
3	$3s-5p$	$^{2}\mathrm{S}-{}^{2}\mathrm{P}^{\circ}$	*2 852.88*	*2 853.72*	0.000–*35 042.0*	2–6	5.36−03	1.96−03	3.69−02	−2.407	B+	2,6n
			2 852.811	2 853.649	0.000–35 042.85	2–4	5.38−03	1.31−03	2.47−02	−2.582	B+	2,6n
			2 853.012	2 853.850	0.000–35 040.38	2–2	5.31−03	6.48−04	1.22−02	−2.887	B+	2,6n
4	$3s-6p$	$^{2}\mathrm{S}-{}^{2}\mathrm{P}^{\circ}$	*2 680.37*	*2 681.17*	0.000–*37 297.2*	2–6	1.83−03	5.93−04	1.05−02	−2.926	B+	2,6n
			2 680.341	2 681.137	0.000–37 297.61	2–4	1.84−03	3.98−04	7.02−03	−3.099	B+	2,6n
			2 680.433	*2 681.230*	0.000–37 296.32	2–2	1.81−03	1.96−04	3.45−03	−3.407	B	2,6n
5	$3s-7p$	$^{2}\mathrm{S}-{}^{2}\mathrm{P}^{\circ}$	*2 593.89*	*2 594.66*	0.000–*38 540.7*	2–6	8.07−04	2.44−04	4.18−03	−3.312	C+	2,6n
			2 593.869	2 594.644	0.000–38 540.93	2–4	8.13−04	1.64−04	2.80−03	−3.484	B	2,6n
			2 593.919	2 594.695	0.000–38 540.18	2–2	7.96−04	8.03−05	1.37−03	−3.794	C+	2,6n
6	$3s-8p$	$^{2}\mathrm{S}-{}^{2}\mathrm{P}^{\circ}$	*2 543.85*	*2 544.61*	0.000–*39 298.7*	2–6	4.42−04	1.29−04	2.16−03	−3.588	C+	2,6n
			2 543.841	2 544.604	0.000–39 298.84	2–4	4.46−04	8.65−05	1.45−03	−3.762	C+	2,6n
			2 543.872	2 544.636	0.000–39 298.35	2–2	4.35−04	4.22−05	7.08−04	−4.074	C+	2,6n
7	$3s-9p$	$^{2}\mathrm{S}-{}^{2}\mathrm{P}^{\circ}$	*2 512.14*	*2 512.90*	0.000–*39 794.70*	2–6	3.16−04	8.98−05	1.49−03	−3.746	C	2,6n
			2 512.134	2 512.891	0.000–39 794.810	2–4	3.20−04	6.05−05	1.00−03	−3.917	D+	2,6n
			2 512.155	*2 512.911*	0.000–39 794.480	2–2	3.10−04	2.93−05	4.86−04	−4.232	C	2,6n
8	$3s-10p$	$^{2}\mathrm{S}-{}^{2}\mathrm{P}^{\circ}$	*2 490.72*	*2 491.47*	0.000–*40 136.96*	2–6	1.89−04	5.28−05	8.66−04	−3.976	D+	6n
			2 490.713	2 491.464	0.000–40 137.039	2–4	1.89−04	3.52−05	5.77−04	−4.152	D+	6n
			2 490.727	2 491.479	0.000–40 136.805	2–2	1.89−04	1.76−05	2.89−04	−4.453	D+	6n
9	$3p-4s$	$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{S}$	*11 396.33*	*11 399.45*	*16 967.64*–25 739.991	6–2	2.64−01	1.71−01	3.86−01	0.011	A	2
			11 403.779	11 406.901	16 973.368–25 739.991	4–2	1.76−01	1.71−01	2.58−01	−0.165	A	2
			11 381.454	11 384.570	16 956.172–25 739.991	2–2	8.80−02	1.71−01	1.28−01	−0.466	A	2
10	$3p-3d$	$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{D}$	*8 190.96*	*8 193.22*	*16 967.64–29 172.86*	6–10	5.14−01	8.63−01	1.40+02	0.714	A+	2
			8 194.824	8 197.077	16 973.368–29 172.839	4–6	5.14−01	7.77−01	8.39+01	0.492	A+	2
			8 183.255	8 185.505	16 956.172–29 172.889	2–4	4.29−01	8.62−01	4.65+01	0.237	A+	2
			8 194.790	8 197.043	16 973.368–29 172.889	4–4	8.57−02	8.63−02	9.32+00	−0.462	A	2
11	$3p-5s$	$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{S}$	*6 158.57*	*6 160.28*	*16 967.64*–33 200.675	6–2	7.47−02	1.42−02	1.72+00	−1.070	A	2
			6 160.747	6 162.452	16 973.368–33 200.675	4–2	4.98−02	1.42−02	1.15+00	−1.246	A	2
			6 154.225	6 155.929	16 956.172–33 200.675	2–2	2.50−02	1.42−02	5.75+01	−1.547	A	2
12	$3p-4d$	$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{D}$	*5 686.35*	*5 687.92*	*16 967.64–34 548.75*	6–10	1.21−01	9.82−02	1.10−01	−0.230	A	2
			5 688.205	5 689.783	16 973.368–34 548.731	4–6	1.21−01	8.83−02	6.62+00	−0.452	A	2
			5 682.633	5 684.210	16 956.172–34 548.766	2–4	1.01−01	9.83−02	3.68+00	−0.706	A	2
			5 688.193	5 689.772	16 973.368–34 548.766	4–4	2.02−02	9.82−03	7.35−01	−1.406	A	2
13	$3p-6s$	$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{S}$	*5 151.88*	*5 153.32*	*16 967.64*–36 372.620	6–2	3.40−02	4.52−03	4.60−01	−1.567	B+	2
			5 153.402	5 154.838	16 973.368–36 372.620	4–2	2.27−02	4.52−03	3.06−01	−1.743	B+	2

TABLE 4. Transition probabilities of allowed lines for Na I (references for this table are as follows: 1=Taylor,[104] 2=Froese Fischer,[34] 3=Jones *et al.*,[48] 4=Oates *et al.*,[72] 5=Volz *et al.*,[120] 6=Filippov and Prokof'ev[28])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})$^{\mathrm{a}}$	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
			5 148.838	5 150.273	16 956.172–36 372.620	2–2	1.14−02	4.52−03	1.53−01	−2.044	B+	2
14	$3p-5d$	$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{D}$	*4 981.39*	*4 982.78*	*16 967.64–37 036.76*	6–10	4.89−02	3.04−02	2.99+00	−0.739	A	2
			4 982.813	4 984.204	16 973.368–37 036.754	4–6	4.88−02	2.73−02	1.79+00	−0.962	A	2
			4 978.541	4 979.930	16 956.172–37 036.774	2–4	4.09−02	3.04−02	9.98−01	−1.216	A	2
			4 982.808	4 984.199	16 973.368–37 036.774	4–4	8.15−03	3.03−03	1.99−01	−1.916	A	2
15	$3p-7s$	$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{S}$	*4 750.53*	*4 751.86*	*16 967.64*–38 012.044	6–2	1.85−02	2.09−03	1.96−01	−1.902	B	2
			4 751.822	4 753.151	16 973.368–38 012.044	4–2	1.23−02	2.09−03	1.31−01	−2.078	B	2
			4 747.941	4 749.269	16 956.172–38 012.044	2–2	6.19−03	2.09−03	6.55−02	−2.379	B	2
16	$3p-6d$	$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{D}$	*4 667.31*	*4 668.62*	*16 967.64–38 387.26*	6–10	2.49−02	1.36−02	1.25+00	−1.088	B+	2
			4 668.559	4 669.866	16 973.368–38 387.257	4–6	2.49−02	1.22−02	7.50−01	−1.312	A	2
			4 664.811	4 666.117	16 956.172–38 387.270	2–4	2.08−02	1.36−02	4.18−01	−1.565	B+	2
			4 668.557	4 669.864	16 973.368–38 387.270	4–4	4.14−03	1.36−03	8.33−02	−2.264	B+	2
17	$3p-8s$	$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{S}$	*4 544.00*	*4 545.27*	*16 967.64*–38 968.51	6–2	1.13−02	1.16−03	1.04−01	−2.157	B	2
			4 545.184	4 546.458	16 973.368–38 968.51	4–2	7.50−03	1.16−03	6.95−02	−2.333	B	2
			4 541.633	4 542.907	16 956.172–38 968.51	2–2	3.76−03	1.16−03	3.48−02	−2.635	B	2
18	$3p-7d$	$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{D}$	*4 496.50*	*4 497.77*	*16 967.64–39 200.9*	6–10	1.47−02	7.42−03	6.59−01	−1.351	B+	2
			4 497.657	4 498.919	16 973.368–39 200.93	4–6	1.46−02	6.67−03	3.95−01	−1.574	B+	2
			4 494.180	4 495.441	16 956.172–39 200.93	2–4	1.23−02	7.44−03	2.20−01	−1.827	B+	2
			4 497.657	4 498.919	16 973.368–39 200.93	4–4	2.44−03	7.41−04	4.39−02	−2.528	B	2
19	$3p-9s$	$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{S}$	*4 422.13*	*4 423.37*	*16 967.64*–39 574.85	6–2	8.43−03	8.24−04	7.20−02	−2.306	C+	2
			4 423.247	4 424.489	16 973.368–39 574.85	4–2	5.61−03	8.24−04	4.80−02	−2.482	C+	2
			4 419.884	4 421.125	16 956.172–39 574.85	2–2	2.82−03	8.25−04	2.40−02	−2.783	C+	2
20	$3p-8d$	$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{D}$	*4 392.23*	*4 393.47*	*16 967.64–39 728.7*	6–10	1.18−02	5.67−03	4.92−01	−1.468	B+	2
			4 393.340	4 394.574	16 973.368–39 728.70	4–6	1.17−02	5.09−03	2.95−01	−1.691	B+	2
			4 390.023	4 391.256	16 956.172–39 728.70	2–4	9.83−03	5.69−03	1.64−01	−1.944	B+	2
			4 393.340	4 394.574	16 973.368–39 728.70	4–4	1.95−03	5.66−04	3.28−02	−2.645	B	2
21	$3p-10s$	$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{S}$	*4 343.65*	*4 344.87*	*16 967.64*–39 983.27	6–2	9.76−03	9.20−04	7.90−02	−2.258	C+	2
			4 344.734	4 345.955	16 973.368–39 983.27	4–2	6.50−03	9.20−04	5.26−02	−2.434	C+	2
			4 341.489	4 342.710	16 956.172–39 983.27	2–2	3.26−03	9.22−04	2.63−02	−2.734	C+	2
22	$4s-4p$	$^{2}\mathrm{S}-{}^{2}\mathrm{P}^{\circ}$		*4 530.7 cm^{-1}*	25 739.991–*30 270.7*	2–6	6.64−02	1.45+00	2.11−02	0.462	A+	2
				4 532.59 cm^{-1}	25 739.991–30 272.58	2–4	6.64−02	9.69−01	1.41−02	0.287	A+	2
				4 527.00 cm^{-1}	25 739.991–30 266.99	2–2	6.62−02	4.85−01	7.05−01	−0.013	A+	2
23	$4s-5p$	$^{2}\mathrm{S}-{}^{2}\mathrm{P}^{\circ}$	*10 747.4*	*10 750.4*	25 739.991–*35 042.0*	2–6	7.29−03	3.79−02	2.68+00	−1.120	A	2
			10 746.44	10 749.38	25 739.991–35 042.85	2–4	7.32−03	2.54−02	1.79+00	−1.294	A	2
			10 749.29	10 752.24	25 739.991–35 040.38	2–2	7.24−03	1.25−02	8.88−01	−1.602	A	2
24	$4s-6p$	$^{2}\mathrm{S}-{}^{2}\mathrm{P}^{\circ}$	*8 650.2*	*8 652.6*	25 739.991–*37 297.2*	2–6	2.23−03	7.52−03	4.29−01	−1.823	B+	2
			8 649.93	8 652.30	25 739.991–37 297.61	2–4	2.25−03	5.04−03	2.87−01	−1.997	B+	2
			8 650.89	8 653.27	25 739.991–37 296.32	2–2	2.21−03	2.48−03	1.41−01	−2.305	B+	2
25	$4s-7p$	$^{2}\mathrm{S}-{}^{2}\mathrm{P}^{\circ}$	*7 809.9*	*7 812.1*	25 739.991–*38 540.7*	2–6	9.84−04	2.70−03	1.39−01	−2.268	B	2
			7 809.78	7 811.93	25 739.991–38 540.93	2–4	9.91−04	1.81−03	9.32−02	−2.441	B	2
			7 810.24	7 812.38	25 739.991–38 540.18	2–2	9.72−04	8.89−04	4.57−02	−2.750	B	2

TABLE 4. Transition probabilities of allowed lines for Na I (references for this table are as follows: 1=Taylor,[104] 2=Froese Fischer,[34] 3=Jones *et al.*,[48] 4=Oates *et al.*,[72] 5=Volz *et al.*,[120] 6=Filippov and Prokof'ev[28])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^{a}	$E_i - E_k$ (cm^{-1})	$g_i - g_k$	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log *gf*	Acc.	Source
26	4*s*–8*p*	^{2}S–^{2}P$^{\circ}$	*7 373.3*	*7 375.3*	25 739.991–*39 298.7*	2–6	5.38−04	1.32−03	6.39−02	−2.578	B	2
			7 373.23	7 375.26	25 739.991–39 298.84	2–4	5.42−04	8.83−04	4.29−02	−2.753	B	2
			7 373.49	7 375.52	25 739.991–39 298.35	2–2	5.30−04	4.32−04	2.10−02	−3.063	B	2
27	4*s*–9*p*	^{2}S–^{2}P$^{\circ}$	*7 113.09*	*7 115.05*	25 739.991–*39 794.70*	2–6	4.39−04	1.00−03	4.69−02	−2.699	C+	2
			7 113.036	7 114.997	25 739.991–39 794.810	2–4	4.43−04	6.72−04	3.15−02	−2.872	C+	2
			7 113.203	7 115.164	25 739.991–39 794.480	2–2	4.32−04	3.28−04	1.54−02	−3.183	C+	2
28	3*d*–4*p*	^{2}D–^{2}P$^{\circ}$		*1 097.8 cm^{-1}*	*29 172.86–30 270.7*	10–6	1.58−03	1.18−01	3.54−02	0.072	A+	2
				1 099.74 cm^{-1}	29 172.839–30 272.58	6–4	1.43−03	1.18−01	2.12−02	−0.150	A+	2
				1 094.10 cm^{-1}	29 172.889–30 266.99	4–2	1.57−03	9.81−02	1.18−02	−0.406	A+	2
				1 099.69 cm^{-1}	29 172.889–30 272.58	4–4	1.59−04	1.97−02	2.36−01	−1.103	A	2
29	3*d*–4*f*	^{2}D–^{2}F$^{\circ}$	*18 465*	*18 470*	*29 172.86–34 586.9*	10–14	1.40−01	1.00+00	6.11−02	1.000	A	2
			18 465.3	18 470.4	29 172.839–34 586.92	6–8	1.40−01	9.57−01	3.49−02	0.759	A	2
			18 465.5	18 470.5	29 172.889–34 586.92	4–6	1.31−01	1.00+00	2.44−02	0.602	A	2
			18 465.3	18 470.4	29 172.839–34 586.92	6–6	9.35−03	4.78−02	1.74−01	−0.542	A	2
30	3*d*–5*p*	^{2}D–^{2}P$^{\circ}$	*17 033.5*	*17 038.3*	*29 172.86–35 042.0*	10–6	5.37−05	1.40−04	7.86−02	−2.854	B+	2
			17 031.09	17 035.74	29 172.839–35 042.85	6–4	4.70−05	1.36−04	4.59−02	−3.088	B+	2
			17 038.41	17 043.06	29 172.889–35 040.38	4–2	5.65−05	1.23−04	2.76−02	−3.308	B+	2
			17 031.24	17 035.89	29 172.889–35 042.85	4–4	5.22−06	2.27−05	5.10−03	−4.042	B+	2
31	3*d*–5*f*	^{2}D–^{2}F$^{\circ}$	*12 679.2*	*12 682.6*	*29 172.86–37 057.7*	10–14	4.70−02	1.59−01	6.62−01	0.201	A	2
			12 679.14	12 682.61	29 172.839–37 057.65	6–8	4.70−02	1.51−01	3.78−01	−0.043	A	2
			12 679.22	12 682.69	29 172.889–37 057.65	4–6	4.38−02	1.59−01	2.65−01	−0.197	A	2
			12 679.14	12 682.61	29 172.839–37 057.65	6–6	3.13−03	7.55−03	1.89+00	−1.344	A	2
32	3*d*–6*p*	^{2}D–^{2}P$^{\circ}$	*12 305.4*	*12 308.7*	*29 172.86–37 297.2*	10–6	1.82−05	2.48−05	1.01−02	−3.606	B	2
			12 304.67	12 308.04	29 172.839–37 297.61	6–4	1.59−05	2.41−05	5.85−03	−3.840	B	2
			12 306.70	12 310.07	29 172.889–37 296.32	4–2	1.93−05	2.20−05	3.56−03	−4.056	B	2
			12 304.75	12 308.11	29 172.889–37 297.61	4–4	1.77−06	4.01−06	6.50−04	−4.795	C+	2
33	3*d*–6*f*	^{2}D–^{2}F$^{\circ}$	*10 834.9*	*10 837.8*	*29 172.86–38 399.8*	10–14	2.23−02	5.50−02	1.96−01	−0.260	A	2
			10 834.85	10 837.82	29 172.839–38 399.79	6–8	2.23−02	5.24−02	1.12−01	−0.503	A	2
			10 834.91	10 837.88	29 172.889–38 399.79	4–6	2.08−02	5.50−02	7.85+00	−0.658	A	2
			10 834.85	10 837.82	29172.839–38399.79	6–6	1.49−03	2.62−03	5.61−01	−1.804	A	2
34	3*d*–7*p*	^{2}D–^{2}P$^{\circ}$	*10 671.9*	*10 674.8*	*29 172.86–38 540.7*	10–6	6.97−06	7.14−06	2.51−03	−4.146	C	2
			10 671.61	10 674.53	29 172.839–38 540.93	6–4	6.04−06	6.88−06	1.45−03	−4.384	C	2
			10 672.52	10 675.45	29 172.889–38 540.18	4–2	7.48−06	6.39−06	8.98−04	−4.592	C	2
			10 671.67	10 674.59	29 172.889–38 540.93	4–4	6.72−07	1.15−06	1.61−04	−5.337	C	2
35	3*d*–7*f*	^{2}D–^{2}F$^{\circ}$	*9 961.3*	*9 964.0*	*29 172.86–39 209.0*	10–14	1.27−02	2.64−02	8.66+00	−0.578	B+	2
			9 961.26	9 963.99	29 172.839–39 208.98	6–8	1.27−02	2.52−02	4.95+00	−0.820	A	2
			9 961.31	9 964.04	29 172.889–39 208.98	4–6	1.18−02	2.64−02	3.47+00	−0.976	B+	2
			9 961.26	9 963.99	29 172.839–39 208.98	6–6	8.45−04	1.26−03	2.48−01	−2.121	B+	2
36	3*d*–8*p*	^{2}D–^{2}P$^{\circ}$	*9 873.0*	*9 875.7*	*29 172.86–39 298.7*	10–6	3.26−02	2.86−06	9.30−04	−4.544	C	2
			9 872.86	9 875.57	29 172.839–39 298.84	6–4	2.81−06	2.74−06	5.35−04	−4.784	C	2
			9 873.39	9 876.09	29 172.889–39 298.35	4–2	3.54−06	2.59−06	3.36−04	−4.985	C	2
			9 872.91	9 875.62	29 172.889–39 298.84	4–4	3.12−07	4.57−07	5.94−05	−5.738	D+	2

TABLE 4. Transition probabilities of allowed lines for Na I (references for this table are as follows: 1 = Taylor,[104] 2 = Froese Fischer,[34] 3 = Jones *et al.*,[48] 4 = Oates *et al.*,[72] 5 = Volz *et al.*,[120] 6 = Filippov and Prokof'ev[28])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	$E_i - E_k$ (cm^{-1})	$g_i - g_k$	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
37	$3d-8f$	^{2}D$-^2$F$^\circ$	*9 465.9*	*9 468.5*	*29 172.86–39 734.2*	10–14	9.56−03	1.80−02	5.61+00	−0.745	B+	2
			9 465.92	9 468.51	29 172.839–39 734.16	6–8	9.57−03	1.71−02	3.21+00	−0.989	B+	2
			9 465.96	9 468.56	29 172.889–39 734.16	4–6	8.93−03	1.80−02	2.24+00	−1.143	B+	2
			9 465.92	9 468.51	29 172.839–39 734.16	6–6	6.38−04	8.57−04	1.60−01	−2.289	B+	2
38	$3d-9p$	^{2}D$-^2$P$^\circ$	*9 411.98*	*9 414.56*	*29 172.86–39 794.70*	10–6	2.26−06	1.80−06	5.59−04	−4.745	D+	2
			9 411.866	9 414.449	29 172.839–39 794.810	6–4	1.94−06	1.72−06	3.19−04	−4.986	D+	2
			9 412.203	9 414.785	29 172.889–39 794.480	4–2	2.48−06	1.65−06	2.04−04	−5.180	D+	2
			9 411.911	9 414.493	29 172.889–39 794.810	4–4	2.15−07	2.86−07	3.55−05	−5.942	D	2
39	$4p-5s$	^{2}P$^\circ-^2$S		*2 930.0 cm^{-1}*	*30 270.7*–33 200.675	6–2	5.40−02	3.14−01	2.12−02	0.275	A+	2
				2 928.10 cm^{-1}	30 272.58–33 200.675	4–2	3.60−02	3.14−01	1.41−02	0.099	A+	2
				2 933.69 cm^{-1}	30 266.99–33 200.675	2–2	1.80−02	3.14−01	7.04−01	−0.202	A+	2
40	$4p-4d$	^{2}P$^\circ-^2$D		*4 278.0 cm^{-1}*	*30 270.7–34 548.75*	6–10	7.01−02	9.57−01	4.42−02	0.759	A+	2
				4 276.15 cm^{-1}	30 272.58–34 548.731	4–6	7.01−02	8.62−01	2.65−02	0.538	A+	2
				4 281.78 cm^{-1}	30 266.99–34 548.766	2–4	5.84−02	9.55−01	1.47−02	0.281	A+	2
				4 276.19 cm^{-1}	30 272.58–34 548.766	4–4	1.17−02	9.58−02	2.95−01	−0.417	A	2
41	$4p-6s$	^{2}P$^\circ-^2$S	*16 383.9*	*16 388.3*	*30 270.7*–36 372.620	6–2	1.75−02	2.35−02	7.61+00	−0.851	A	2
			16 388.86	16 393.34	30 272.58–36 372.620	4–2	1.17−02	2.35−02	5.07+00	−1.027	A	2
			16 373.85	16 378.33	30 266.99–36 372.620	2–2	5.85−02	2.35−02	2.54+00	−1.328	A	2
42	$4p-5d$	^{2}P$^\circ-^2$D	*14 775.6*	*14 779.7*	*30 270.7–37 036.76*	6–10	2.61−02	1.43−01	4.16−01	−0.067	A	2
			14 779.73	14 783.77	30 272.58–37 036.754	4–6	2.61−02	1.28−01	2.50−01	−0.291	A	2
			14 767.48	14 771.52	30 266.99–37 036.774	2–4	2.18−02	1.43−01	1.39−01	−0.544	A	2
			14 779.69	14 783.73	30 272.58–37 036.774	4–4	4.35−05	1.42−02	2.77+00	−1.246	A	2
43	$4p-7s$	^{2}P$^\circ-^2$S	*12 914.1*	*12 917.7*	*30 270.7*–38 012.044	6–2	8.90−03	7.42−03	1.89+00	−1.351	B+	2
			12 917.26	12 920.79	30 272.58–38 012.044	4–2	5.92−03	7.41−03	1.26+00	−1.528	B+	2
			12 907.94	12 911.47	30 266.99–38 012.044	2–2	2.97−03	7.43−03	6.32−01	−1.828	B+	2
44	$4p-6d$	^{2}P$^\circ-^2$D	*12 317.1*	*12 320.5*	*30 270.7–38 387.26*	6–10	1.30−02	4.91−02	1.20−01	−0.531	A	2
			12 319.98	12 323.35	30 272.58–38 387.257	4–6	1.29−02	4.42−02	7.17+00	−0.753	A	2
			12 311.48	12 314.85	30 266.99–38 387.270	2–4	1.08−02	4.92−02	3.99+00	−1.007	A	2
			12 319.96	12 323.33	30 272.58–38 387.270	4–4	2.16−03	4.91−03	7.97−01	−1.707	A	2
45	$4p-8s$	^{2}P$^\circ-^2$S	*11 494.0*	*11 497.1*	*30 270.7*–38 968.51	6–2	5.25−03	3.47−03	7.88−01	−1.682	B+	2
			11 496.49	11 499.63	30 272.58–38 968.51	4–2	3.50−03	3.47−03	5.25−01	−1.858	B+	2
			11 489.10	11 492.25	30 266.99–38 968.51	2–2	1.76−03	3.48−03	2.63−01	−2.157	B+	2
46	$4p-7d$	^{2}P$^\circ-^2$D	*11 194.9*	*11 198.0*	*30 270.7–39 200.9*	6–10	7.53−03	2.36−02	5.22+00	−0.849	B+	2
			11 197.21	11 200.28	30 272.58–39 200.93	4–6	7.52−03	2.12−02	3.13+00	−1.072	B+	2
			11 190.211	11 93.27	30 266.99–39 200.93	2–4	6.29−03	2.36−02	1.74+00	−1.326	B+	2
			11 197.21	11 200.28	30 272.58–39 200.93	4–4	1.25−03	2.36−03	3.48−01	−2.025	B+	2
47	$4p-9s$	^{2}P$^\circ-^2$S	*10 745.0*	*10 747.9*	*30 270.7*–39 574.85	6–2	3.86−03	2.23−03	4.73−01	−1.874	B	2
			10 747.12	10 750.06	30 272.58–39 574.85	4–2	2.57−03	2.22−03	3.15−01	−2.052	B	2
			10 740.67	10 743.61	30 266.99–39 574.85	2–2	1.29−03	2.23−03	1.58−01	−2.351	B	2
48	$4p-8d$	^{2}P$^\circ-^2$D	*10 570.2*	*10 573.1*	*30 270.7–39 728.7*	6–10	5.93−03	1.66−02	3.46+00	−1.002	B+	2
			10 572.27	10 575.16	30 272.58–39 728.70	4–6	5.92−03	1.49−02	2.08+00	−1.225	B+	2
			10 566.02	10 568.91	30 266.99–39 728.70	2–4	4.96−03	1.66−02	1.16+00	−1.479	B+	2

TABLE 4. Transition probabilities of allowed lines for Na I (references for this table are as follows: 1=Taylor,[104] 2=Froese Fischer,[34] 3=Jones *et al.*,[48] 4=Oates *et al.*,[72] 5=Volz *et al.*,[120] 6=Filippov and Prokof'ev[28])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
			10 572.27	10 575.16	30 272.58–39 728.70	4–4	9.88−04	1.66−03	2.31−01	−2.178	B+	2
49	$4p-10s$	$^2\mathrm{P}^\circ-{}^2\mathrm{S}$	*10 293.1*	*10 295.9*	*30 270.7*–39 983.27	6–2	4.26−03	2.25−03	4.59−01	−1.870	B	2
			10 295.11	10 297.93	30 272.58–39 983.27	4–2	2.83−03	2.25−03	3.05−01	−2.046	B	2
			10 289.18	10 292.00	30 266.99–39 983.27	2–2	1.42−03	2.26−03	1.53−01	−2.345	B	2
50	$5s-5p$	$^2\mathrm{S}-{}^2\mathrm{P}^\circ$		*1 841.3 cm^{-1}*	33 200.675–*35 042.0*	2–6	1.43−02	1.89+00	6.77+02	0.577	A+	2
				1 842.17 cm^{-1}	33 200.675–35 042.85	2–4	1.43−02	1.26+00	4.51+02	0.401	A+	2
				1 839.70 cm^{-1}	33 200.675–35 040.38	2–2	1.42−02	6.31−01	2.26+02	0.101	A+	2
51	$5s-6p$	$^2\mathrm{S}-{}^2\mathrm{P}^\circ$		*4 096.5 cm^{-1}*	33 200.675–*37 297.2*	2–6	2.30−03	6.15−02	9.89+00	−0.910	A	2
				4 096.93 cm^{-1}	33 200.675–37 297.61	2–4	2.30−03	4.11−02	6.61+00	−1.085	A	2
				4 095.64 cm^{-1}	33 200.675–37 296.32	2–2	2.28−03	2.04−02	3.27+00	−1.389	A	2
52	$5s-7p$	$^2\mathrm{S}-{}^2\mathrm{P}^\circ$	*18 721*	*18 727*	33 200.675–*38 540.7*	2–6	8.61−04	1.36−02	1.67+00	−1.565	B+	2
			18 720.6	18 725.7	33 200.675–38 540.93	2–4	8.65−04	9.09−03	1.12+00	−1.740	B+	2
			18 723.2	18 728.3	33 200.675–38 540.18	2–2	8.53−04	4.48−03	5.53−01	−2.048	B+	2
53	$5s-8p$	$^2\mathrm{S}-{}^2\mathrm{P}^\circ$	*16 394.3*	*16 398.8*	33 200.675–*39 298.7*	2–6	4.38−04	5.30−03	5.72−01	−1.975	B+	2
			16 393.90	16 398.38	33 200.675–39 298.84	2–4	4.40−04	3.55−03	3.83−01	−2.149	B+	2
			16 395.21	16 399.69	33 200.675–39 298.35	2–2	4.33−04	1.75−03	1.89−01	−2.456	B+	2
54	$5s-9p$	$^2\mathrm{S}-{}^2\mathrm{P}^\circ$	15 161.10	15 165.24	33 200.675–39 794.70	2–6	3.36−04	3.48−03	3.47−01	−2.157	B	2
			15 160.848	15 164.991	33 200.675–39 794.810	2–4	3.38−04	2.33−03	2.33−01	−2.332	B	2
			15 161.607	15 165.750	33 200.675–39 794.480	2–2	3.32−04	1.14−03	1.14−01	−2.642	B	2
55	$4d-5p$	$^2\mathrm{D}-{}^2\mathrm{P}^\circ$		*493.3 cm^{-1}*	*34 548.75–35 042.0*	10–6	6.22−04	2.30−01	1.53+03	0.362	A+	2
				494.12 cm^{-1}	34 548.731–35 042.85	6–4	5.62−04	2.30−01	9.20+02	0.140	A+	2
				491.61 cm^{-1}	34 548.766–35 040.38	4–2	6.16−04	1.91−01	5.12+02	−0.117	A+	2
				494.08 cm^{-1}	34 548.766–35 042.85	4–4	6.24−05	3.83−02	1.02+02	−0.815	A+	2
56	$4d-5f$	$^2\mathrm{D}-{}^2\mathrm{F}^\circ$		*2 508.9 cm^{-1}*	34 548.75–*37 057.7*	10–14	2.59−02	8.65−01	1.13+03	0.937	A+	2
				2 508.92 cm^{-1}	34 548.731–37 057.65	6–8	2.59−02	8.23−01	6.48+02	0.694	A+	2
				2 508.88 cm^{-1}	34 548.766–37 057.65	4–6	2.42−02	8.65−01	4.54+02	0.539	A+	2
				2 508.92 cm^{-1}	34 548.731–37 057.65	6–6	1.73−03	4.12−02	3.24+01	−0.607	A	2
57	$4d-6p$	$^2\mathrm{D}-{}^2\mathrm{P}^\circ$		*2 748.4 cm^{-1}*	*34 548.75–37 297.2*	10–6	6.55−05	7.80−04	9.34−01	−2.108	B+	2
				2 748.88 cm^{-1}	34 548.731–37 297.61	6–4	5.79−05	7.66−04	5.50−01	−2.338	B+	2
				2 747.55 cm^{-1}	34 548.766–37 296.32	4–2	6.78−05	6.73−04	3.23−01	−2.570	B+	2
				2 748.84 cm^{-1}	34 548.766–37 297.61	4–4	6.43−06	1.28−04	6.11−02	−3.291	B+	2
58	$4d-6f$	$^2\mathrm{D}-{}^2\mathrm{F}^\circ$		*3 851.1 cm^{-1}*	*34 548.75–38 399.8*	10–14	1.31−02	1.86−01	1.59+02	0.270	A	2
				3 851.06 cm^{-1}	34 548.731–38 399.79	6–8	1.31−02	1.77−01	9.07+01	0.026	A	2
				3 851.02 cm^{-1}	34 548.766–38 399.79	4–6	1.22−02	1.86−01	6.35+01	−0.128	A	2
				3 851.06 cm^{-1}	34 548.731–38 399.79	6–6	8.74−04	8.84−03	4.53+00	−1.275	A	2
59	$4d-7p$	$^2\mathrm{D}-{}^2\mathrm{P}^\circ$		*3 991.9 cm^{-1}*	*34 548.75–38 540.7*	10–6	3.40−05	1.92−04	1.58−01	−2.717	B	2
				3 992.20 cm^{-1}	34 548.731–38 540.93	6–4	3.00−05	1.88−04	9.32−02	−2.948	B	2
				3 991.41 cm^{-1}	34 548.766–38 540.18	4–2	3.52−05	1.65−04	5.46−02	−3.180	B	2
				3 992.16 cm^{-1}	34 548.766–38 540.93	4–4	3.34−06	3.14−05	1.04−02	−3.901	C+	2
60	$4d-7f$	$^2\mathrm{D}-{}^2\mathrm{F}^\circ$		*4 660.3 cm^{-1}*	*34 548.75–39 209.0*	10–14	7.58−03	7.32−02	5.17+01	−0.135	A	2
				4 660.25 cm^{-1}	34 548.731–39 208.98	6–8	7.57−03	6.97−02	2.96+01	−0.379	A	2

TABLE 4. Transition probabilities of allowed lines for Na I (references for this table are as follows: 1=Taylor,[104] 2=Froese Fischer,[34] 3=Jones *et al.*,[48] 4=Oates *et al.*,[72] 5=Volz *et al.*,[120] 6=Filippov and Prokof'ev[28])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				4 660.21 cm^{-1}	34 548.766–39 208.98	4–6	7.07−03	7.32−02	2.07+01	−0.533	A	2
				4 660.25 cm^{-1}	34 548.731–39 208.98	6–6	5.05−04	3.49−03	1.48+00	−1.679	B+	2
61	$4d-8p$	^{2}D$-^2$P$^\circ$		*4 749.9 cm^{-1}*	*34 548.75–39 298.7*	10–6	1.82−05	7.25−05	5.03−02	−3.140	B	2
				4 750.11 cm^{-1}	34 548.731–39 298.84	6–4	1.61−05	7.12−05	2.96−02	−3.369	B	2
				4 749.58 cm^{-1}	34 548.766–39 298.35	4–2	1.89−05	6.27−05	1.74−02	−3.601	B	2
				4 750.07 cm^{-1}	34 548.766–39 298.84	4–4	1.79−06	1.19−05	3.29−03	−4.322	C+	2
62	$4d-8f$	^{2}D$-^2$F$^\circ$	*19 280*	*19 285*	*34 548.75–39 734.2*	10–14	5.70−03	4.45−02	2.83+01	−0.352	A	2
			19 279.5	19 284.8	34 548.731–39 734.16	6–8	5.70−03	4.24−02	1.61+01	−0.594	A	2
			19 279.7	19 284.9	34 548.766–39 734.16	4–6	5.32−03	4.45−02	1.13+01	−0.750	A	2
			19 279.5	19 284.8	34 548.731–39 734.16	6–6	3.80−04	2.12−03	8.07−01	−1.896	B+	2
63	$4d-9p$	^{2}D$-^2$P$^\circ$	*19 057.1*	*19 062.3*	*34 548.75–39 794.70*	10–6	1.38−05	4.52−05	2.84−02	−3.345	C	2
			19 056.65	19 061.86	34 548.731–39 794.810	6–4	1.22−05	4.43−05	1.67−02	−3.575	C+	2
			19 057.98	19 063.18	34 548.766–39 794.480	4–2	1.44−05	3.92−05	9.83−03	−3.805	C	2
			19 056.78	19 061.98	34 548.766–39 794.810	4–4	1.36−06	7.38−06	1.85−03	−4.530	C	2
64	$4f-5d$	^{2}F$^\circ-^2$D		*2 449.9 cm^{-1}*	*34 586.9–37 036.76*	14–10	5.75−04	1.03−02	1.93+01	−0.841	A	2
				2 449.83 cm^{-1}	34 586.92–37 036.754	8–6	5.48−04	1.03−02	1.10+01	−1.084	A	2
				2 449.85 cm^{-1}	34 586.92–37 036.774	6–4	5.75−04	9.58−03	7.72+00	−1.240	A	2
				2 449.83 cm^{-1}	34 586.92–37 036.754	6–6	2.74−05	6.84−04	5.52−01	−2.387	B+	2
65	$4f-6d$	^{2}F$^\circ-^2$D		*3 800.4 cm^{-1}*	*34 586.9–38 387.26*	14–10	2.46−04	1.82−03	2.21+00	−1.594	A	2
				3 800.34 cm^{-1}	34 586.92–38 387.257	8–6	2.34−04	1.82−03	1.26+00	−1.837	A	2
				3 800.35 cm^{-1}	34 586.92–38 387.270	6–4	2.46−04	1.70−03	8.83−01	−1.991	A	2
				3 800.34 cm^{-1}	34 586.92–38 387.257	6–6	1.17−05	1.21−04	6.31−02	−3.139	B+	2
66	$4f-7d$	^{2}F$^\circ-^2$D		*4 614.0 cm^{-1}*	*34 586.9–39 200.9*	14–10	1.30−04	6.56−04	6.55−01	−2.037	B+	2
				4 614.01 cm^{-1}	34 586.92–39 200.93	8–6	1.24−04	6.56−04	3.75−01	−2.280	B+	2
				4 614.01 cm^{-1}	34 586.92–39 200.93	6–4	1.30−04	6.12−04	2.62−01	−2.435	B+	2
				4 614.01 cm^{-1}	34 586.92–39 200.93	6–6	6.21−06	4.37−05	1.87−02	−3.581	B	2
67	$4f-8d$	^{2}F$^\circ-^2$D	*19 443*	*19 448*	*34 586.9–39 728.7*	14–10	9.55−05	3.87−04	3.47−01	−2.266	B+	2
			19 443.2	19 448.5	34 586.92–39 728.70	8–6	9.10−05	3.87−04	1.98−01	−2.509	B+	2
			19 443.2	19 448.5	34 586.92–39 728.70	6–4	9.55−05	3.61−04	1.39−01	−2.664	B	2
			19 443.2	19 448.5	34 586.92–39 728.70	6–6	4.55−06	2.58−05	9.91−03	−3.810	C+	2
68	$5p-6s$	^{2}P$^\circ-^2$S		*1 330.6 cm^{-1}*	*35 042.0–36 372.620*	6–2	1.61−02	4.53−01	6.73+02	0.434	A	2
				1 329.77 cm^{-1}	35 042.85–36 372.620	4–2	1.07−02	4.54−01	4.49+02	0.259	A	2
				1 332.24 cm^{-1}	35 040.38–36 372.620	2–2	5.36−03	4.53−01	2.24+02	−0.043	A	2
69	$5p-5d$	^{2}P$^\circ-^2$D		*1 994.8 cm^{-1}*	*35 042.0–37 036.76*	6–10	1.69+06	1.06+00	1.05+03	0.803	A+	2
				1 993.90 cm^{-1}	35 042.85–37 036.754	4–6	1.69−02	9.58−01	6.33+02	0.583	A+	2
				1 996.39 cm^{-1}	35 040.38–37 036.774	2–4	1.41−02	1.06+00	3.50+02	0.326	A+	2
				1 993.92 cm^{-1}	35 042.85–37 036.774	4–4	2.82−03	1.07−01	7.03+01	−0.369	A+	2
70	$5p-7s$	^{2}P$^\circ-^2$S		*2 970.0 cm^{-1}*	*35 042.0*–38 012.044	6–2	5.66−03	3.20−02	2.13+01	−0.717	A	2
				2 969.19 cm^{-1}	35 042.85–38 012.044	4–2	3.77−03	3.20−02	1.42+01	−0.893	A	2
				2 971.66 cm^{-1}	35 040.38–38 012.044	2–2	1.89−03	3.21−02	7.11+00	−1.192	A	2
71	$5p-6d$	^{2}P$^\circ-^2$D		*3 345.3 cm^{-1}*	*35 042.0–38 387.26*	6–10	7.74−03	1.73−01	1.02+02	0.016	A	2
				3 344.41 cm^{-1}	35 042.85–38 387.257	4–6	7.74−03	1.56−01	6.13+01	−0.205	A	2

TABLE 4. Transition probabilities of allowed lines for Na I (references for this table are as follows: 1=Taylor,[104] 2=Froese Fischer,[34] 3=Jones *et al.*,[48] 4=Oates *et al.*,[72] 5=Volz *et al.*,[120] 6=Filippov and Prokof'ev[28])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				3 346.89 cm^{-1}	35 040.38–38 387.270	2–4	6.46−03	1.73−01	3.40+01	−0.461	A	2
				3 344.42 cm^{-1}	35 042.85–38 387.270	4–4	1.29−03	1.73−02	6.81+00	−1.160	A	2
72	$5p-8s$	$^2P^\circ-^2S$		*3 926.5 cm*$^{-1}$	*35 042.0*–38 968.51	6–2	3.09−03	1.00−02	5.04+00	−1.222	B+	2
				3 925.66 cm^{-1}	35 042.85–38 968.51	4–2	2.06−03	1.00−02	3.36+00	−1.398	B+	2
				3 928.13 cm^{-1}	35 040.38–38 968.51	2–2	1.03−03	1.01−02	1.69+00	−1.695	B+	2
73	$5p-7d$	$^2P^\circ-^2D$		*4 158.9 cm*$^{-1}$	*35 042.0–39 200.9*	6–10	4.37−03	6.31−02	3.00+01	−0.422	A	2
				4 158.08 cm^{-1}	35 042.85–39 200.93	4–6	4.37−03	5.68−02	1.80+01	−0.644	A	2
				4 160.55 cm^{-1}	35 040.38–39 200.93	2–4	3.65−03	6.32−02	1.00+01	−0.898	A	2
				4 158.08 cm^{-1}	35 042.85–39 200.93	4–4	7.28−04	6.31−03	2.00+00	−1.598	B+	2
74	$5p-9s$	$^2P^\circ-^2S$		*4 532.8 cm*$^{-1}$	*35 042.0*–39 574.85	6–2	2.18−03	5.30−03	2.31+00	−1.498	B+	2
				4 532.00 cm^{-1}	35 042.85–39 574.85	4–2	1.45−03	5.29−03	1.54+00	−1.674	B+	2
				4 534.47 cm^{-1}	35 040.38–39 574.85	2–2	7.29−04	5.31−03	7.72−01	−1.974	B	2
75	$5p-8d$	$^2P^\circ-^2D$		*4 686.7 cm*$^{-1}$	*35 042.0–39 728.7*	6–10	3.34−03	3.80−02	1.60+01	−0.642	A	2
				4 685.85 cm^{-1}	35 042.85–39 728.70	4–6	3.34−03	3.42−02	9.61+00	−0.864	A	2
				4 688.32 cm^{-1}	35 040.38–39 728.70	2–4	2.79−03	3.80−02	5.34+00	−1.119	A	2
				4 685.85 cm^{-1}	35 042.85–39 728.70	4–4	5.56−04	3.80−03	1.07+00	−1.818	B+	2
76	$5p-10s$	$^2P^\circ-^2S$		*4 941.3 cm*$^{-1}$	*35 042.0*–39 983.27	6–2	2.22−03	4.55−03	1.82+00	−1.564	B	2
				4 940.42 cm^{-1}	35 042.85–39 983.27	4–2	1.48−03	4.54−03	1.21+00	−1.741	B+	2
				4 942.89 cm^{-1}	35 040.38–39 983.27	2–2	7.43−04	4.56−03	6.07−01	−2.040	B	2
77	$6s-6p$	$^2S-^2P^\circ$		*924.6* cm^{-1}	36 372.620–*37 297.2*	2–6	4.41−03	2.32+00	1.65+03	0.667	A	2
				924.99 cm^{-1}	36 372.620–37 297.61	2–4	4.41−03	1.55+00	1.10+03	0.491	A	2
				923.70 cm^{-1}	36 372.620–37 296.32	2–2	4.40−03	7.73−01	5.51+02	0.189	A	2
78	$6s-7p$	$^2S-^2P^\circ$		*2 168.1 cm*$^{-1}$	36 372.620–*38 540.7*	2–6	8.80−04	8.42−02	2.56+01	−0.774	A	2
				2 168.31 cm^{-1}	36 372.620–38 540.93	2–4	8.83−04	5.63−02	1.71+01	−0.948	A	2
				2 167.56 cm^{-1}	36 372.620–38 540.18	2–2	8.75−04	2.79−02	8.48+00	−1.253	A	2
79	$6s-8p$	$^2S-^2P^\circ$		*2 926.1 cm*$^{-1}$	36 372.620–*39 298.7*	2–6	3.81−04	2.00−02	4.50+00	−1.398	B+	2
				2 926.22 cm^{-1}	36 372.620–39 298.84	2–4	3.83−04	1.34−02	3.01+00	−1.572	B+	2
				2 925.73 cm^{-1}	36 372.620–39 298.35	2–2	3.78−04	6.62−03	1.49+00	−1.878	B+	2
80	$6s-9p$	$^2S-^2P^\circ$		*3 422.08 cm*$^{-1}$	36 372.620–*39 794.70*	2–6	2.61−04	1.00−02	1.93+00	−1.699	B+	2
				3 422.190 cm^{-1}	36 372.620–39 794.810	2–4	2.62−04	6.72−03	1.29+00	−1.872	B+	2
				3 421.860 cm^{-1}	36 372.620–39 794.480	2–2	2.59−04	3.31−03	6.37−01	−2.179	B	2
81	$5d-6p$	$^2D-^2P^\circ$		*260.4* cm^{-1}	*37 036.76–37 297.2*	10–6	2.53−04	3.35−01	4.23+03	0.525	A	2
				260.86 cm^{-1}	37 036.754–37 297.61	6–4	2.28−04	3.35−01	2.54+03	0.303	A	2
				259.55 cm^{-1}	37 036.774–37 296.32	4–2	2.50−04	2.78−01	1.41+03	0.046	A	2
				260.84 cm^{-1}	37 036.774–37 297.61	4–4	2.54−05	5.59−02	2.82+02	−0.651	A	2
82	$5d-6f$	$^2D-^2F^\circ$		*1 363.0* cm^{-1}	*37 036.76–38 399.8*	10–14	7.16−03	8.09−01	1.95+03	0.908	A	2
				1 363.04 cm^{-1}	37 036.754–38 399.79	6–8	7.16−03	7.70−01	1.12+03	0.665	A	2
				1 363.02 cm^{-1}	37 036.774–38 399.79	4–6	6.68−03	8.09−01	7.81+02	0.510	A	2
				1 363.04 cm^{-1}	37 036.754–38 399.79	6–6	4.77−04	3.85−02	5.58+01	−0.636	A	2
83	$5d-7p$	$^2D-^2P^\circ$		*1 503.9* cm^{-1}	*37 036.76–38 540.7*	10–6	4.88−05	1.94−03	4.25+00	−1.712	B+	2
				1 504.18 cm^{-1}	37 036.754–38 540.93	6–4	4.33−05	1.91−03	2.51+00	−1.941	B+	2

TABLE 4. Transition probabilities of allowed lines for Na I (references for this table are as follows: 1=Taylor,[104] 2=Froese Fischer,[34] 3=Jones *et al.*,[48] 4 =Oates *et al.*,[72] 5=Volz *et al.*,[120] 6=Filippov and Prokof'ev[28])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				1 503.41 cm^{-1}	37 036.774–38 540.18	4–2	5.01−05	1.66−03	1.46+00	−2.178	B+	2
				1 504.16 cm^{-1}	37 036.774–38 540.93	4–4	4.81−06	3.19−04	2.79−01	−2.894	B+	2
84	$5d-7f$	^{2}D−^{2}F$^\circ$		*2 172.2 cm^{-1}*	*37 036.76–39 209.0*	10–14	4.38−03	1.95−01	2.96+02	0.290	A	2
				2 172.23 cm^{-1}	37 036.754–39 208.98	6–8	4.38−03	1.86−01	1.69+02	0.048	A	2
				2 172.21 cm^{-1}	37 036.774–39 208.98	4–6	4.09−03	1.95−01	1.18+02	−0.108	A	2
				2 172.23 cm^{-1}	37 036.754–39 208.98	6–6	2.92−04	9.29−03	8.45+00	−1.254	A	2
85	$5d-8p$	^{2}D−^{2}P$^\circ$		*2 261.9 cm^{-1}*	*37 036.76–39 298.7*	10–6	3.10−05	5.44−04	7.92−01	−2.264	B+	2
				2 262.09 cm^{-1}	37 036.754–39 298.84	6–4	2.75−05	5.37−04	4.69−01	−2.492	B+	2
				2 261.58 cm^{-1}	37 036.774–39 298.35	4–2	3.17−05	4.65−04	2.71−01	−2.730	B+	2
				2 262.07 cm^{-1}	37 036.774–39 298.84	4–4	3.06−06	8.95−05	5.21−02	−3.446	B	2
86	$5d-8f$	^{2}D−^{2}F$^\circ$		*2 697.4 cm^{-1}*	*37 036.76–39 734.2*	10–14	3.29−03	9.50−02	1.16+02	−0.022	A	2
				2 697.41 cm^{-1}	37 036.754–39 734.16	6–8	3.29−03	9.05−02	6.62+01	−0.265	A	2
				2 697.39 cm^{-1}	37 036.774–39 734.16	4–6	3.07−03	9.50−02	4.64+01	−0.420	A	2
				2 697.41 cm^{-1}	37 036.754–39 734.16	6–6	2.20−04	4.52−03	3.31+00	−1.567	B+	2
87	$5d-9p$	^{2}D−^{2}P$^\circ$		*2 757.94 cm^{-1}*	*37 036.76–39 794.70*	10–6	2.33−05	2.75−04	3.28−01	−2.561	B	2
				2 758.056 cm^{-1}	37 036.754–39 794.810	6–4	2.07−05	2.72−04	1.95−01	−2.787	B	2
				2 757.706 cm^{-1}	37 036.774–39 794.480	4–2	2.39−05	2.35−04	1.12−01	−3.027	B	2
				2 758.036 cm^{-1}	37 036.774–39 794.810	4–4	2.30−06	4.52−05	2.16−02	−3.743	C+	2
88	$5d-9f$	^{2}D−^{2}F$^\circ$		*3 057.4 cm^{-1}*	*37 036.76–40 094.2*	10–14	1.89−03	4.25−02	4.58+01	−0.372	D	1
				3 057.44 cm^{-1}	37 036.754–40 094.19	6–8	1.89−03	4.05−02	2.62+01	−0.614	D	LS
				3 057.42 cm^{-1}	37 036.774–40 094.19	4–6	1.77−03	4.25−02	1.83+01	−0.770	D	LS
				3 057.44 cm^{-1}	37 036.754–40 094.19	6–6	1.27−04	2.03−03	1.31+00	−1.914	E	LS
89	$5d-10f$	^{2}D−^{2}F$^\circ$		*3 315.0 cm^{-1}*	*37 036.76–40 351.8*	10–14	1.35−03	2.57−02	2.55+01	−0.590	E+	1
				3 315.02 cm^{-1}	37 036.754–40 351.77	6–8	1.35−03	2.45−02	1.46+01	−0.833	D	LS
				3 315.00 cm^{-1}	37 036.774–40 351.77	4–6	1.26−03	2.57−02	1.02+01	−0.988	E+	LS
				3 315.02 cm^{-1}	37 036.754–40 351.77	6–6	8.94−05	1.22−03	7.27−01	−2.135	E	LS
90	$5f-6d$	^{2}F$^\circ$−^{2}D		*1 329.6 cm^{-1}*	*37 057.7–38 387.26*	14–10	4.43−04	2.68−02	9.30+01	−0.426	A	2
				1 329.61 cm^{-1}	37 057.65–38 387.257	8–6	4.22−04	2.68−02	5.31+01	−0.669	A	2
				1 329.62 cm^{-1}	37 057.65–38 387.270	6–4	4.43−04	2.50−02	3.72+01	−0.824	A	2
				1 329.61 cm^{-1}	37 057.65–38 387.257	6–6	2.11−05	1.79−03	2.66+00	−1.969	A	2
91	$5f-7d$	^{2}F$^\circ$−^{2}D		*2 143.2 cm^{-1}*	*37 057.7–39 200.9*	14–10	2.19−04	5.11−03	1.10+01	−1.145	A	2
				2 143.28 cm^{-1}	37 057.65–39 200.93	8–6	2.09−04	5.11−03	6.27+00	−1.388	A	2
				2 143.28 cm^{-1}	37 057.65–39 200.93	6–4	2.19−04	4.77−03	4.39+00	−1.543	A	2
				2 143.28 cm^{-1}	37 057.65–39 200.93	6–6	1.04−05	3.40−04	3.14−01	−2.690	B+	2
92	$5f-8d$	^{2}F$^\circ$−^{2}D		*2 671.0 cm^{-1}*	*37 057.7–39 728.7*	14–10	1.49−04	2.24−03	3.86+00	−1.504	B+	2
				2 671.05 cm^{-1}	37 057.65–39 728.70	8–6	1.42−04	2.24−03	2.20+00	−1.747	B+	2
				2 671.05 cm^{-1}	37 057.65–39 728.70	6–4	1.49−04	2.09−03	1.54+00	−1.902	B+	2
				2 671.05 cm^{-1}	37 057.65–39 728.70	6–6	7.09−06	1.49−04	1.10−01	−3.049	B	2
93	$6p-7s$	^{2}P$^\circ$−^{2}S		*714.8 cm^{-1}*	*37 297.2*–38 012.044	6–2	6.05−03	5.92−01	1.63+03	0.550	A	2
				714.43 cm^{-1}	37 297.61–38 012.044	4–2	4.03−03	5.92−01	1.09+03	0.374	A	2
				715.72 cm^{-1}	37 296.32–38 012.044	2–2	2.02−03	5.91−01	5.44+02	0.073	A	2
94	$6p-6d$	^{2}P$^\circ$−^{2}D		*1 090.1 cm^{-1}*	*37 297.2–38 387.26*	6–10	5.60−03	1.18+00	2.14+03	0.850	A	2

TABLE 4. Transition probabilities of allowed lines for Na I (references for this table are as follows: 1=Taylor,[104] 2=Froese Fischer,[34] 3=Jones *et al.*,[48] 4=Oates *et al.*,[72] 5=Volz *et al.*,[120] 6=Filippov and Prokof'ev[28])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log *gf*	Acc.	Source
				1 089.65 cm^{-1}	37 297.61–38 387.257	4–6	5.61−03	1.06+00	1.28+03	0.627	A	2
				1 090.95 cm^{-1}	37 296.32–38 387.270	2–4	4.67−03	1.18+00	7.10+02	0.373	A	2
				1 089.66 cm^{-1}	37 297.61–38 387.270	4–4	9.34−04	1.18−01	1.43+02	−0.326	A	2
95	6*p*−8*s*	^{2}P°−^{2}S		*1 671.3 cm*$^{-1}$	*37 297.2*–38 968.51	6–2	2.25−03	4.03−02	4.76+01	−0.617	A	2
				1 670.90 cm^{-1}	37 297.61–38 968.51	4–2	1.50−03	4.02−02	3.17+01	−0.794	A	2
				1 672.19 cm^{-1}	37 296.32–38 968.51	2–2	7.52−04	4.03−02	1.59+01	−1.094	A	2
96	6*p*−7*d*	^{2}P°−^{2}D		*1 903.7 cm*$^{-1}$	*37 297.2–39 200.9*	6–10	2.91−03	2.01−01	2.08+02	0.081	A	2
				1 903.32 cm^{-1}	37 297.61–39 200.93	4–6	2.91−03	1.81−01	1.25+02	−0.140	A	2
				1 904.61 cm^{-1}	37 296.32–39 200.93	2–4	2.43−03	2.01−01	6.94+01	−0.396	A	2
				1 903.32 cm^{-1}	37 297.61–39 200.93	4–4	4.85−04	2.01−02	1.39+01	−1.095	A	2
97	6*p*−9*s*	^{2}P°−^{2}S		*2 277.7 cm*$^{-1}$	*37 297.2*–39 574.85	6–2	1.43−03	1.38−02	1.20+01	−1.082	B+	2
				2 277.24 cm^{-1}	37 297.61–39 574.85	4–2	9.54−04	1.38−02	7.98+00	−1.258	B+	2
				2 278.53 cm^{-1}	37 296.32–39 574.85	2–2	4.80−04	1.39−02	4.00+00	−1.556	B+	2
98	6*p*−8*d*	^{2}P°−^{2}D		*2 431.5 cm*$^{-1}$	*37 297.2–39 728.7*	6–10	2.10−03	8.87−02	7.21+01	−0.274	A	2
				2 431.09 cm^{-1}	37 297.61–39 728.70	4–6	2.10−03	7.98−02	4.33+01	−0.496	A	2
				2 432.38 cm^{-1}	37 296.32–39 728.70	2–4	1.75−03	8.88−02	2.40+01	−0.751	A	2
				2 431.09 cm^{-1}	37 297.61–39 728.70	4–4	3.50−04	8.87−03	4.81+00	−1.450	A	2
99	6*p*−10*s*	^{2}P°−^{2}S		*2 686.1 cm*$^{-1}$	*37 297.2*–39 983.27	6–2	1.28−03	8.84−03	6.50+00	−1.275	B+	2
				2 685.66 cm^{-1}	37 297.61–39 983.27	4–2	8.49−04	8.82−03	4.33+00	−1.452	B+	2
				2 686.95 cm^{-1}	37 296.32–39 983.27	2–2	4.27−04	8.86−03	2.17+00	−1.752	B+	2
100	6*p*−9*d*	^{2}P°−^{2}D		*2 793.1 cm*$^{-1}$	*37 297.2–40 090.3*	6–10	1.14−03	3.66−02	2.59+01	−0.658	E+	1
				2 792.70 cm^{-1}	37 297.61–40 090.31	4–6	1.14−03	3.29−02	1.55+01	−0.881	D	LS
				2 793.99 cm^{-1}	37 296.32–40 090.31	2–4	9.53−04	3.66−02	8.63+00	−1.135	E+	LS
				2 792.70 cm^{-1}	37 297.61–40 090.31	4–4	1.90−04	3.66−03	1.73+00	−1.834	E	LS
101	7*s*−7*p*	^{2}S−^{2}P°		*528.7 cm*$^{-1}$	38 012.044–*38 540.7*	2–6	1.70−03	2.74+00	3.41+03	0.739	A	2
				528.89 cm^{-1}	38 012.044–38 540.93	2–4	1.70−03	1.83+00	2.27+03	0.563	A	2
				528.14 cm^{-1}	38 012.044–38 540.18	2–2	1.70−03	9.13−01	1.14+03	0.262	A	2
102	7*s*−8*p*	^{2}S−^{2}P°		*1 286.7 cm*$^{-1}$	38 012.044–*39 298.7*	2–6	3.96−04	1.08−01	5.51+01	−0.666	A	2
				1 286.80 cm^{-1}	38 012.044–39 298.84	2–4	3.97−04	7.20−02	3.68+01	−0.842	A	2
				1 286.31 cm^{-1}	38 012.044–39 298.35	2–2	3.94−04	3.57−02	1.83+01	−1.146	A	2
103	7*s*−9*p*	^{2}S−^{2}P°		*1 782.66 cm*$^{-1}$	38 012.044–*39 794.70*	2–6	2.16−04	3.05−02	1.13+01	−1.215	B	2
				1 782.766 cm^{-1}	38 012.044–39 794.810	2–4	2.17−04	2.04−02	7.55+00	−1.389	B	2
				1 782.436 cm^{-1}	38 012.044–39 794.480	2–2	2.14−04	1.01−02	3.73+00	−1.695	B	2
104	6*d*−7*p*	^{2}D−^{2}P°		*153.4 cm*$^{-1}$	*38 387.26–38 540.7*	10–6	1.14−04	4.36−01	9.36+03	0.639	A	2
				153.67 cm^{-1}	38 387.257–38 540.93	6–4	1.03−04	4.37−01	5.61+03	0.419	A	2
				152.91 cm^{-1}	38 387.270–38 540.18	4–2	1.13−04	3.62−01	3.12+03	0.161	A	2
				153.66 cm^{-1}	38 387.270–38 540.93	4–4	1.15−05	7.28−02	6.24+02	−0.536	A	2
105	6*d*−7*f*	^{2}D−^{2}F°		*821.7 cm*$^{-1}$	*38 387.26–39209.0*	10–14	2.55−03	7.94−01	3.18+03	0.900	A	2
				821.72 cm^{-1}	38 387.257–39 208.98	6–8	2.55−03	7.56−01	1.82+03	0.657	A	2
				821.71 cm^{-1}	38 387.270–39 208.98	4–6	2.38−03	7.94−01	1.27+03	0.502	A	2
				821.72 cm^{-1}	38 387.257–39 208.98	6–6	1.70−04	3.78−02	9.08+01	−0.644	A	2
106	6*d*−8*p*	^{2}D−^{2}P°		*911.4 cm*$^{-1}$	*38 387.26–39 298.7*	10–6	3.42−05	3.70−03	1.34+01	−1.432	A	2

TABLE 4. Transition probabilities of allowed lines for Na I (references for this table are as follows: 1 = Taylor,[104] 2 = Froese Fischer,[34] 3 = Jones *et al.*,[48] 4 = Oates *et al.*,[72] 5 = Volz *et al.*,[120] 6 = Filippov and Prokof'ev[28])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	$E_i - E_k$ (cm^{-1})	$g_i - g_k$	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				911.58 cm^{-1}	38 387.257–39 298.84	6–4	3.04−05	3.66−03	7.93+00	−1.658	A	2
				911.08 cm^{-1}	38 387.270–39 298.35	4–2	3.50−05	3.16−03	4.57+00	−1.898	A	2
				911.57 cm^{-1}	38 387.270–39 298.84	4–4	3.38−06	6.10−04	8.81−01	−2.613	B+	2
107	6d–8f	^{2}D–^{2}F$^\circ$		*1 346.9 cm^{-1}*	*38 387.26–39 734.2*	10–14	1.95−03	2.26−01	5.51+02	0.354	A	2
				1 346.90 cm^{-1}	38 387.257–39 734.16	6–8	1.95−03	2.15−01	3.15+02	0.111	A	2
				1 346.89 cm^{-1}	38 387.270–39 734.16	4–6	1.82−03	2.26−01	2.21+02	−0.044	A	2
				1 346.90 cm^{-1}	38 387.257–39 734.16	6–6	1.30−04	1.07−02	1.58+01	−1.192	A	2
108	6d–9p	^{2}D–^{2}P$^\circ$		*1 407.44 cm^{-1}*	*38 387.26–39 794.70*	10–6	2.75−05	1.25−03	2.92+00	−1.903	B+	2
				1 407.553 cm^{-1}	38 387.257–39 794.810	6–4	2.45−05	1.24−03	1.74+00	−2.128	B+	2
				1 407.210 cm^{-1}	38 387.270–39 794.480	4–2	2.81−05	1.06−03	9.95−01	−2.373	B+	2
				1 407.540 cm^{-1}	38 387.270–39 794.810	4–4	2.72−06	2.06−04	1.93−01	−3.084	B	2
109	6d–9f	^{2}D–^{2}F$^\circ$		*1 706.9 cm^{-1}*	*38 387.26–40 094.2*	10–14	1.18−03	8.53−02	1.64+02	−0.069	D+	1
				1 706.93 cm^{-1}	38 387.257–40 094.19	6–8	1.18−03	8.12−02	9.40+01	−0.312	D+	LS
				1 706.92 cm^{-1}	38 387.270–40 094.19	4–6	1.11−03	8.53−02	6.58+01	−0.467	D+	LS
				1 706.93 cm^{-1}	38 387.257–40 094.19	6–6	7.89−05	4.06−03	4.70+00	−1.613	E+	LS
110	6d–10f	^{2}D–^{2}F$^\circ$		*1 964.5 cm^{-1}*	*38 387.26–40 351.8*	10–14	8.44−04	4.59−02	7.69+01	−0.338	D	1
				1 964.51 cm^{-1}	38 387.257–40 351.77	6–8	8.44−04	4.37−02	4.39+01	−0.581	D+	LS
				1 964.50 cm^{-1}	38 387.270–40 351.77	4–6	7.88−04	4.59−02	3.08+01	−0.736	D	LS
				1 964.51 cm^{-1}	38 387.257–40 351.77	6–6	5.64−05	2.19−03	2.20+00	−1.881	E	LS
111	6f–7d	^{2}F$^\circ$–^{2}D		*801.1 cm^{-1}*	*38 399.8–39 200.9*	14–10	2.85−04	4.75−02	2.74+02	−0.177	A	2
				801.14 cm^{-1}	38 399.79–39 200.93	8–6	2.71−04	4.75−02	1.56+02	−0.420	A	2
				801.14 cm^{-1}	38 399.79–39 200.93	6–4	2.85−04	4.44−02	1.09+02	−0.574	A	2
				801.14 cm^{-1}	38 399.79–39 200.93	6–6	1.36−05	3.17−03	7.81+00	−1.721	A	2
112	6f–8d	^{2}F$^\circ$–^{2}D		*1 328.9 cm^{-1}*	*38 399.8–39 728.7*	14–10	1.72−04	1.05−02	3.63+01	−0.833	A	2
				1 328.91 cm^{-1}	38 399.79–39 728.70	8–6	1.64−04	1.05−02	2.07+01	−1.076	A	2
				1 328.91 cm^{-1}	38 399.79–39 728.70	6–4	1.72−04	9.76−03	1.45+01	−1.232	A	2
				1 328.91 cm^{-1}	38 399.79–39 728.70	6–6	8.21−06	6.97−04	1.04+00	−2.379	B+	2
113	7p–8s	^{2}P$^\circ$–^{2}S		*427.8 cm^{-1}*	*38 540.7*–38 968.51	6–2	2.67−03	7.29−01	3.37+03	0.641	A	2
				427.58 cm^{-1}	38 540.93–38 968.51	4–2	1.78−03	7.30−01	2.25+03	0.465	A	2
				428.33 cm^{-1}	38 540.18–38 968.51	2–2	8.92−04	7.29−01	1.12+03	0.164	A	2
114	7p–7d	^{2}P$^\circ$–^{2}D		*660.2 cm^{-1}*	*38 540.7–39 200.9*	6–10	2.27−03	1.30+00	3.88+03	0.892	A	2
				660.00 cm^{-1}	38 540.93–39 200.93	4–6	2.27−03	1.17+00	2.33+03	0.670	A	2
				660.75 cm^{-1}	38 540.18–39 200.93	2–4	1.89−03	1.30+00	1.29+03	0.415	A	2
				660.00 cm^{-1}	38 540.93–39 200.93	4–4	3.78−04	1.30−01	2.59+02	−0.284	A	2
115	7p–9s	^{2}P$^\circ$–^{2}S		*1 034.2 cm^{-1}*	*38 540.7*–39 574.85	6–2	1.09−03	5.09−02	9.72+01	−0.515	B+	2
				1 033.92 cm^{-1}	38 540.93–39 574.85	4–2	7.25−04	5.08−02	6.48+01	−0.692	B+	2
				1 034.67 cm^{-1}	38 540.18–39 574.85	2–2	3.64−04	5.10−02	3.25+01	−0.991	B+	2
116	7p–8d	^{2}P$^\circ$–^{2}D		*1 188.0 cm^{-1}*	*38 540.7–39 728.7*	6–10	1.41−03	2.50−01	4.16+02	0.176	A	2
				1 187.77 cm^{-1}	38 540.93–39 728.70	4–6	1.41−03	2.25−01	2.50+02	−0.046	A	2
				1 188.52 cm^{-1}	38 540.18–39 728.70	2–4	1.18−03	2.50−01	1.39+02	−0.301	A	2
				1 187.77 cm^{-1}	38 540.93–39 728.70	4–4	2.36−04	2.50−02	2.78+01	−1.000	A	2
117	7p–10s	^{2}P$^\circ$–^{2}S		*1 442.6 cm^{-1}*	*38 540.7*–39 983.27	6–2	7.57−04	1.82−02	2.49+01	−0.962	B+	2

TABLE 4. Transition probabilities of allowed lines for Na I (references for this table are as follows: 1=Taylor,[104] 2=Froese Fischer,[34] 3=Jones *et al.*,[48] 4=Oates *et al.*,[72] 5=Volz *et al.*,[120] 6=Filippov and Prokof'ev[28])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})$^{\mathrm{a}}$	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				1 442.34 cm^{-1}	38 540.93–39 983.27	4–2	5.03−04	1.81−02	1.66+01	−1.140	B+	2
				1 443.09 cm^{-1}	38 540.18–39 983.27	2–2	2.53−04	1.82−02	8.32+00	−1.439	B+	2
118	$8s-8p$	$^2\mathrm{S}-^2\mathrm{P}^\circ$		*330.2 cm^{-1}*	38 968.51–*39 298.7*	2–6	7.63−04	3.15+00	6.28+03	0.799	A	2
				330.33 cm^{-1}	38 968.51–39 298.84	2–4	7.64−04	2.10+00	4.19+03	0.623	A	2
				329.84 cm^{-1}	38 968.51–39 298.35	2–2	7.62−04	1.05+00	2.10+03	0.322	A	2
119	$8s-9p$	$^2\mathrm{S}-^2\mathrm{P}^\circ$		*826.19 cm^{-1}*	38 968.51–*39 794.70*	2–6	1.83−04	1.21−01	9.61+01	−0.616	B+	2
				826.30 cm^{-1}	38 968.51–39 794.810	2–4	1.84−04	8.06−02	6.42+01	−0.793	B+	2
				825.97 cm^{-1}	38 968.51–39 794.480	2–2	1.82−04	4.00−02	3.19+01	−1.097	B+	2
120	$7d-8f$	$^2\mathrm{D}-^2\mathrm{F}^\circ$		*533.3 cm^{-1}*	*39 200.9–39 734.2*	10–14	1.14−03	8.44−01	5.21+03	0.926	A	2
				533.23 cm^{-1}	39 200.93–39 734.16	6–8	1.14−03	8.03−01	2.98+03	0.683	A	2
				533.23 cm^{-1}	39 200.93–39 734.16	4–6	1.07−03	8.43−01	2.08+03	0.528	A	2
				533.23 cm^{-1}	39 200.93–39 734.16	6–6	7.62−05	4.02−02	1.49+02	−0.618	A	2
121	$7d-9p$	$^2\mathrm{D}-^2\mathrm{P}^\circ$		*593.8 cm^{-1}*	*39 200.9–39 794.70*	10–6	3.21−05	8.19−03	4.54+01	−1.087	B+	2
				593.88 cm^{-1}	39 200.93–39 794.810	6–4	2.86−05	8.11−03	2.70+01	−1.313	B+	2
				593.55 cm^{-1}	39 200.93–39 794.480	4–2	3.26−05	6.94−03	1.54+01	−1.557	B+	2
				593.88 cm^{-1}	39 200.93–39 794.810	4–4	3.18−06	1.35−03	3.00+00	−2.268	B	2
122	$7d-9f$	$^2\mathrm{D}-^2\mathrm{F}^\circ$		*893.3 cm^{-1}*	*39 200.9–40 094.2*	10–14	7.75−04	2.04−01	7.51+02	0.310	D+	1
				893.26 cm^{-1}	39 200.93–40 094.19	6–8	7.74−04	1.94−01	4.29+02	0.066	D+	LS
				893.26 cm^{-1}	39 200.93–40 094.19	4–6	7.24−04	2.04−01	3.01+02	−0.088	D	LS
				893.26 cm^{-1}	39 200.93–40 094.19	6–6	5.17−05	9.72−03	2.15+01	−1.234	E	LS
123	$7d-10f$	$^2\mathrm{D}-^2\mathrm{F}^\circ$		*1 150.9 cm^{-1}*	*39 200.9–40 351.8*	10–14	5.61−04	8.89−02	2.54+02	−0.051	D	1
				1 150.84 cm^{-1}	39 200.93–40 351.77	6–8	5.61−04	8.46−02	1.45+02	−0.294	D	LS
				1 150.84 cm^{-1}	39 200.93–40 351.77	4–6	5.24−04	8.89−02	1.02+02	−0.449	E+	LS
				1 150.84 cm^{-1}	39 200.93–40 351.77	6–6	3.74−05	4.23−03	7.26+00	−1.596	E	LS
124	$7f-8d$	$^2\mathrm{F}^\circ-^2\mathrm{D}$		*519.7 cm^{-1}*	*39 209.0–39 728.7*	14–10	1.89−04	7.49−02	6.64+02	0.021	A	2
				519.72 cm^{-1}	39 208.98–39 728.70	8–6	1.80−04	7.49−02	3.80+02	−0.222	A	2
				519.72 cm^{-1}	39 208.98–39 728.70	6–4	1.89−04	6.99−02	2.66+02	−0.377	A	2
				519.72 cm^{-1}	39 208.98–39 728.70	6–6	8.99−06	4.99−03	1.90+01	−1.524	A	2
125	$8p-9s$	$^2\mathrm{P}^\circ-^2\mathrm{S}$		*276.2 cm^{-1}*	*39 298.7–39 574.85*	6–2	1.28−03	8.38−01	5.99+03	0.701	B+	2
				2 76.01 cm^{-1}	39 298.84–39 574.85	4–2	8.52−04	8.38−01	4.00+03	0.525	B+	2
				2 76.50 cm^{-1}	39 298.35–39 574.85	2–2	4.27−04	8.37−01	1.99+03	0.224	B+	2
126	$8p-8d$	$^2\mathrm{P}^\circ-^2\mathrm{D}$		*430.0 cm^{-1}*	*39 298.7–39 728.7*	6–10	1.06−03	1.43+00	6.56+03	0.933	A	2
				429.86 cm^{-1}	39 298.84–39 728.70	4–6	1.06−03	1.29+00	3.94+03	0.713	A	2
				430.35 cm^{-1}	39 298.35–39 728.70	2–4	8.81−04	1.43+00	2.18+03	0.456	A	2
				429.86 cm^{-1}	39 298.84–39 728.70	4–4	1.76−04	1.43−01	4.38+02	−0.243	A	2
127	$8p-10s$	$^2\mathrm{P}^\circ-^2\mathrm{S}$		*684.6 cm^{-1}*	*39 298.7*–39 983.27	6–2	3.46−04	3.69−02	1.06+02	−0.655	B+	2
				684.43 cm^{-1}	39 298.84–39 983.27	4–2	2.30−04	3.68−02	7.08+01	−0.832	B+	2
				684.92 cm^{-1}	39 298.35–39 983.27	2–2	1.16−04	3.70−02	3.56+01	−1.131	B+	2
128	$8p-9d$	$^2\mathrm{P}^\circ-^2\mathrm{D}$		*791.6 cm^{-1}*	*39 298.7–40 090.3*	6–10	6.24−04	2.49−01	6.21+02	0.174	D	1
				791.47 cm^{-1}	39 298.84–40 090.31	4–6	6.24−04	2.24−01	3.73+02	−0.048	D+	LS
				791.96 cm^{-1}	39 298.35–40 090.31	2–4	5.21−04	2.49−01	2.07+02	−0.303	D	LS
				791.47 cm^{-1}	39 298.84–40 090.31	4–4	1.04−04	2.49−02	4.14+01	−1.002	E+	LS

TABLE 4. Transition probabilities of allowed lines for Na I (references for this table are as follows: 1=Taylor,[104] 2=Froese Fischer,[34] 3=Jones *et al.*,[48] 4=Oates *et al.*,[72] 5=Volz *et al.*,[120] 6=Filippov and Prokof'ev[28])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
129	9*s*−9*p*	$^{2}\mathrm{S}-{}^{2}\mathrm{P}^{\circ}$		*219.85 cm*$^{-1}$	39 574.85–*39 794.70*	2–6	3.29−04	3.07+00	9.18+03	0.788	A	2
				2 19.96 cm^{-1}	39 574.85–39 794.810	2–4	3.30−04	2.04+00	6.12+03	0.611	A	2
				2 19.63 cm^{-1}	39 574.85–39 794.480	2–2	3.29−04	1.02+00	3.06+03	0.310	A	2
130	9*s*−10*p*	$^{2}\mathrm{S}-{}^{2}\mathrm{P}^{\circ}$		*562.11 cm*$^{-1}$	39 574.85–*40 136.96*	2–6	1.06−04	1.51−01	1.77+02	−0.520	D+	1
				562.19 cm^{-1}	39 574.85–40 137.039	2–4	1.06−04	1.01−01	1.18+02	−0.695	C	LS
				561.96 cm^{-1}	39 574.85–40 136.805	2–2	1.06−04	5.02−02	5.88+01	−0.998	D+	LS
131	8*d*−9*f*	$^{2}\mathrm{D}-{}^{2}\mathrm{F}^{\circ}$		*365.5 cm*$^{-1}$	*39 728.7–40 094.2*	10–14	5.11−04	8.03−01	7.23+03	0.905	C	1
				365.49 cm^{-1}	39 728.70–40 094.19	6–8	5.11−04	7.64−01	4.13+03	0.661	C	LS
				365.49 cm^{-1}	39 728.70–40 094.19	4–6	4.77−04	8.03−01	2.89+03	0.507	C	LS
				365.49 cm^{-1}	39 728.70–40 094.19	6–6	3.40−05	3.82−02	2.06+02	−0.640	D	LS
132	8*d*−10*f*	$^{2}\mathrm{D}-{}^{2}\mathrm{F}^{\circ}$		*623.1 cm*$^{-1}$	*39 728.7–40 351.8*	10–14	3.87−04	2.09−01	1.10+03	0.320	D+	1
				623.07 cm^{-1}	39 728.70–40 351.77	6–8	3.86−04	1.99−01	6.31+02	0.077	D+	LS
				623.07 cm^{-1}	39 728.70–40 351.77	4–6	3.61−04	2.09−01	4.42+02	−0.078	D+	LS
				623.07 cm^{-1}	39 728.70–40 351.77	6–6	2.58−05	9.96−03	3.16+01	−1.224	E	LS
133	8*f*−9*d*	$^{2}\mathrm{F}^{\circ}-{}^{2}\mathrm{D}$		*356.1 cm*$^{-1}$	*39 734.2–40 090.3*	14–10	1.13−04	9.57−02	1.24+03	0.127	D+	1
				356.15 cm^{-1}	39 734.16–40 090.31	8–6	1.08−04	9.57−02	7.08+02	−0.116	D+	LS
				356.15 cm^{-1}	39 734.16–40 090.31	6–4	1.13−04	8.93−02	4.95+02	−0.271	D+	LS
				356.15 cm^{-1}	39 734.16–40 090.31	6–6	5.40−06	6.38−03	3.54+01	−1.417	E	LS
134	9*p*−10*s*	$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{S}$		*188.57 cm*$^{-1}$	*39 794.70*–39 983.27	6–2	4.81−04	6.76−01	7.09+03	0.608	A	2
				188.46 cm^{-1}	39 794.810–39 983.27	4–2	3.21−04	6.77−01	4.73+03	0.433	A	2
				188.79 cm^{-1}	39 794.480–39 983.27	2–2	1.61−04	6.76−01	2.36+03	0.131	A	2
135	9*p*−9*d*	$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{D}$		*295.6 cm*$^{-1}$	*39 794.70–40 090.3*	6–10	5.63−04	1.61+00	1.08+04	0.985	B	1
				295.50 cm^{-1}	39 794.810–40 090.31	4–6	5.63−04	1.45+00	6.46+03	0.763	B	LS
				295.83 cm^{-1}	39 794.480–40 090.31	2–4	4.70−04	1.61+00	3.58+03	0.508	B	LS
				295.50 cm^{-1}	39 794.810–40 090.31	4–4	9.38−05	1.61−01	7.17+02	−0.191	C+	LS
136	9*p*−11*s*	$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{S}$		*476.68 cm*$^{-1}$	*39 794.70*–40 271.38	6–2	2.89−04	6.36−02	2.64+02	−0.418	C	1
				476.57 cm^{-1}	39 794.810–40 271.38	4–2	1.93−04	6.36−02	1.76+02	−0.594	C	LS
				476.90 cm^{-1}	39 794.480–40 271.38	2–2	9.65−05	6.36−02	8.78+01	−0.896	D+	LS
137	9*p*−10*d*	$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{D}$		*554.1 cm*$^{-1}$	*39 794.70–40 348.8*	6–10	3.35−04	2.72−01	9.71+02	0.213	C	1
				554.02 cm^{-1}	39 794.810–40 348.83	4–6	3.34−04	2.45−01	5.82+02	−0.009	C+	LS
				554.35 cm^{-1}	39 794.480–40 348.83	2–4	2.80−04	2.73−01	3.24+02	−0.263	C	LS
				554.02 cm^{-1}	39 794.810–40 348.83	4–4	5.57−05	2.72−02	6.47+01	−0.963	D+	LS
138	10*s*−10*p*	$^{2}\mathrm{S}-{}^{2}\mathrm{P}^{\circ}$		*153.69 cm*$^{-1}$	*39 983.27–40 136.96*	2–6	2.10−04	4.00+00	1.71+04	0.903	B	1
				153.77 cm^{-1}	39 983.27–40 137.039	2–4	2.11−04	2.67+00	1.14+04	0.728	B	LS
				153.54 cm^{-1}	39 983.27–40 136.805	2–2	2.09−04	1.33+00	5.70+03	0.425	B	LS
139	9*d*−10*f*	$^{2}\mathrm{D}-{}^{2}\mathrm{F}^{\circ}$		*261.5 cm*$^{-1}$	*40 090.3–40 351.8*	10–14	2.67−04	8.21−01	1.03+04	0.914	B	1
				2 61.46 cm^{-1}	40 090.31–40 351.77	6–8	2.67−04	7.82−01	5.91+03	0.671	B	LS
				261.46 cm^{-1}	40 090.31–40 351.77	4–6	2.50−04	8.21−01	4.13+03	0.516	B	LS
				261.46 cm^{-1}	40 090.31–40 351.77	6–6	1.78−05	3.91−02	2.95+02	−0.630	C	LS
140	9*f*−10*d*	$^{2}\mathrm{F}^{\circ}-{}^{2}\mathrm{D}$		*254.6 cm*$^{-1}$	*40 094.2–40 348.8*	14–10	7.45−05	1.23−01	2.23+03	0.236	C+	1
				254.64 cm^{-1}	40 094.19–40 348.83	8–6	7.09−05	1.23−01	1.27+03	−0.007	C+	LS
				254.64 cm^{-1}	40 094.19–40 348.83	6–4	7.46−05	1.15−01	8.92+02	−0.161	C+	LS

TABLE 4. Transition probabilities of allowed lines for Na I (references for this table are as follows: 1=Taylor,[104] 2=Froese Fischer,[34] 3=Jones *et al.*,[48] 4=Oates *et al.*,[72] 5=Volz *et al.*,[120] 6=Filippov and Prokof'ev[28])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				254.64 cm^{-1}	40 094.19–40 348.83	6–6	3.54−06	8.19−03	6.35+01	−1.309	D+	LS
141	$10p-11s$	$^2P^\circ-^2S$		*134.42 cm^{-1}*	*40 136.96*–40 271.38	6–2	4.16−04	1.15+00	1.69+04	0.839	B	1
				134.34 cm^{-1}	40 137.039–40 271.38	4–2	2.77−04	1.15+00	1.13+04	0.663	B	LS
				134.57 cm^{-1}	40 136.805–40 271.38	2–2	1.39−04	1.15+00	5.63+03	0.362	B	LS
142	$10p-10d$	$^2P^\circ-^2D$				6–10						1
				211.79 cm^{-1}	40 137.039–40 348.83	4–6	3.13−04	1.57+00	9.76+03	0.798	B	LS
				212.03 cm^{-1}	40 136.805–40 348.83	2–4	2.62−04	1.75+00	5.43+03	0.544	B	LS

[a] Wavelengths (Å) are always given unless cm^{-1} is indicated.

10.1.3. Forbidden Transitions for Na I

Transitions from energy levels up to the $4d$ have been published by Froese Fischer[35] using the MCHF approach. A number of $3s$-nd, $n=3-10$, transitions have been published in Kundu and Mackerjee,[52] Godefroid *et al.*,[42] and Tull *et al.*;[110] however, these were reported as multiplet averages and are not listed here.

No transitions from Froese Fischer[35] were reported in Kundu and Mackerjee,[52] Godefroid *et al.*,[42] and Tull *et al.*[110] Therefore, to estimate the accuracy of the forbidden lines from allowed lines, we isoelectronically averaged the logarithmic quality factors (described in Sec. 4.1) observed for lines from the lower-lying levels of Na-like ions of Na, Mg, Al, and Si and applied the result to forbidden lines of Na I, as described in the introduction. Thus the listed accuracies are less well established than for the allowed lines.

10.1.4. References for Forbidden Transitions for Na I

[42] M. Godefroid, C. E. Magnusson, P. O. Zetterberg, and I. Joelsson, Phys. Scr. **32**, 125 (1985).

[35] C. Froese Fischer, http://www.vuse.vanderbilt.edu/~cff/mchf_collection/ (MCHF, *ab initio*, downloaded on Aug. 6, 2002).

[52] B. Kundu and P. K. Mackerjee, Phys. Rev. A **35**, 980 (1987).

[110] C. E. Tull, M. Jackson, R. P. McEachran, and M. Cohen, Can. J. Phys. **50**, 1169 (1972).

TABLE 5. Wavelength finding list for forbidden lines for Na I

Wavelength (air) (Å)	Mult. No.	Wavelength (air) (Å)	Mult. No.	Wavelength (air) (Å)	Mult. No.	Wavelength (air) (Å)	Mult. No.
3 302.369	3	5 688.205	8	7 520.33	7	11 403.779	5
3 883.905	2	5 889.950	1	8 183.255	6	18 596.37	11
5 682.633	8	7 507.47	7	8 183.289	6	18 596.49	11
5 682.645	8	7 510.62	7	8 194.790	6	18 596.54	11
5 688.193	8	7 517.17	7	8 194.824	6	18 596.66	11
Wavenumber (cm^{-1})	Mult. No.	Wavenumber (cm^{-1})	Mult. No.	Wavenumber (cm^{-1})	Mult. No.	Wavenumber (cm^{-1})	Mult. No.
4 532.59	9	4 276.19	12	1 099.69	10	17.196	4
4 281.78	12	4 276.15	12	1 094.15	10		
4 281.74	12	1 099.74	10	1 094.10	10		

TABLE 6. Transition probabilities of forbidden lines for Na I (references for this table are as follows: 1=Froese Fischer[35])

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	Type	A_{ki} (s^{-1})	S (a.u.)	Acc.	Source
1	$3s-3p$	$^2S-^2P^\circ$									
			5 889.950	5 891.583	0.000–16 973.368	2–4	M2	1.99−04	3.79+02	A	1
2	$3s-4s$	$^2S-^2S$									
			3 883.905	3 885.005	0.000–25 739.991	2–2	M1	6.95−04	3.02−06	C	1
3	$3s-4p$	$^2S-^2P^\circ$									

TABLE 6. Transition probabilities of forbidden lines for Na I (references for this table are as follows: 1=Froese Fischer[35])—Continued

No.	Transition array	Mult.	$\lambda_{\rm air}$ (Å)	$\lambda_{\rm vac}$ (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	Type	A_{ki} (s^{-1})	S (a.u.)	Acc.	Source
			3 302.369	3 303.319	0.000–30 272.58	2–4	M2	2.88−05	3.03+00	B+	1
4	$3p-3p$	$^2P^\circ-{}^2P^\circ$									
				17.196 cm^{-1}	16 956.172–16 973.368	2–4	M1	4.57−08	1.33+00	A	1
				17.196 cm^{-1}	16 956.172–16 973.368	2–4	E2	5.26−14	1.25+03	A	1
5	$3p-4s$	$^2P^\circ-{}^2S$									
			11 403.779	11 406.901	16 973.368–25 739.991	4–2	M2	1.45−05	3.75+02	A	1
6	$3p-3d$	$^2P^\circ-{}^2D$									
			8 183.289	8 185.539	16 956.172–29 172.839	2–6	M2	1.97−05	2.91+02	A	1
			8 194.824	8 197.077	16 973.368–29 172.839	4–6	M2	1.07−04	1.59+03	A	1
			8 183.255	8 185.505	16 956.172–29 172.889	2–4	M2	2.76−06	2.72+01	A	1
			8 194.790	8 197.043	16 973.368–29 172.889	4–4	M2	6.09−14	6.04−07	E+	1
7	$3p-4p$	$^2P^\circ-{}^2P^\circ$									
			7 517.17	7 519.24	16 973.368–30 272.58	4–4	M1	4.28−05	2.70−06	C	1
			7 517.17	7 519.24	16 973.368–30 272.58	4–4	E2	8.88+00	7.63+02	A	1
			7 510.62	7 512.69	16 956.172–30 266.99	4–2	M1	1.15−06	3.62−08	D	1
			7 520.33	7 522.40	16 973.368–30 266.99	4–2	M1	8.84−06	2.79−07	D+	1
			7 520.33	7 522.40	16 973.368–30 266.99	4–2	E2	1.78+01	7.65+02	A	1
			7 507.47	7 509.53	16 956.172–30 272.58	2–4	M1	6.24−06	3.92−07	D+	1
			7 507.47	7 509.53	16 956.172–30 272.58	2–4	E2	8.93+00	7.62+02	A	1
8	$3p-4d$	$^2P^\circ-{}^2D$									
			5 682.645	5 684.221	16 956.172–34 548.731	2–6	M2	1.01−05	2.41+01	A	1
			5 688.205	5 689.783	16 973.368–34 548.731	4–6	M2	5.49−05	1.32+02	A	1
			5 682.633	5 684.210	16 956.172–34 548.766	2–4	M2	1.42−06	2.26+00	B+	1
			5 688.193	5 689.772	16 973.368–34 548.766	4–4	M2	2.12−13	3.40−07	E+	1
9	$4s-4p$	$^2S-{}^2P^\circ$									
				4 532.59 cm^{-1}	25 739.991–30 272.58	2–4	M2	1.50−06	2.10+03	A	1
10	$3d-4p$	$^2D-{}^2P^\circ$									
				1 094.15 cm^{-1}	29 172.839–30 266.99	6–2	M2	8.91−10	7.62+02	A	1
				1 099.74 cm^{-1}	29 172.839–30 272.58	6–4	M2	2.50−09	4.16+03	A	1
				1 094.10 cm^{-1}	29 172.889–30 266.99	4–2	M2	8.35−11	7.14+01	A	1
				1 099.69 cm^{-1}	29 172.889–30 272.58	4–4	M2	1.10−19	1.84−07	E	1
11	$3d-4d$	$^2D-{}^2D$	18 596.49	18 601.56	29 172.839–34 548.731	6–6	M1	4.14−08	5.93−08	D	1
			18 596.49	18 601.56	29 172.839–34 548.731	6–6	E2	9.64−01	1.15+04	A+	1
			18 596.54	18 601.62	29 172.889–34 548.766	4–4	M1	1.05−08	1.00−08	D	1
			18 596.54	18 601.62	29 172.889–34 548.766	4–4	E2	8.44−01	6.71+03	A+	1
			18 596.37	18 601.44	29 172.839–34 548.766	6–4	M1	3.24−09	3.09−09	E+	1
			18 596.37	18 601.44	29 172.839–34 548.766	6–4	E2	3.62−01	2.88+03	A+	1
			18 596.66	18 601.74	29 172.889–34 548.731	4–6	M1	9.99−10	1.43−09	E+	1
			18 596.66	18 601.74	29 172.889–34 548.731	4–6	E2	2.41−01	2.88+03	A+	1
12	$4p-4d$	$^2P^\circ-{}^2D$									
				4 281.74 cm^{-1}	30 266.99–34 548.731	2–6	M2	3.25−07	9.09+02	A	1
				4 276.15 cm^{-1}	30 272.58–34 548.731	4–6	M2	1.77−06	4.97+03	A	1
				4 281.78 cm^{-1}	30 266.99–34 548.766	2–4	M2	4.57−08	8.52+01	A	1
				4 276.19 cm^{-1}	30 272.58–34 548.766	4–4	M2	5.94−17	1.11−07	E	1

[a] Wavelengths (Å) are always given unless cm^{-1} is indicated.

10.2. Na II

Neon isoelectronic sequence
Ground state: $1s^22s^22p^6\ ^1S_0$
Ionization energy: 47.286 35 eV=381 390.2 cm^{-1}

10.2.1. Allowed Transitions for Na II

The sources we used in the compilation[45,93,98,107] are far from comprehensive, resulting in the relatively small number of lines presented below. These are limited to transitions with upper levels through to the 4s. Wherever available we have used the data of Tachiev and Froese Fischer,[98] which result from extensive MCHF calculations with Breit-Pauli corrections to order α^2. The calculations extend only to transitions from energy levels up to the $2p^54s$. Hibbert *et al.*[45] applied the CIV3 code. No OP data were used for this Ne-like spectrum, in which spin-orbit effects play a critical role.

In the NIST energy level tables,[61] only levels with $2p^6$, $2p^53s$, and $2p^53p$ configurations are designated with LS-coupled terms. All higher-lying levels, those above 310 000 cm^{-1}, with configurations $2p^53d$ and higher, are designated with terms in jK (or pair) coupling. Many of these levels have a highly mixed composition in any coupling scheme, some to the extent that they cannot be assigned an unambiguous term. Most of the transitions involving these higher levels have estimated accuracies too low to be included in this compilation.

To estimate accuracies, we pooled the relative standard deviation of the mean (RSDM) for each of the lines with transition rates published in two or more of the references cited below, as described in the general introduction. For this purpose the spin-allowed and intercombination data were treated separately and each of these was in turn divided into two upper-level energy groups below and above 310 000 cm^{-1}. To estimate the accuracy of lines from higher-lying levels, we isoelectronically averaged the logarithmic quality factors (see Sec. 4.1 of the Introduction) observed for lines from the lower-lying levels of Ne-like ions of Na, Mg, Al, and Si and scaled them for lines from high-lying levels, as described in the introduction. Thus the listed accuracies for these higher-lying transitions are less well established than for those from lower levels.

10.2.2. References for Allowed Transitions for Na II

[45] A. Hibbert, M. LeDourneuf, and M. Mohan, At. Data Nucl. Data Tables **53**, 23 (1993).

[61] W. C. Martin and R. Zalubas, J. Phys. Chem. Ref. Data **10**, 153 (1981).

[93] G. Tachiev and C. Froese Fischer, http://www.vuse.vanderbilt.edu/~cff/mchf_collection/ (MCHF, *ab initio*, downloaded on May 5, 2002).

[98] G. Tachiev and C. Froese Fischer, http://www.vuse.vanderbilt.edu/~cff/mchf_collection/ (MCHF, energy adjusted, downloaded on December 3, 2003).

[107] E. Träbert, Phys. Scr. **53**, 167 (1996).

TABLE 7. Wavelength finding list for allowed lines for Na II

Wavelength (vac) (Å)	Mult. No.
300.153	4
300.203	5
301.436	3
372.075	2
376.379	1

TABLE 7. Wavelength finding list for allowed lines for Na II—Continued

Wavelength (air) (Å)	Mult. No.
2 315.648	11
2 493.148	17
2 506.302	53
2 515.457	53
2 525.649	52
2 531.540	47
2 594.959	20
2 600.324	21
2 660.997	20
2 671.829	19
2 678.085	19
2 799.217	55
2 808.705	54
2 809.520	10
2 811.843	54
2 818.285	55
2 829.867	55
2 839.564	54
2 841.721	10
2 842.772	54
2 859.486	9
2 861.021	55
2 871.277	10
2 872.957	55
2 881.149	10
2 886.259	54
2 893.954	48
2 901.143	28
2 904.709	28
2 904.918	10
2 917.521	8
2 919.050	42
2 920.944	10
2 923.484	9
2 930.881	24
2 934.078	28
2 937.726	28
2 942.655	49
2 945.699	26
2 947.445	57
2 951.235	25
2 952.396	42
2 960.115	57
2 970.727	56
2 974.238	56
2 974.990	9
2 977.128	24
2 979.660	26
2 980.624	24
2 984.174	8
2 984.191	28
2 999.329	42
3 004.151	50
3 007.446	7
3 009.143	59
3 015.400	24

TABLE 7. Wavelength finding list for allowed lines for Na II—Continued

Wavelength (air) (Å)	Mult. No.
3 022.350	59
3 029.070	61
3 029.316	23
3 037.075	58
3 042.453	61
3 045.597	50
3 053.665	60
3 055.354	61
3 056.160	7
3 057.375	60
3 058.715	43
3 064.374	24
3 066.534	61
3 070.823	30
3 078.320	7
3 078.338	32
3 078.747	23
3 080.251	61
3 087.057	23
3 092.731	7
3 094.449	43
3 095.546	60
3 104.400	51
3 124.413	31
3 125.212	44
3 129.376	7
3 135.478	7
3 137.853	34
3 145.700	35
3 149.275	16
3 159.528	38
3 161.154	16
3 162.526	44
3 163.732	30
3 167.484	40
3 179.055	29
3 184.544	45
3 188.134	38
3 189.790	16
3 200.309	38
3 212.191	15
3 216.286	39
3 225.978	45
3 234.927	34
3 250.949	33
3 257.968	38
3 260.215	33
3 274.220	37
3 285.608	14
3 301.348	38
3 304.951	37
3 318.036	37
3 327.689	37
3 400.098	13
3 462.494	13
3 533.057	6
3 631.272	6
3 711.074	6
4 087.593	12
4 123.069	62
4 344.124	46
4 368.588	41

TABLE 8. Transition probabilities of allowed lines for Na II (references for this table are as follows: 1 = Tachiev and Froese Fischer,[98] 2 = Tachiev and Froese Fischer,[93] 3 = Hibbert *et al.*,[45] and 4 = Träbert[107])

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	$E_i - E_k$ (cm^{-1})	$g_i - g_k$	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
1	$2p^6-2p^53s$	$^1\mathrm{S}-{}^3\mathrm{P}^\circ$		376.379	0.0–265 689.62	1–3	1.70+00	1.08−02	1.34−02	−1.967	C	4
2		$^1\mathrm{S}-{}^1\mathrm{P}^\circ$		372.075	0.0–268 762.96	1–3	3.13+01	1.95−01	2.39−01	−0.710	B+	4
3	$2p^6-2p^5(^2\mathrm{P}^\circ_{3/2})3d$	$^1\mathrm{S}-{}^2[3/2]^\circ$		301.436	0.0–331 745.06	1–3	3.33+01	1.36−01	1.35−01	−0.866	D+	3
4	$2p^6-2p^5(^2\mathrm{P}^\circ_{1/2})4s$	$^1\mathrm{S}-{}^2[1/2]^\circ$		300.153	0.0–333 162.94	1–3	1.18+01	4.77−02	4.71−02	−1.321	D	1
5	$2p^6-2p^5(^2\mathrm{P}^\circ_{1/2})3d$	$^1\mathrm{S}-{}^2[3/2]^\circ$		300.203	0.0–333 107.74	1–3	1.17+01	4.76−02	4.70−02	−1.322	D	3
6	$2p^53s-2p^53p$	$^3\mathrm{P}^\circ-{}^3\mathrm{S}$	*3 584.48*	*3 585.50*	*265 330.2*–293 220.33	9–3	1.34+00	8.64−02	9.17+00	−0.109	A	1
			3 533.057	3 534.067	264 924.32–293 220.33	5–3	8.81−01	9.90−02	5.76+00	−0.305	A	1
			3 631.272	3 632.307	265 689.62–293 220.33	3–3	3.72−01	7.36−02	2.64+00	−0.656	A	1
			3 711.074	3 712.130	266 281.62–293 220.33	1–3	1.02−01	6.32−02	7.73−01	−1.199	B+	1

TABLE 8. Transition probabilities of allowed lines for Na II (references for this table are as follows: 1=Tachiev and Froese Fischer,[98] 2=Tachiev and Froese Fischer,[93] 3=Hibbert *et al.*,[45] and 4=Träbert[107])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
7		$^3P^\circ-{}^3D$	*3 101.72*	*3 102.61*	*265 330.2–297 561.1*	9–15	2.06+00	4.95−01	4.55+01	0.649	A	1
			3 092.731	3 093.629	264 924.32–297 248.82	5–7	2.09+00	4.21−01	2.14+01	0.323	A	1
			3 129.376	3 130.283	265 689.62–297 635.61	3–5	1.28+00	3.14−01	9.72+00	−0.026	A	1
			3 135.478	3 136.387	266 281.62–298 165.44	1–3	7.42−01	3.28−01	3.39+00	−0.484	A	1
			3 056.160	3 057.048	264 924.32–297 635.61	5–5	7.46−01	1.05−01	5.26+00	−0.280	A	1
			3 078.320	3 079.214	265 689.62–298 165.44	3–3	1.17+00	1.66−01	5.05+00	−0.303	A	1
			3 007.446	3 008.322	264 924.32–298 165.44	5–3	1.68−01	1.37−02	6.77−01	−1.164	B+	1
8		$^3P^\circ-{}^1D$										
			2 984.174	2 985.044	265 689.62–299 189.96	3–5	1.74−01	3.87−02	1.14+00	−0.935	B	1
			2 917.521	2 918.375	264 924.32–299 189.96	5–5	7.92−01	1.01−01	4.86+00	−0.297	B+	1
9		$^3P^\circ-{}^1P$										
			2 923.484	2 924.340	265 689.62–299 885.37	3–3	1.41−01	1.80−02	5.21−01	−1.268	B	1
			2 859.486	2 860.326	264 924.32–299 885.37	5–3	2.19−01	1.61−02	7.60−01	−1.094	B	1
			2 974.990	2 975.858	266 281.62–299 885.37	1–3	6.47−01	2.58−01	2.53+00	−0.588	B+	1
10		$^3P^\circ-{}^3P$	*2 861.24*	*2 862.07*	*265 330.2–300 269.9*	9–9	1.71+00	2.10−01	1.78+01	0.276	A	1
			2 841.721	2 842.556	264 924.32–300 103.92	5–5	8.92−01	1.08−01	5.05+00	−0.268	A	1
			2 871.277	2 872.120	265 689.62–300 507.11	3–3	2.75−01	3.40−02	9.66−01	−0.991	B+	1
			2 809.520	2 810.347	264 924.32–300 507.11	5–3	5.95−01	4.23−02	1.96+00	−0.675	A	1
			2 881.149	2 881.994	265 689.62–300 387.82	3–1	2.50+00	1.04−01	2.96+00	−0.506	A	1
			2 904.918	2 905.769	265 689.62–300 103.92	3–5	7.30−01	1.54−01	4.42+00	−0.335	A	1
			2 920.944	2 921.799	266 281.62–300 507.11	1–3	6.66−01	2.56−01	2.46+00	−0.592	A	1
11		$^3P^\circ-{}^1S$										
			2 315.648	2 316.360	265 689.62–308 860.80	3–1	1.05−01	2.82−03	6.45−02	−2.073	C+	2,3
12		$^1P^\circ-{}^3S$										
			4 087.593	4 088.747	268 762.96–293 220.33	3–3	3.81−03	9.56−04	3.86−02	−2.542	C	1
13		$^1P^\circ-{}^3D$										
			3 462.494	3 463.485	268 762.96–297 635.61	3–5	3.61−02	1.08−02	3.70−01	−1.489	B	1
			3 400.098	3 401.074	268 762.96–298 165.44	3–2	1.24−02	2.16−03	7.25−02	−2.188	C+	1
14		$^1P^\circ-{}^1D$	3 285.608	3 286.555	268 762.96–299 189.96	3–5	1.10+00	2.98−01	9.66+00	−0.049	A	1
15		$^1P^\circ-{}^1P$	3 212.191	3 213.119	268 762.96–299 885.37	3–3	1.12+00	1.74−01	5.52+00	−0.282	A	1
16		$^1P^\circ-{}^3P$										
			3 149.275	3 150.187	268 762.96–300 507.11	3–3	8.24−01	1.23−01	3.81+00	−0.433	B+	1
			3 161.154	3 162.069	268 762.96–300 387.82	3–1	4.36−02	2.18−03	6.81−02	−2.184	C+	1
			3 189.790	3 190.713	268 762.96–300 103.92	3–5	7.30−01	1.86−01	5.85+00	−0.253	B+	1
17		$^1P^\circ-{}^1S$	2 493.148	2 493.900	268 762.96–308 860.80	3–1	4.15+00	1.29−01	3.18+00	−0.412	A	2,3
18[b]												
19	$2p^53p-2p^5(^2P^\circ_{3/2})3d$	$^3S-{}^2[1/2]^\circ$										
			2 671.829	2 672.623	293 220.33–330 636.75	3–3	2.64+00	2.82−01	7.45+00	−0.073	B+	3
20		$^3S-{}^2[3/2]^\circ$										
			2 660.997	2 661.789	293 220.33–330 789.05	3–5	1.65+00	2.92−01	7.69+00	−0.057	B+	3
			2 594.959	2 595.735	293 220.33–331 745.06	3–3	3.71−01	3.74−02	9.60−01	−0.950	B	1
21		$^3S-{}^2[5/2]^\circ$										
			2 600.324	2 601.101	293 220.33–331 665.59	3–5	4.93−03	8.33−04	2.14−02	−2.602	D	3
22[b]												
23		$^3D-{}^2[1/2]^\circ$										

TABLE 8. Transition probabilities of allowed lines for Na II (references for this table are as follows: 1 = Tachiev and Froese Fischer,[98] 2 = Tachiev and Froese Fischer,[93] 3 = Hibbert *et al.*,[45] and 4 = Träbert[107])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	$E_i - E_k$ (cm^{-1})	$g_i - g_k$	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
			3 078.747	3 079.642	298 165.44–330 636.75	3–3	3.59−02	5.10−03	1.55−01	−1.815	D+	3
			3 029.316	3 030.198	297 635.61–330 636.75	5–3	6.32−02	5.22−03	2.60−01	−1.583	C	3
			3 087.057	3 087.953	298 165.44–330 549.35	3–1	1.66−01	7.90−03	2.41−01	−1.625	C	3
24		^{3}D–^{2}[3/2]$^\circ$										
			3 064.374	3 065.265	298 165.44–330 789.05	3–5	7.62−02	1.79−02	5.42−01	−1.270	C	3
			3 015.400	3 016.278	297 635.61–330 789.05	5–5	1.51−01	2.06−02	1.02+00	−0.987	C+	3
			2 977.128	2 977.997	298 165.44–331 745.06	3–3	1.05−01	1.39−02	4.10−01	−1.380	C+	1
			2 980.624	2 981.494	297 248.82–330 789.05	7–5	3.30−03	3.14−04	2.16−02	−2.658	D	3
			2 930.881	2 931.739	297 635.61–331 745.06	5–3	9.83−01	7.60−02	3.67+00	−0.420	B+	1
25		^{3}D–^{2}[7/2]$^\circ$										
			2 951.235	2 952.097	297 248.82–331 123.04	7–9	4.33+00	7.27−01	4.94+01	0.707	A	1
26		^{3}D–^{2}[7/2]$^\circ$										
			2 979.660	2 980.529	297 635.61–331 186.70	5–7	1.96+00	3.65−01	1.79+01	0.261	B+	3
			2 945.699	2 946.560	297 248.82–331 186.70	7–7	2.50−02	3.26−03	2.21−01	−1.642	C	3
27	$2p^53p-2p^5(^2P^\circ_{1/2})3d$	^{3}D–^{2}[3/2]$^\circ$										
			2 861.021	2 861.861	298 165.44–333 107.74	3–3	6.43−01	7.90−02	2.23+00	−0.625	B	3
28	$2p^53p-2p^5(^2P^\circ_{3/2})3d$	^{3}D–^{2}[5/2]$^\circ$										
			2 934.078	2 934.936	297 635.61–331 707.90	5–7	3.17+00	5.72−01	2.76+01	0.456	B+	1
			2 984.191	2 985.061	298 165.44–331 665.59	3–5	2.36+00	5.26−01	1.55+01	0.198	B+	3
			2 901.143	2 901.993	297 248.82–331 707.90	7–7	2.89−01	3.64−02	2.44+00	−0.594	B	1
			2 937.726	2 938.585	297 635.61–331 665.59	5–5	1.28+00	1.66−01	8.04+00	−0.081	B+	3
			2 904.709	2 905.560	297 248.82–331 665.59	7–5	1.04+04	9.36−03	6.27−01	−1.184	C	3
29		^{1}D–^{2}[1/2]$^\circ$										
			3 179.055	3 179.975	299 189.96–330 636.75	5–3	3.94−01	3.58−02	1.88+00	−0.747	B	1
30		^{1}D–^{2}[3/2]$^\circ$										
			3 163.732	3 164.648	299 189.96–330 789.05	5–5	1.05+00	1.58−01	8.22+00	−0.102	B+	1
			3 070.823	3 071.715	299 189.96–331 745.06	5–3	8.70−02	7.38−03	3.73−01	−1.433	C	3
31		^{1}D–^{2}[7/2]$^\circ$										
			3 124.413	3 125.318	299 189.96–331 186.70	5–7	2.56+00	5.24−01	2.70+01	0.418	A	1
32		^{1}D–^{2}[5/2]$^\circ$										
			3 078.338	3 079.232	299 189.96–331 665.59	5–5	1.11−02	1.58−03	8.00−02	−2.102	C	1
33		^{1}P–^{2}[1/2]$^\circ$										
			3 250.949	3 251.887	299 885.37–330 636.75	3–3	9.65−02	1.53−02	4.91−01	−1.338	C+	1
			3 260.215	3 261.155	299 885.37–330 549.35	3–1	4.65−01	2.47−02	7.95−01	−1.130	B	1
34		^{1}P–^{2}[3/2]$^\circ$										
			3 234.927	3 235.861	299 885.37–330 789.05	3–5	1.83−01	4.79−02	1.53+00	−0.843	B	1
			3 137.853	3 138.762	299 885.37–331 745.06	3–3	1.41+00	2.08−01	6.44+00	−0.205	B+	3
35		^{1}P–^{1}[5/2]$^\circ$										
			3 145.700	3 146.611	299 885.37–331 665.59	3–5	7.23−03	1.79−03	5.56−02	−2.270	D+	1
36		^{3}P–^{2}[1/2]$^\circ$										1
			3 327.689	3 328.647	300 507.11–330 549.35	3–1	9.42−01	5.21−02	1.71+00	−0.806	B+	1
37		^{3}P–^{2}[1/2]$^\circ$										
			3 304.951	3 305.902	300 387.82–330 636.75	1–3	3.60−01	1.77−01	1.93+00	−0.752	B	3
			3 318.036	3 318.991	300 507.11–330 636.75	3–3	4.14−01	6.83−02	2.24+00	−0.688	B	3
			3 274.220	3 275.163	300 103.92–330 636.75	5–3	4.29−01	4.14−02	2.23+00	−0.684	B	3
			3 327.689	3 328.647	300 507.11–330 549.35	3–1	9.45−01	5.23−02	1.72+00	−0.804	B	3
38		^{3}P–^{2}[3/2]$^\circ$										

TABLE 8. Transition probabilities of allowed lines for Na II (references for this table are as follows: 1=Tachiev and Froese Fischer,[98] 2=Tachiev and Froese Fischer,[93] 3=Hibbert *et al.*,[45] and 4=Träbert[107])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
			3 301.348	3 302.298	300 507.11–330 789.05	3–5	4.54−02	1.24−02	4.03−01	−1.429	C	3
			3 188.134	3 189.056	300 387.82–331 745.06	1–3	6.66−01	3.05−01	3.20+00	−0.516	B+	1
			3 257.968	3 258.907	300 103.92–330 789.05	5–5	1.03+00	1.64−01	8.78+00	−0.086	B+	3
			3 200.309	3 201.234	300 507.11–331 745.06	3–3	3.82−06	5.87−07	1.86−05	−5.754	E	1
			3 159.528	3 160.442	300 103.92–331 745.06	5–3	1.38−03	1.24−04	6.44−03	−3.208	D	1
39		$^{3}\mathrm{P}-^{2}[7/2]^{\circ}$										
			3 216.286	3 217.215	300 103.92–331 186.70	5–7	1.45−01	3.14−02	1.66+00	−0.804	B	3
40		$^{3}\mathrm{P}-^{2}[5/2]^{\circ}$										
			3 163.243	3 164.158	300 103.92–331 707.90	5–7	1.24−01	2.60−02	1.35+00	−0.886	B	1
			3 167.484	3 168.400	300 103.92–331 665.59	5–5	9.26−02	1.39−02	7.27−01	−1.158	C+	3
41		$^{1}\mathrm{S}-^{2}[3/2]^{\circ}$										
			4 368.588	4 369.816	308 860.80–331 745.06	1–3	3.59−01	3.08−01	4.43+00	−0.511	B	3
42	$2p^53p-2p^5(^2\mathrm{P}^\circ_{3/2})4s$	$^{3}\mathrm{D}-^{2}[3/2]^{\circ}$										
			2 999.329	3 000.204	298 165.44–331 496.51	3–5	2.25+00	5.05−01	1.50+01	0.180	B+	1
			2 952.396	2 953.259	297 635.61–331 496.51	5–5	1.29+00	1.69−01	8.22+00	−0.073	B+	1
			2 919.050	2 919.905	297 248.82–331 496.51	7–5	7.94−02	7.25−03	4.88−01	−1.295	C+	1
43		$^{1}\mathrm{D}-^{2}[3/2]^{\circ}$										
			3 094.449	3 095.348	299 189.96–331 496.51	5–5	1.91−03	2.75−04	1.40−02	−2.862	E+	1
			3 058.715	3 059.604	299 189.96–331 873.93	5–3	2.18−01	1.84−02	9.26−01	−1.036	C+	1
44		$^{1}\mathrm{P}-^{2}[3/2]^{\circ}$										
			3 162.526	3 163.442	299 885.37–331 496.51	3–5	4.41−01	1.10−01	3.44+00	−0.481	B	1
			3 125.212	3 126.118	299 885.37–331 873.93	3–3	9.72−02	1.42−02	4.40−01	−1.371	C	1
45		$^{3}\mathrm{P}-^{2}[3/2]^{\circ}$										
			3 225.978	3 226.910	300 507.11–331 496.51	3–5	4.23−05	1.10−05	3.51−04	−4.481	E	1
			3 184.544	3 185.465	300 103.92–331 496.51	5–5	8.26−02	1.26−02	6.59−01	−1.201	C+	1
46		$^{1}\mathrm{S}-^{2}[3/2]^{\circ}$										
			4 344.124	4 345.345	308 860.80–331 873.93	1–3	4.32−01	3.67−01	5.24+00	−0.435	B+	1
47	$2p^53p-2p^5(^2\mathrm{P}^\circ_{1/2})4s$	$^{3}\mathrm{S}-^{2}[1/2]^{\circ}$										
			2 531.540	2 532.301	293 220.33–332 710.11	3–1	8.44−01	2.70−02	6.76−01	−1.092	C+	1
48		$^{3}\mathrm{D}-^{2}[1/2]^{\circ}$										
			2 893.954	2 894.803	298 165.44–332 710.11	3–1	1.48+00	6.18−02	1.77+00	−0.732	B	1
49		$^{1}\mathrm{D}-^{2}[1/2]^{\circ}$										
			2 942.655	2 943.516	299 189.96–333 162.94	5–3	1.04−01	8.08−03	3.92−01	−1.394	C	1
50		$^{1}\mathrm{P}-^{2}[1/2]^{\circ}$										
			3 004.151	3 005.027	299 885.37–333 162.94	3–3	9.44−02	1.28−02	3.79−01	−1.416	C	1
			3 045.597	3 046.483	299 885.37–332 710.11	3–1	6.92−01	3.21−02	9.66−01	−1.016	C+	1
51		$^{3}\mathrm{P}-^{2}[1/2]^{\circ}$										
			3 104.400	3 105.301	300 507.11–332 710.11	3–1	5.63−01	2.71−02	8.33−01	−1.090	C+	1
52	$2p^53p-2p^5(^2\mathrm{P}^\circ_{1/2})3d$	$^{3}\mathrm{S}-^{2}[5/2]^{\circ}$										
			2 525.649	2 526.409	293 220.33–332 802.21	3–5	2.78−03	4.43−04	1.11−02	−2.876	D	1
53		$^{3}\mathrm{S}-^{2}[3/2]^{\circ}$										
			2 515.457	2 516.214	293 220.33–332 962.57	3–5	2.25−01	3.57−02	8.86−01	−0.970	C+	3
			2 506.302	2 507.057	293 220.33–333 107.74	3–3	2.73−01	2.57−02	6.37−01	−1.113	C+	1
54		$^{3}\mathrm{D}-^{2}[5/2]^{\circ}$										
			2 839.564	2 840.399	297 635.61–332 841.93	5–7	1.11+00	1.88−01	8.77+00	−0.027	B+	3
			2 886.259	2 887.105	298 165.44–332 802.21	3–5	1.07+00	2.24−01	6.38+00	−0.173	B+	1

TABLE 8. Transition probabilities of allowed lines for Na II (references for this table are as follows: 1 = Tachiev and Froese Fischer,[98] 2 = Tachiev and Froese Fischer,[93] 3 = Hibbert *et al.*,[45] and 4 = Träbert[107])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
			2 808.705	2 809.533	297 248.82–332 841.93	7–7	1.93−02	2.29−03	1.48−01	−1.795	D+	3
			2 842.772	2 843.607	297 635.61–332 802.21	5–5	5.23−03	6.34−04	2.97−02	−2.499	D	1
			2 811.843	2 812.671	297 248.82–332 802.21	7–5	1.01−02	8.56−04	5.55−02	−2.222	D+	1
55		${}^3D-{}^2[3/2]^\circ$										
			2 872.957	2 873.800	298 165.44–332 962.57	3–5	2.63−01	5.43−02	1.54+00	−0.788	C+	3
			2 829.867	2 830.699	297 635.61–332 962.57	5–5	3.36−01	4.04−02	1.88+00	−0.695	B	3
			2 861.021	2 861.861	298 165.44–333 107.74	3–3	8.00−02	9.82−03	2.78−01	−1.531	C	1
			2 799.217	2 800.042	297 248.82–332 962.57	7–5	2.64−02	2.21−03	1.43−01	−1.811	D+	3
			2 818.285	2 819.115	297 635.61–333 107.74	5–3	1.24−01	8.86−03	4.11−01	−1.354	C+	1
56		${}^1D-{}^2[5/2]^\circ$										
			2 970.727	2 971.594	299 189.96–332 841.93	5–7	1.03−01	1.92−02	9.37−01	−1.018	B	1
			2 974.238	2 975.106	299 189.96–332 802.21	5–5	2.02−01	2.68−02	1.31+00	−0.873	C+	3
57		${}^1D-{}^2[3/2]^\circ$										
			2 960.115	2 960.979	299 189.96–332 962.57	5–5	5.60−01	7.36−02	3.59+00	−0.434	B+	1
			2 947.445	2 948.306	299 189.96–333 107.74	5–3	4.27−02	3.34−03	1.62−01	−1.777	D+	3
58		${}^1P-{}^2[5/2]^\circ$										
			3 037.075	3 037.959	299 885.37–332 802.21	3–5	2.55+00	5.88−01	1.76+01	0.246	B+	3
59		${}^1P-{}^2[3/2]^\circ$										
			3 022.350	3 023.231	299 885.37–332 962.57	3–5	6.91−03	1.58−03	4.71−02	−2.324	D+	1
			3 009.143	3 010.020	299 885.37–333 107.74	3–3	1.73−01	2.35−02	7.00−01	−1.152	C+	3
60		${}^3P-{}^2[5/2]^\circ$										
			3 053.665	3 054.553	300 103.92–332 841.93	5–7	2.99+00	5.85−01	2.94+01	0.466	B+	3
			3 095.546	3 096.445	300 507.11–332 802.21	3–5	3.97−03	9.51−04	2.91−02	−2.545	D+	1
			3 057.375	3 058.264	300 103.92–332 802.21	5–5	4.51−01	6.32−02	3.18+00	−0.500	B+	1
61		${}^3P-{}^2[3/2]^\circ$										
			3 080.251	3 081.146	300 507.11–332 962.57	3–5	2.81+00	6.67−01	2.03+01	0.301	B+	3
			3 055.354	3 056.242	300 387.82–333 107.74	1–3	8.80−02	3.70−02	3.72−01	−1.432	C+	1
			3 042.453	3 043.339	300 103.92–332 962.57	5–5	7.49−03	1.04−03	5.21−02	−2.284	D	3
			3 066.534	3 067.425	300 507.11–333 107.74	3–3	3.74−01	5.27−02	1.60+00	−0.801	B	1
			3 029.070	3 029.952	300 103.92–333 107.74	5–3	9.86−01	8.14−02	4.06+00	−0.390	B+	1
62		${}^1S-{}^2[3/2]^\circ$										
			4 123.069	4 124.232	308 860.80–333 107.74	1–3	3.71−01	2.84−01	3.86+00	−0.547	B	3

[a] Wavelengths (Å) are always given unless cm^{-1} is indicated.

[b] Line deleted in proof.

10.2.3. Forbidden Transitions for Na II

The extensive MCHF results of Tachiev and Froese Fischer[98] overlap with only one of the two transitions for the results of Landman.[53] Agreement was good, but we still estimated the accuracies by scaling the pooling parameters (as discussed in Sec. 4.1 of the Introduction) for the lower-lying spin-allowed lines. As a result the cited accuracies are only rough estimates.

10.2.4. References for Forbidden Transitions for Na II

[53] D. A. Landman, J. Quant. Spectrosc. Radiat. Transf. **34**, 365 (1985).

[98] G. Tachiev and C. Froese Fischer, http://www.vuse.vanderbilt.edu/~cff/mchf_collection/ (MCHF, energy adjusted, downloaded on Dec. 3, 2003).

TABLE 9. Wavelength finding list for forbidden lines for Na II

Wavelength (vac) (Å)	Mult. No.
333.218	4
334.236	3
335.981	2
377.466	1
Wavelength (air) (Å)	**Mult. No.**
2 809.520	11
2 818.971	11
2 841.721	11

TABLE 9. Wavelength finding list for forbidden lines for Na II—Continued

Wavelength (air) (Å)	Mult. No.
2 859.486	10
2 871.277	11
2 904.918	11
2 917.521	9
2 923.484	10
2 955.766	11
2 984.174	9
3 007.446	8
3 037.859	9
3 056.160	8
3 078.320	8
3 092.731	8
3 129.376	8
3 149.275	16
3 167.731	8
3 188.465	8
3 189.790	16
3 212.191	15
3 285.608	14
3 400.098	13
3 462.494	13
3 509.510	13
3 533.057	7
3 631.272	7
4 087.593	12
13 719.73	18
13 948.07	18
14 523.33	18
16 746.88	17

TABLE 9. Wavelength finding list for forbidden lines for Na II—Continued

Wavenumber (cm^{-1})	Mult. No.
3 838.64	6
3 073.34	6
2 871.50	22
2 855.10	22
2 481.34	6
2 468.31	22
2 341.67	22
2 249.76	21
2 222.38	22
1 941.14	20
1 938.48	22
1 719.93	21
1 554.35	20
1 357.30	5
1 317.15	24
1 024.52	20
913.96	24
765.30	5
695.41	23
621.74	25
592.00	5
529.83	19
502.45	25
403.19	26
386.79	19
218.55	25
119.29	26

TABLE 10. Transition probabilities of forbidden lines for Na II (references for this table are as follows: 1=Tachiev and Froese Fischer[98] and 2=Landman[53])

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	Type	A_{ki} (s^{-1})	S (a.u.)	Acc.	Source
1	$2p^6-2p^53s$	$^1S-^3P^\circ$									
				377.466	0.0–264 924.32	1–5	M2	1.21+00	3.12+00	C+	1,2
2	$2p^6-2p^53p$	$^1S-^3D$									
				335.981	0.0–297 635.61	1–5	E2	6.40+03	1.22−01	C+	1
3		$^1S-^1D$									
				334.236	0.0–299 189.96	1–5	E2	4.50+04	8.38−01	B+	1
4		$^1S-^3P$									
				333.218	0.0–300 103.92	1–5	E2	1.60+04	2.93−01	B	1
5	$2p^53s-2p^53s$	$^3P^\circ-^3P^\circ$									
				1 357.30 cm^{-1}	264 924.32–266 281.62	5–1	E2	1.00−07	1.94−01	C+	2
				765.30 cm^{-1}	264 924.32–265 689.62	5–3	M1	9.64−03	2.39+00	A	1
				592.00 cm^{-1}	265 689.62–266 281.62	3–1	M1	1.07−02	1.91+00	A	1,2
6		$^3P^\circ-^1P^\circ$									
				3 073.34 cm^{-1}	265 689.62–268 762.96	3–3	M1	1.63−02	6.23−02	C	1
				3 838.64 cm^{-1}	264 924.32–268 762.96	5–3	M1	5.52−02	1.09−01	C+	1
				2 481.34 cm^{-1}	266 281.62–268 762.96	1–3	M1	1.19−02	8.68−02	C	1
7	$2p^53s-2p^53p$	$^3P^\circ-^3S$									

TABLE 10. Transition probabilities of forbidden lines for Na II (references for this table are as follows: 1=Tachiev and Froese Fischer[98] and 2=Landman[53])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	Type	A_{ki} (s^{-1})	S (a.u.)	Acc.	Source
			3 533.057	3 534.067	264 924.32–293 220.33	5–3	M2	5.17−04	5.74+01	A	1
			3 631.272	3 632.307	265 689.62–293 220.33	3–3	M2	3.90−05	4.96+00	B+	1
8		$^3P^\circ-^3D$									
			3 167.731	3 168.648	265 689.62–297 248.82	3–7	M2	7.35−04	1.10+02	A	1
			3 188.465	3 189.387	266 281.62–297 635.61	1–5	M2	1.61−04	1.79+01	A	1
			3 092.731	3 093.629	264 924.32–297 248.82	5–7	M2	1.02−03	1.36+02	A	1
			3 129.376	3 130.283	265 689.62–297 635.61	3–5	M2	9.52−05	9.60+00	A	1
			3 056.160	3 057.048	264 924.32–297 635.61	5–5	M2	9.64−06	8.63−01	C+	1
			3 078.320	3 079.214	265 689.62–298 165.44	3–3	M2	1.84−04	1.02+01	A	1
			3 007.446	3 008.322	264 924.32–298 165.44	5–3	M2	5.07−04	2.51+01	A	1
9		$^3P^\circ-^1D$									
			3 037.859	3 038.743	266 281.62–299 189.96	1–5	M2	1.67−04	1.45+01	A	1
			2 984.174	2 985.044	265 689.62–299 189.96	3–5	M2	1.01−03	7.99+01	A	1
			2 917.521	2 918.375	264 924.32–299 189.96	5–5	M2	1.93−03	1.37+02	A	1
10		$^3P^\circ-^1P$									
			2 923.484	2 924.340	265 689.62–299 885.37	3–3	M2	5.02−07	2.16−02	E+	1
			2 859.486	2 860.326	264 924.32–299 885.37	5–3	M2	8.97−04	3.45+01	A	1
11		$^3P^\circ-^3P$									
			2 841.721	2 842.556	264 924.32–300 103.92	5–5	M2	3.90−04	2.43+01	A	1
			2 871.277	2 872.120	265 689.62–300 507.11	3–3	M2	1.50−03	5.88+01	A	1
			2 818.971	2 819.801	264 924.32–300 387.82	5–1	M2	1.56−03	1.86+01	A	1
			2 809.520	2 810.347	264 924.32–300 507.11	5–3	M2	4.57−04	1.61+01	A	1
			2 904.918	2 905.769	265 689.62–300 103.92	3–5	M2	2.36−04	1.64+01	A	1
			2 955.766	2 956.629	266 281.62–300 103.92	1–5	M2	8.44−04	6.39+01	A	1
12		$^1P^\circ-^3S$									
			4 087.593	4 088.747	268 762.96–293 220.33	3–3	M2	1.50−04	3.45+01	A	1
13		$^1P^\circ-^3D$									
			3 509.510	3 510.514	268 762.96–297 248.82	3–7	M2	3.87−04	9.68+01	A	1
			3 462.494	3 463.485	268 762.96–297 635.61	3–5	M2	1.09−04	1.82+01	A	1
			3 400.098	3 401.074	268 762.96–298 165.44	3–3	M2	1.07−05	9.82−01	B	1
14		$^1P^\circ-^1D$									
			3 285.608	3 286.555	268 762.96–299 189.96	3–5	M2	2.75−05	3.53+00	B+	1
15		$^1P^\circ-^1P$									
			3 212.191	3 213.119	268 762.96–299 885.37	3–3	M2	1.46−04	1.01+01	A	1
16		$^1P^\circ-^3P$									
			3 149.275	3 150.187	268 762.96–300 507.11	3–3	M2	6.44−04	4.02+01	A	1
			3 189.790	3 190.713	268 762.96–300 103.92	3–5	M2	8.33−04	9.24+01	A	1
17	$2p^53p-2p^53p$	$^3S-^1D$									
			16 746.88	16 751.46	293 220.33–299 189.96	3–5	M1	4.84−03	4.22−03	D	1
18		$^3S-^3P$									
			14 523.33	14 527.30	293 220.33–300 103.92	3–5	M1	1.70−02	9.67−03	D+	1
			13 719.73	13 723.48	293 220.33–300 507.11	3–3	M1	6.91−02	1.99−02	D+	1
			13 948.07	13 951.89	293 220.33–300 387.82	3–1	M1	1.12−01	1.13−02	D+	1
19		$^3D-^3D$									
				386.79 cm^{-1}	297 248.82–297 635.61	7–5	M1	1.29−03	4.13+00	A	1
				529.83 cm^{-1}	297 635.61–298 165.44	5–3	M1	5.05−03	3.77+00	A	1
20		$^3D-^1D$									
				1 554.35 cm^{-1}	297 635.61–299 189.96	5–5	M1	2.72−03	1.34−01	C+	1

TABLE 10. Transition probabilities of forbidden lines for Na II (references for this table are as follows: 1 = Tachiev and Froese Fischer[98] and 2 = Landman[53])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	$E_i - E_k$ (cm^{-1})	$g_i - g_k$	Type	A_{ki} (s^{-1})	S (a.u.)	Acc.	Source
				1 941.14 cm^{-1}	297 248.82–299 189.96	7–5	M1	6.90−03	1.75−01	C+	1
				1 024.52 cm^{-1}	298 165.44–299 189.96	3–5	M1	1.73−03	2.97−01	B	1
21		^{3}D−^{1}P									
				2 249.76 cm^{-1}	297 635.61–299 885.37	5–3	M1	2.36−02	2.30−01	B	1
				1 719.93 cm^{-1}	298 165.44–299 885.37	3–3	M1	9.80−03	2.14−01	C+	1
22		^{3}D−^{3}P									
				2 855.10 cm^{-1}	297 248.82–300 103.92	7–5	M1	4.57−02	3.64−01	B	1
				2 871.50 cm^{-1}	297 635.61–300 507.11	5–3	M1	4.29−03	2.01−02	+	1
				2 222.38 cm^{-1}	298 165.44–300 387.82	3–1	M1	1.89−02	6.39−02	C	1
				2 468.31 cm^{-1}	297 635.61–300 103.92	5–5	M1	3.60−04	4.44−03	D	1
				2 341.67 cm^{-1}	298 165.44–300 507.11	3–3	M1	4.72−03	4.09−02	C	1
				1 938.48 cm^{-1}	298 165.44–300 103.92	3–5	M1	4.31−03	1.10−01	C+	1
23		^{1}D−^{1}P									
				695.41 cm^{-1}	299 189.96–299 885.37	5–3	M1	3.29−04	1.09−01	B+	1
24		^{1}D−^{3}P									
				1 317.15 cm^{-1}	299 189.96–300 507.11	5–3	M1	1.01−02	4.92−01	B	1
				913.96 cm^{-1}	299 189.96–300 103.92	5–5	M1	5.75−03	1.40+00	B+	1
25		^{1}P−^{3}P									
				621.74 cm^{-1}	299 885.37–300 507.11	3–3	M1	6.03−04	2.79−01	B	1
				502.45 cm^{-1}	299 885.37–300 387.82	3–1	M1	1.90−03	5.54−01	B	1
				218.55 cm^{-1}	299 885.37–300 103.92	3–5	M1	4.24−05	7.53−01	B+	1
26		^{3}P−^{3}P									
				403.19 cm^{-1}	300 103.92–300 507.11	5–3	M1	7.07−04	1.20+00	B+	1
				119.29 cm^{-1}	300 387.82–300 507.11	1–3	M1	2.08−05	1.36+00	D+	1

[a] Wavelengths (Å) are always given unless cm^{-1} is indicated.

10.3. Na III

Fluorine isoelectronic sequence
Ground State: $1s^2 2s^2 2p^5\ ^2P^{\text{o}}_{3/2}$
Ionization energy: 71.6200 eV = 577 654 cm^{-1}

10.3.1. Allowed Transitions for Na III

Only OP (Ref. 15) results were available for transitions from energy levels above the $3d$. Wherever available, we have used the data of Tachiev and Froese Fischer,[97] and McPeake and Hibbert[57] The former result from extensive MCHF calculations with Breit-Pauli corrections to order α^2 and the latter by using the CIV3 code.

This spectrum appears to present considerable difficulties for accurate computing for all but transitions from the lowest-lying levels. Particularly at smaller line strengths, the agreement between Tachiev and Froese Fischer[97] and McPeake and Hibbert[57] was significantly better than between either of these and three studies—Butler and Zeippen,[15] Blackford and Hibbert,[8] and Berrington.[5] To estimate accuracies, we pooled the relative standard deviation of the mean (RSDM) for each of the lines with transition rates published in two or more of the references cited below, as described in the general introduction. For this purpose, the spin-allowed (non-OP) and intercombination data were treated separately and each of these was in turn divided into two upper-level energy groups below and above 415 000 cm^{-1}. Estimated accuracies were substantially better for the lower energy groups. RSDM plots for these data are presented in the general introduction. OP lines constituted a fifth group and have been used only when more accurate sources were not available, because spin-orbit effects are often significant for this spectrum. Energy levels labeled $2p^4(^3P)3p$ ($^2P^{\text{o}}$ and $^2S^{\text{o}}$) and $2p^4(^3P)3d$ (^2D, ^2F, and ^4P) are highly mixed in LS coupling, and therefore transitions from them were assigned lower accuracies.

10.3.2. References for Allowed Transitions for Na III

[5] K. Berrington, J. Phys. B **34**, 1443 (2001).
[8] H. M. S. Blackford and A. Hibbert, At. Data and Nucl. Data Tables **58**, 101 (1994).
[15] K. Butler and C. J. Zeippen, http://legacy.gsfc.nasa.gov/topbase, downloaded on Aug. 8, 1995 (Opacity Project).
[57] D. McPeake and A. Hibbert, J. Phys. B **33**, 2809 (2000).
[97] G. Tachiev and C. Froese Fischer, http://www.vuse.vanderbilt.edu/~cff/mchf_collection/ (MCHF, energy adjusted, downloaded on Dec. 3, 2002).

TABLE 11. Wavelength finding list for allowed lines for Na III

Wavelength (vac) (Å)	Mult. No.
188.858	14
188.871	14
189.347	14
202.148	13
202.182	13
202.491	12
202.708	13
202.719	11
202.761	11
203.053	12
203.282	11
203.324	11
214.230	10
214.587	10
214.859	10
215.046	8
215.079	9
215.218	10
215.224	9
215.326	9
215.336	8
215.481	7
215.660	7
215.679	8
215.859	9
215.961	9
216.118	7
217.039	6
217.111	6
217.198	6
217.684	6
217.757	6
229.870	5
230.594	5
250.512	4
250.517	4
251.372	4
266.894	3
267.643	3
267.871	3
268.625	3
272.072	2
272.449	2
273.087	2
273.109	2
273.467	2
378.136	1
380.100	1
466.355	18
466.444	18
544.507	17
546.171	17
648.923	16
649.509	16
676.890	15
677.981	15
900.250	75
900.543	75
901.379	75
950.103	28
950.474	28
959.655	28
960.033	28
1 129.210	98
1 129.670	98
1 131.145	98
1 194.741	99
1 195.256	99
1 195.822	99
1 196.338	99
1 220.260	100
1 220.797	100
1 228.646	100
1 232.235	70
1 232.318	70
1 243.719	69
1 245.006	69
1 245.990	70
1 254.558	33
1 254.677	33
1 255.324	33
1 257.647	69
1 258.963	69
1 267.263	68
1 280.054	68
1 281.726	68
1 309.163	71
1 310.912	71
1 311.160	74
1 312.590	74
1 313.554	74
1 325.702	73
1 328.150	73
1 335.533	72
1 336.755	63
1 337.353	72
1 338.017	72
1 339.845	72
1 340.679	63
1 342.398	63
1 342.733	27
1 347.190	63
1 352.894	27
1 352.922	63
1 355.286	63
1 361.889	27
1 361.939	63
1 372.344	27
1 384.258	26
1 385.709	26

TABLE 11. Wavelength finding list for allowed lines for Na III—Continued

Wavelength (vac) (Å)	Mult. No.
1 406.121	26
1 418.558	95
1 418.568	95
1 420.886	95
1 440.780	64
1 444.193	64
1 445.730	64
1 449.309	64
1 452.909	64
1 457.944	64
1 461.156	64
1 465.926	65
1 467.990	65
1 470.079	64
1 487.433	65
1 523.536	96
1 523.548	96
1 525.295	96
1 525.306	96
1 539.147	67
1 542.448	67
1 562.874	67
1 563.607	66
1 565.280	97
1 565.292	97
1 566.277	67
1 577.904	66
1 579.118	97
1 598.175	66
1 650.223	39
1 660.098	39
1 668.811	39
1 681.767	39
1 690.709	39
1 699.880	37
1 701.976	38
1 710.361	37
1 711.123	38
1 712.483	38
1 718.212	37
1 719.610	37
1 721.744	38
1 728.271	38
1 728.921	37
1 730.680	36
1 731.117	38
1 737.715	38
1 809.901	45
1 823.611	45
1 831.550	45
1 835.031	88
1 835.214	88
1 838.118	35
1 838.927	88
1 839.112	88
1 844.353	35
1 845.143	35
1 849.555	35
1 849.792	45
1 850.379	35
1 852.935	44
1 855.912	35
1 856.697	35
1 857.961	45
1 860.615	87
1 861.209	35
1 863.498	87
1 867.516	87
1 869.807	43
1 872.195	43
1 872.344	44
1 883.420	44
1 884.444	43
1 887.007	42
1 887.021	44
1 887.472	103
1 892.012	43
1 892.922	43
1 896.995	41
1 898.271	44
1 903.284	41
1 904.538	51
1 906.208	44
1 906.875	44
1 907.000	43
1 907.140	42
1 913.186	41
1 914.884	44
1 917.343	41
1 918.451	41
1 926.259	41
1 927.239	41
1 932.736	41
1 933.885	41
1 937.393	51
1 938.64	104
1 946.426	86
1 946.92	104
1 950.811	86
1 950.906	86
1 951.236	21
1 966.969	51
1 970.988	49
1 973.807	50
1 974.150	109
1 975.752	109
1 977.161	109
1 985.572	21
1 986.119	50
1 995.677	49

TABLE 11. Wavelength finding list for allowed lines for Na III—Continued

Wavelength (air) (Å)	Mult. No.
2 004.214	54
2 005.216	21
2 005.548	49
2 007.572	47
2 008.468	50
2 011.865	48
2 014.169	91
2 017.024	91
2 017.246	91
2 021.225	50
2 022.298	40
2 023.228	47
2 024.293	57
2 028.557	40
2 030.230	50
2 031.128	49
2 035.898	54
2 037.780	40
2 041.665	47
2 043.289	32
2 044.130	47
2 044.821	90
2 045.450	40
2 047.992	90
2 048.305	90
2 048.725	40
2 051.486	90
2 051.853	40
2 055.185	40
2 056.619	57
2 058.755	40
2 060.363	47
2 062.987	40
2 065.278	40
2 066.598	32
2 066.714	62
2 066.923	32
2 072.673	62
2 094.805	53
2 099.563	55
2 100.420	62
2 102.763	56
2 104.479	53
2 104.753	89
2 106.575	62
2 109.279	89
2 112.653	89
2 116.749	56
2 120.765	94
2 124.512	94
2 126.627	56
2 127.613	55
2 140.722	31
2 141.071	31
2 144.197	31
2 144.547	31

TABLE 11. Wavelength finding list for allowed lines for Na III—Continued

Wavelength (air) (Å)	Mult. No.
2 145.232	60
2 146.235	94
2 148.573	61
2 151.653	60
2 158.600	46
2 159.089	93
2 163.177	61
2 167.208	46
2 169.706	61
2 173.494	61
2 174.397	46
2 174.524	60
2 180.086	61
2 182.848	20
2 185.299	92
2 185.494	93
2 189.432	59
2 190.179	92
2 193.514	46
2 196.121	59
2 200.921	46
2 202.831	20
2 208.065	59
2 209.870	46
2 212.353	92
2 214.208	20
2 217.354	92
2 225.279	25
2 225.928	20
2 230.328	20
2 232.188	25
2 239.484	20
2 246.710	20
2 251.473	20
2 278.414	25
2 279.482	77
2 280.439	52
2 281.620	77
2 285.658	25
2 288.446	52
2 309.986	24
2 361.698	58
2 367.295	24
2 369.481	58
2 370.286	58
2 378.127	58
2 380.668	58
2 386.992	30
2 393.592	30
2 394.028	30
2 406.588	110
2 459.309	110
2 468.855	110
2 474.731	19
2 497.015	19
2 510.264	19

TABLE 11. Wavelength finding list for allowed lines for Na III—Continued

Wavelength (air) (Å)	Mult. No.
2 530.246	19
2 542.799	19
2 553.546	19
2 563.304	19
2 592.778	23
2 608.861	23
2 637.454	23
2 665.195	23
2 682.192	23
2 740.3	108
2 763.6	108
2 766.7	108
2 789.310	85
2 833.534	85
2 868.249	85
2 915.033	85
3 008.200	22
3 036.939	22
3 070.566	22
3 106.117	22
3 136.767	22
4 762.726	80
4 779.960	80
4 945.591	80
5 160.058	29
5 195.305	29
5 196.039	84
5 197.358	29
5 201.381	79
5 221.943	79
5 351.624	84
5 376.974	79
5 398.951	79
5 414.454	84
5 524.023	78
5 583.607	84
5 722.55	82
5 746.39	83
5 852.04	83
5 911.84	82
5 928.16	83
5 935.82	82
6 018.62	34
6 048.22	81
6 050.14	83
6 069.43	34
6 131.53	83
6 192.56	81
6 260.07	81
6 310.24	107
6 326.65	107
6 360.11	107
6 662.05	106
6 680.34	106
6 897.55	101
6 918.03	105
6 937.75	105
6 967.17	105
6 987.17	105
7 209.77	101
7 231.20	101
7 643.56	76
7 766.57	102
7 791.43	102
7 985.05	76
8 264.90	102
8 293.06	102

TABLE 12. Transition probabilities of allowed lines for Na III (references for this table are as follows: 1 = Butler and Zeippen,[15] 2 = Tachiev and Froese Fischer,[97] and 3 = McPeake and Hibbert[57])

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
1	$2s^22p^5-2s2p^6$	$^2P^{\circ}-^2S$		*378.79*	*455*–264 455.0	6–2	1.26+02	9.00−02	6.73−01	−0.268	B+	2,3
				378.136	0.0–264 455.0	4–2	8.42+01	9.03−02	4.50−01	−0.442	B+	2,3
				380.100	1 366.3–264 455.0	2–2	4.13+01	8.95−02	2.24−01	−0.747	B+	2,3
2	$2p^5-2p^4(^3P)3s$	$^2P^{\circ}-^4P$										
				272.449	0.0–367 040.66	4–4	3.37−01	3.75−04	1.34−03	−2.824	C	2,3
				273.087	1 366.3–367 550.17	2–2	1.46−01	1.63−04	2.93−04	−3.487	D+	2,3
				272.072	0.0–367 550.17	4–2	1.27−02	7.05−06	2.53−05	−4.550	D	2,3
				273.109	0.0–366 154.41	4–6	2.04−02	3.42−05	1.23−04	−3.864	D+	2,3
				273.467	1 366.3–367 040.66	2–4	3.46−02	7.75−05	1.40−04	−3.810	D+	2,3
3		$^2P^{\circ}-^2P$		*267.72*	*455–373 981.5*	6–6	1.14+02	1.23−01	6.50−01	−0.132	B+	2,3
				267.643	0.0–373 632.32	4–4	9.67+01	1.04−01	3.66−01	−0.381	B+	2,3
				267.871	1 366.3–374 679.91	2–2	7.56+01	8.13−02	1.43−01	−0.789	B+	2,3
				266.894	0.0–374 679.91	4–2	3.90+01	2.08−02	7.33−02	−1.080	B+	2,3
				268.625	1 366.3–373 632.32	2–4	1.77+01	3.84−02	6.78−02	−1.115	B+	2,3
4	$2p^5-2p^4(^1D)3s$	$^2P^{\circ}-^2D$		*250.80*	*455–399 177.8*	6–10	4.48+01	7.05−02	3.49−01	−0.374	B+	2,3
				250.517	0.0–399 174.71	4–6	4.49+01	6.33−02	2.09−01	−0.597	B+	2,3
				251.372	1 366.3–399 182.31	2–4	3.87+01	7.33−02	1.21−01	−0.834	B+	2,3
				250.512	0.0–399 182.31	4–4	6.10+00	5.74−03	1.89−02	−1.639	B+	2,3
5	$2p^5-2p^4(^1S)3s$	$^2P^{\circ}-^2S$		*230.11*	*455*–435 028.00	6–2	4.50+01	1.19−02	5.41−02	−1.146	C	2,3
				229.870	0.0–435 028.00	4–2	2.91+01	1.15−02	3.49−02	−1.337	C	2,3
				230.594	1 366.3–435 028.00	2–2	1.59+01	1.27−02	1.92−02	−1.595	C	2,3
6	$2p^5-2p^4(^3P)3d$	$^2P^{\circ}-^4D$										
				217.198	0.0–460 409.70	4–6	6.79−02	7.20−05	2.06−04	−3.541	C	2,3
				217.757	1 366.3–460 593.62	2–4	4.92−02	7.00−05	1.00−04	−3.854	D	2,3
				217.111	0.0–460 593.62	4–4	2.44−01	1.72−04	4.92−04	−3.162	C+	2,3
				217.684	1 366.3–460 746.98	2–2	2.55−01	1.81−04	2.60−04	−3.441	C	2,3
				217.039	0.0–460 746.98	4–2	1.23−01	4.33−05	1.24−04	−3.761	C	2,3
7		$^2P^{\circ}-^4F$										
				215.660	0.0–463 691.90	4–6	2.21+01	2.32−02	6.58−02	−1.032	C	2,3
				216.118	1 366.3–464 077.16	2–4	1.57+01	2.20−02	3.13−02	−1.357	D+	2,3
				215.481	0.0–464 077.16	4–4	6.98+00	4.86−03	1.38−02	−1.711	D+	2,3
8		$^2P^{\circ}-^2D$		*215.43*	*455–464 641.2*	6–10	8.89+01	1.03−01	4.39−01	−0.209	C+	2,3
				215.336	0.0–464 390.17	4–6	5.31+01	5.54−02	1.57−01	−0.654	C+	2,3
				215.679	1 366.3–465 017.83	2–4	9.78+01	1.36−01	1.94−01	−0.565	C+	2,3
				215.046	0.0–465 017.83	4–4	4.49+01	3.11−02	8.82−02	−0.905	C	2,3
9		$^2P^{\circ}-^4P$										
				215.224	0.0–464 631.29	4–4	1.65+01	1.14−02	3.24−02	−1.341	D+	2,3
				215.961	1 366.3–464 411.94	2–2	3.03−01	2.12−04	3.01−04	−3.373	E+	2,3
				215.326	0.0–464 411.94	4–2	6.36−01	2.21−04	6.27−04	−3.054	D	2,3
				215.079	0.0–464 945.37	4–6	6.06+01	6.30−02	1.78−01	−0.599	C	2,3
				215.859	1 366.3–464 631.29	2–4	1.72+01	2.41−02	3.42−02	−1.317	D+	2,3
10		$^2P^{\circ}-^2P$		*214.56*	*455–466 529.3*	6–6	1.04+02	7.15−02	3.03−01	−0.368	C+	2,3
				214.230	0.0–466 788.03	4–4	5.16+01	3.55−02	1.00−01	−0.848	C+	2,3
				215.218	1 366.3–466 011.91	2–2	6.08+01	4.22−02	5.99−02	−1.074	C+	2,3
				214.587	0.0–466 011.91	4–2	3.33+01	1.15−02	3.25−02	−1.337	C+	2,3
				214.859	1 366.3–466 788.03	2–4	5.65+01	7.83−02	1.11−01	−0.805	C	2,3

TABLE 12. Transition probabilities of allowed lines for Na III (references for this table are as follows: 1 = Butler and Zeippen,[15] 2 = Tachiev and Froese Fischer,[97] and 3 = McPeake and Hibbert[57])—Continued

No.	Transition array	Mult.	$\lambda_{\rm air}$ (Å)	$\lambda_{\rm vac}$ (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
11	$2p^5-2p^4(^1D)3d$	$^2P^\circ-^2P$		*202.93*	*455–493 226.0*	6–6	1.55+02	9.59−02	3.85−01	−0.240	C	2,3
				202.761	0.0–493 192.06	4–4	1.26+02	7.77−02	2.07−01	−0.508	C+	2,3
				203.282	1 366.3–493 293.98	2–2	9.24+01	5.73−02	7.67−02	−0.941	C	2,3
				202.719	0.0–493 293.98	4–2	6.72+01	2.07−02	5.53−02	−1.082	C	2,3
				203.324	1 366.3–493 192.06	2–4	2.73+01	3.38−02	4.52−02	−1.170	C	2,3
12		$^2P^\circ-^2S$		*202.68*	*455*–493 849.24	6–2	2.62+02	5.38−02	2.16−01	−0.491	C	2,3
				202.491	0.0–493 849.24	4–2	1.59+02	4.89−02	1.30−01	−0.709	C+	2,3
				203.053	1 366.3–493 849.24	2–2	1.03+02	6.38−02	8.53−02	−0.894	C	2,3
13		$^2P^\circ-^2D$		202.36	*455–494 636.0*	6–10	7.45+01	7.62−02	3.05−01	−0.340	C+	2,3
				202.182	0.0–494 602.73	4–6	7.21+01	6.63−02	1.76−01	−0.576	C+	2,3
				202.708	1 366.3–494 685.86	2–4	6.40+01	7.89−02	1.05−01	−0.802	C	2,3
				202.148	0.0–494 685.86	4–4	1.40+01	8.59−03	2.29−02	−1.464	C	2,3
14	$2p^5-2p^4(^1S)3d$	$^2P^\circ-^2D$		*189.03*	*455–529 476.1*	6–10	3.45+01	3.08−02	1.15−01	−0.733	D+	3
				188.871	0.0–529 461.64	4–6	3.34+01	2.68−02	6.67−02	−0.970	D+	3
				189.347	1 366.3–529 497.70	2–4	3.07+01	3.30−02	4.11−02	−1.180	D+	3
				188.858	0.0–529 497.70	4–4	5.42+00	2.90−03	7.21−03	−1.936	D	3
15	$2s2p^6-2s^22p^4(^3P)3p$	$^2S-^4D^\circ$										
				677.981	264 455.0–411 951.78	2–4	1.86−04	2.56−06	1.14−05	−5.291	D	2,3
				676.890	264 455.0–412 189.46	2–2	4.12−04	2.83−06	1.26−05	−5.247	D	2,3
16		$^2S-^2P^\circ$		*649.31*	264 455.0–*418 463.8*	2–6	5.04−02	9.55−04	4.08−03	−2.719	D	2,3
				649.509	264 455.0–418 417.50	2–4	5.47−02	6.92−04	2.96−03	−2.859	D	2,3
				648.923	264 455.0–418 556.54	2–2	4.16−02	2.63−04	1.12−03	−3.279	D	2,3
17	$2s2p^6-2s^22p^4(^1D)3p$	$^2S-^2P^\circ$		*545.62*	264 455.0–*447 734.4*	2–6	4.80−01	6.43−03	2.31−02	−1.891	D+	2,3
				546.171	264 455.0–447 547.96	2–4	4.73−01	4.23−03	1.52−02	−2.073	D+	2,3
				544.507	264 455.0–448 107.31	2–2	4.96−01	2.20−03	7.90−03	−2.357	D+	2,3
18	$2s2p^6-2s^22p^4(^1S)3p$	$^2S-^2P^\circ$		*466.38*	264 455.0–*478 870.4*	2–6	1.34+00	1.31−02	4.02−02	−1.582	C	2,3
				466.355	264 455.0–478 884.07	2–4	1.34+00	8.75−03	2.69−02	−1.757	C	2,3
				466.444	264 455.0–478 842.99	2–2	1.33+00	4.34−03	1.33−02	−2.061	D+	2,3
19	$2p^4(^3P)3s-2p^4(^3P)3p$	$^4P-^4P^\circ$	*2 515.58*	*2 516.34*	*366 682.5–406 422.8*	12–12	2.53+00	2.40−01	2.38+01	0.459	A	2,3
			2 497.015	2 497.768	366 154.41–406 190.15	6–6	1.99+00	1.86−01	9.19+00	0.048	A	2,3
			2 530.246	2 531.007	367 040.66–406 550.63	4–4	3.65−01	3.51−02	1.17+00	−0.853	B+	2,3
			2 542.799	2 543.562	367 550.17–406 865.11	2–2	3.39−01	3.28−02	5.50−01	−1.183	B+	2,3
			2 474.731	2 475.479	366 154.41–406 550.63	6–4	1.38+00	8.46−02	4.14+00	−0.294	A	2,3
			2 510.264	2 511.020	367 040.66–406 865.11	4–2	2.19+00	1.03−01	3.42+00	−0.385	A	2,3
			2 553.546	2 554.312	367 040.66–406 190.15	4–6	5.52−01	8.10−02	2.73+00	−0.489	A	2,3
			2 563.304	2 564.072	367 550.17–406 550.63	2–4	7.92−01	1.56−01	2.64+00	−0.506	A	2,3
20		$^4P-^4D^\circ$	*2 232.52*	*2 233.21*	*366 682.5–411 461.0*	12–20	3.61+00	4.50−01	3.97+01	0.732	A	2,3
			2 230.328	2 231.021	366 154.41–410 976.94	6–8	3.64+00	3.62−01	1.59+01	0.337	A	2,3
			2 246.710	2 247.407	367 040.66–411 536.38	4–6	2.72+00	3.09−01	9.14+00	0.092	A	2,3
			2 251.473	2 252.171	367 550.17–411 951.78	2–4	1.66+00	2.52−01	3.74+00	−0.298	A	2,3
			2 202.831	2 203.518	366 154.41–411 536.38	6–6	8.53−01	6.21−02	2.70+00	−0.429	A	2,3
			2 225.928	2 226.620	367 040.66–411 951.78	4–4	1.82+00	1.35−01	3.97+00	−0.268	A	2,3
			2 239.484	2 240.179	367 550.17–412 189.46	2–2	3.09+00	2.32−01	3.43+00	−0.333	A	2,3
			2 182.848	2 183.531	366 154.41–411 951.78	6–4	1.14−01	5.45−03	2.35−01	−1.485	B+	2,3

TABLE 12. Transition probabilities of allowed lines for Na III (references for this table are as follows: 1=Butler and Zeippen,[15] 2=Tachiev and Froese Fischer,[97] and 3=McPeake and Hibbert[57])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})$^{\mathrm{a}}$	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
			2 214.208	2 214.898	367 040.66–412 189.46	4–2	5.14−01	1.89−02	5.51−01	−1.121	B+	2,3
21		$^{4}\mathrm{P}-{}^{4}\mathrm{S}^{\circ}$		*1 971.55*	*366 682.5*–417 403.98	12–4	5.15+00	1.00−01	7.79+00	0.079	B+	2,3
				1 951.236	366 154.41–417 403.98	6–4	2.38+00	9.06−02	3.49+00	−0.265	B+	2,3
				1 985.572	367 040.66–417 403.98	4–4	1.78+00	1.05−01	2.76+00	−0.377	B+	2,3
			2 005.216	2 005.865	367 550.17–417 403.98	2–4	9.67−01	1.17−01	1.54+00	−0.631	B	2,3
22		$^{2}\mathrm{P}-{}^{4}\mathrm{P}^{\circ}$										
			3 036.939	3 037.823	373 632.32–406 550.63	4–4	4.52−05	6.25−06	2.50−04	−4.602	E+	2,3
			3 106.117	3 107.018	374 679.91–406 865.11	2–2	2.48−04	3.59−05	7.34−04	−4.144	C	2,3
			3 008.200	3 009.076	373 632.32–406 865.11	4–2	3.31−04	2.25−05	8.90−04	−4.046	E+	2,3
			3 070.566	3 071.458	373 632.32–406 190.15	4–6	5.37−05	1.14−05	4.61−04	−4.341	E	2,3
			3 136.767	3 137.676	374 679.91–406 550.63	2–4	3.37−06	9.95−07	2.06−05	−5.701	D	2,3
23		$^{2}\mathrm{P}-{}^{4}\mathrm{D}^{\circ}$										
			2 637.454	2 638.240	373 632.32–411 536.38	4–6	2.15−02	3.37−03	1.17−01	−1.870	B	2,3
			2 682.192	2 682.989	374 679.91–411 951.78	2–4	6.73−03	1.45−03	2.57−02	−2.538	C+	2,3
			2 608.861	2 609.640	373 632.32–411 951.78	4–4	6.96−04	7.10−05	2.44−03	−3.547	D+	2,3
			2 665.195	2 665.988	374 679.91–412 189.46	2–2	3.11−04	3.31−05	5.81−04	−4.179	D+	2,3
			2 592.778	2 593.553	373 632.32–412 189.46	4–2	4.70−05	2.37−06	8.09−05	−5.023	E+	2,3
24		$^{2}\mathrm{P}-{}^{2}\mathrm{S}^{\circ}$	*2 328.78*	*2 329.49*	*373 981.5*–416 909.31	6–2	3.18+00	8.62−02	3.97+00	−0.286	B+	2,3
			2 309.986	2 310.697	373 632.32–416 909.31	4–2	3.08+00	1.23−01	3.75+00	−0.308	B+	2,3
			2 367.295	2 368.018	374 679.91–416 909.31	2–2	1.65−01	1.39−02	2.17−01	−1.556	C+	2,3
25		$^{2}\mathrm{P}-{}^{2}\mathrm{P}^{\circ}$	*2 247.39*	*2 248.09*	*373 981.5–418 463.8*	6–6	3.14+00	2.38−01	1.06+01	0.155	B+	2,3
			2 232.188	2 232.882	373 632.32–418 417.50	4–4	2.34+00	1.75−01	5.15+00	−0.155	B+	2,3
			2 278.414	2 279.118	374 679.91–418 556.54	2–2	2.98+00	2.32−01	3.48+00	−0.333	B+	2,3
			2 225.279	2 225.971	373 632.32 -418 556.54	4–2	1.09−01	4.05−03	1.19−01	−1.790	C	2,3
			2 285.658	2 286.363	374 679.91–418 417.50	2–4	7.73−01	1.21−01	1.83+00	−0.616	B+	2,3
26	$2p^4(^3\mathrm{P})3s-2p^4(^1\mathrm{D})3p$	$^{2}\mathrm{P}-{}^{2}\mathrm{D}^{\circ}$		*1 391.57*	*373 981.5–445 842.9*	6–10	3.85−02	1.86−03	5.11−02	−1.952	C	2,3
				1 384.258	373 632.32–445 873.20	4–6	2.18−02	9.39−04	1.71−02	−2.425	D+	2,3
				1 406.121	374 679.91–445 797.52	2–4	4.94−03	2.93−04	2.71−03	−3.232	D	2,3
				1 385.709	373 632.32–445 797.52	4–4	5.96−02	1.72−03	3.13−02	−2.162	C	2,3
27		$^{2}\mathrm{P}-{}^{2}\mathrm{P}^{\circ}$		*1 355.88*	*373 981.5–447 734.4*	6–6	3.31+00	9.12−02	2.44+00	−0.262	B	2,3
				1 352.894	373 632.32–447 547.96	4–4	2.73+00	7.50−02	1.34+00	−0.523	B	2,3
				1 361.889	374 679.91–448 107.31	2–2	2.24+00	6.23−02	5.59−01	−0.904	B	2,3
				1 342.733	373 632.32–448 107.31	4–2	1.06+00	1.43−02	2.52−01	−1.243	C+	2,3
				1 372.344	374 679.91–447 547.96	2–4	5.81−01	3.28−02	2.97−01	−1.183	C+	2,3
28	$2p^4(^3\mathrm{P})3s-2p^4(^1\mathrm{S})3p$	$^{2}\mathrm{P}-{}^{2}\mathrm{P}^{\circ}$		*953.39*	*373 981.8–478 870.4*	6–6	2.64−01	3.60−03	6.78−02	−1.666	C+	2,3
				950.103	373 632.32–478 884.07	4–4	2.09−01	2.82−03	3.53−02	−1.948	B	2,3
				960.033	374 679.91–478 842.99	2–2	1.88−01	2.60−03	1.64−02	−2.284	B+	2,3
				950.474	373 632.32–478 842.99	4–2	1.00−01	6.77−04	8.48−03	−2.567	D+	2,3
				959.655	374 679.91–478 884.07	2–4	4.34−02	1.20−03	7.57−03	−2.620	D+	2,3
29	$2p^4(^1\mathrm{D})3s-2p^4(^3\mathrm{P})3p$	$^{2}\mathrm{D}-{}^{2}\mathrm{P}^{\circ}$	*5 183.64*	*5 185.11*	*399 177.8–418 463.8*	10–6	4.85−02	1.17−02	2.00+00	−0.932	B	2,3
			5 195.305	5 196.752	399 174.71–418 417.50	6–4	4.58−02	1.24−02	1.27+00	−1.128	B	2,3
			5 160.058	5 161.495	399 182.31–418 556.54	4–2	4.42−02	8.83−03	6.00−01	−1.452	B	2,3
			5 197.358	5 198.805	399 182.31–418 417.50	4–4	4.85−03	1.97−03	1.35−01	−2.103	C+	2,3
30	$2p^4(^1\mathrm{D})3s-2p^4(^1\mathrm{D})3p$	$^{2}\mathrm{D}-{}^{2}\mathrm{F}^{\circ}$	2 389.99	2 390.72	399 177.8–441 006.2	10–14	3.04+00	3.64−01	2.87+01	0.561	A	2,3
			2 386.992	2 387.720	399 174.71–441 055.67	6–8	3.05+00	3.48−01	1.64+01	0.320	A	2,3

TABLE 12. Transition probabilities of allowed lines for Na III (references for this table are as follows: 1 = Butler and Zeippen,[15] 2 = Tachiev and Froese Fischer,[97] and 3 = McPeake and Hibbert[57])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
			2 394.028	2 394.757	399 182.31–440 940.20	4–6	2.80+00	3.61−01	1.14+01	0.160	A	2,3
			2 393.592	2 394.321	399 174.71–440 940.20	6–6	2.26−01	1.95−02	9.21−01	−0.932	B	2,3
31		$^2\mathrm{D}-{}^2\mathrm{D}^\circ$	*2 142.25*	*2 142.93*	*399 177.8–445 842.9*	10–10	4.09+00	2.82−01	1.99+01	0.450	B+	2,3
			2 140.722	2 141.397	399 174.71–445 873.20	6–6	3.80+00	2.61−01	1.10+01	0.195	A	2,3
			2 144.547	2 145.223	399 182.31–445 797.52	4–4	3.88+00	2.67−01	7.55+00	0.029	B+	2,3
			2 144.197	2 144.873	399 174.71–445 797.52	6–4	1.98−01	9.08−03	3.85−01	−1.264	C+	2,3
			2 141.071	2 141.745	399 182.31–445 873.20	4–6	3.11−01	3.20−02	9.03−01	−0.893	B	2,3
32		$^2\mathrm{D}-{}^2\mathrm{P}^\circ$	*2 058.79*	*2 059.45*	*399 177.8–447 734.4*	10–6	3.92+00	1.50−01	1.02+01	0.176	B+	2,3
			2 066.598	2 067.258	399 174.71–447 547.96	6–4	3.72+00	1.59−01	6.48+00	−0.020	B+	2,3
			2 043.289	2 043.945	399 182.31–448 107.31	4–2	4.02+00	1.26−01	3.39+00	−0.298	B+	2,3
			2 066.923	2 067.583	399 182.31–447 547.96	4–4	1.57−01	1.01−02	2.74−01	−1.394	C+	2,3
33	$2p^4(^1\mathrm{D})3s-2p^4(^1\mathrm{S})3p$	$^2\mathrm{D}-{}^2\mathrm{P}^\circ$		*1 254.82*	*399 177.8–478 870.4*	10–6	4.69−02	6.65−04	2.75−02	−2.177	D+	2,3
				1 254.558	399 174.71–478 884.07	6–4	4.51−02	7.10−04	1.76−02	−2.371	D+	2,3
				1 255.324	399 182.31–478 842.99	4–2	3.63−02	4.28−04	7.08−03	−2.766	D+	2,3
				1 254.677	399 182.31–478 884.07	4–4	7.17−03	1.69−04	2.80−03	−3.170	D	2,3
34	$2p^4(^3\mathrm{P})3p-2p^4(^1\mathrm{S})3s$	$^2\mathrm{P}^\circ-{}^2\mathrm{S}$	*6 035.5*	*6 037.1*	*418 463.8*–435 028.00	6–2	4.64−03	8.46−04	1.01−01	−2.294	C	2,3
			6 018.62	6 020.29	418 417.50–435 028.00	4–2	3.31−03	8.98−04	7.12−02	−2.445	C	2,3
			6 069.43	6 071.11	418 556.54–435 028.00	2–2	1.34−03	7.42−04	2.97−02	−2.829	C	2,3
35	$2p^4(^3\mathrm{P})3p-2p^4(^3\mathrm{P})3d$	$^4\mathrm{P}^\circ-{}^4\mathrm{D}$		*1 851.97*	*406 422.8–460 419.2*	12–20	7.13+00	6.11−01	4.47+01	0.865	B+	2,3
				1 849.555	406 190.15–460 257.21	6–8	6.87+00	4.70−01	1.72+01	0.450	A	2,3
				1 856.697	406 550.63–460 409.70	4–6	4.22+00	3.27−01	7.99+00	0.117	B+	2,3
				1 861.209	406 865.11–460 593.62	2–4	2.34+00	2.43−01	2.98+00	−0.313	B+	2,3
				1 844.353	406 190.15–460 409.70	6–6	3.00+00	1.53−01	5.58+00	−0.037	B+	2,3
				1 850.379	406 550.63–460 593.62	4–4	4.37+00	2.24−01	5.47+00	−0.048	B+	2,3
				1 855.912	406 865.11–460 746.98	2–2	5.77+00	2.98−01	3.64+00	−0.225	B+	2,3
				1 838.118	406 190.15–460 593.62	6–4	6.77−01	2.29−02	8.31−01	−0.862	B+	2,3
				1 845.143	406 550.63–460 746.98	4–2	1.69+00	4.31−02	1.05+00	−0.763	B+	2,3
36		$^4\mathrm{P}^\circ-{}^2\mathrm{F}$										
				1 730.680	406 190.15–463 970.92	6–8	2.47−02	1.48−03	5.05−02	−2.052	D+	2,3
37		$^4\mathrm{P}^\circ-{}^2\mathrm{D}$										
				1 728.921	406 550.63–464 390.17	4–6	8.00−02	5.38−03	1.22−01	−1.667	C	2,3
				1 719.610	406 865.11–465 017.83	2–4	5.62−01	4.98−02	5.64−01	−1.002	C+	2,3
				1 718.212	406 190.15–464 390.17	6–6	6.87−02	3.04−03	1.03−01	−1.739	C	2,3
				1 710.361	406 550.63–465 017.83	4–4	7.14−02	3.13−03	7.06−02	−1.902	C	2,3
				1 699.880	406 190.15–465 017.83	6–4	3.94−01	1.14−02	3.82−01	−1.165	C+	2,3
38		$^4\mathrm{P}^\circ-{}^4\mathrm{P}$		*1 714.41*	*406 422.8–464 751.8*	12–12	3.26+00	1.44−01	9.73+00	0.238	B	2,3
				1 701.976	406 190.15–464 945.37	6–6	1.35+00	5.88−02	1.98+00	−0.452	B	2,3
				1 721.744	406 550.63–464 631.29	4–4	3.26−01	1.45−02	3.29−01	−1.237	C+	2,3
				1 737.715	406 865.11–464 411.94	2–2	1.13+00	5.13−02	5.87−01	−0.989	B	2,3
				1 711.123	406 190.15–464 631.29	6–4	1.52+00	4.45−02	1.51+00	−0.573	B	2,3
				1 728.271	406 550.63–464 411.94	4–2	4.10+00	9.19−02	2.09+00	−0.435	B+	2,3
				1 712.483	406 550.63–464 945.37	4–6	8.91−01	5.88−02	1.33+00	−0.629	B	2,3
				1 731.117	406 865.11–464 631.29	2–4	1.87+00	1.68−01	1.91+00	−0.474	B+	2,3
39		$^4\mathrm{P}^\circ-{}^2\mathrm{P}$										
				1 660.098	406 550.63–466 788.03	4–4	2.56−04	1.06−05	2.31−04	−4.373	E+	2,3
				1 690.709	406 865.11–466 011.91	2–2	2.89−02	1.24−03	1.38−02	−2.606	D+	2,3
				1 650.223	406 190.15–466 788.03	6–4	2.72−03	7.39−05	2.41−03	−3.353	D	2,3
				1 681.767	406 550.63–466 011.91	4–2	8.49−03	1.80−04	3.99−03	−3.143	D	2,3
				1 668.811	406 865.11–466 788.03	2–4	1.64−02	1.37−03	1.51−02	−2.562	D+	2,3

TABLE 12. Transition probabilities of allowed lines for Na III (references for this table are as follows: 1=Butler and Zeippen,[15] 2=Tachiev and Froese Fischer,[97] and 3=McPeake and Hibbert[57])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
40		$^4D^\circ-^4D$	*2 041.90*	*2 042.56*	*411 461.0–460 419.2*	20–20	1.80+00	1.13−01	1.52+01	0.354	B+	2,3
			2 028.557	2 029.210	410 976.94–460 257.21	8–8	1.93+00	1.19−01	6.36+00	−0.021	B+	2,3
			2 045.450	2 046.106	411 536.38–460 409.70	6–6	1.05+00	6.59−02	2.66+00	−0.403	B+	2,3
			2 055.185	2 055.843	411 951.78–460 593.62	4–4	6.39−01	4.05−02	1.10+00	−0.790	B	2,3
			2 058.755	2 059.413	412 189.46–460 746.98	2–2	6.95−01	4.42−02	6.00−01	−1.054	B	2,3
			2 022.298	2 022.950	410 976.94–460 409.70	8–6	4.62−01	2.13−02	1.13+00	−0.769	B	2,3
			2 037.780	2 038.435	411 536.38–460 593.62	6–4	6.73−01	2.79−02	1.12+00	−0.776	B	2,3
			2 048.725	2 049.382	411 951.78–460 746.98	4–2	8.11−01	2.55−02	6.89−01	−0.991	B	2,3
			2 051.853	2 052.510	411 536.38–460 257.21	6–8	1.37−01	1.15−02	4.67−01	−1.161	B	2,3
			2 062.987	2 063.646	411 951.78–460 409.70	4–6	2.21−01	2.12−02	5.76−01	−1.072	B	2,3
			2 065.278	2 065.938	412 189.46–460 593.62	2–4	2.58−01	3.30−02	4.49−01	−1.180	B	2,3
41		$^4D^\circ-^4F$		*1 927.81*	*411 461.0–463 333.4*	20–28	7.86+00	6.13−01	7.78+01	1.088	A	2,3
				1 926.259	410 976.94–462 891.04	8–10	8.94+00	6.21−01	3.15+01	0.696	A	2,3
				1 933.885	411 536.38–463 245.76	6–8	6.33+00	4.73−01	1.81+01	0.453	B+	2,3
				1 932.736	411 951.78–463 691.90	4–6	5.37+00	4.51−01	1.15+01	0.256	A	2,3
				1 927.239	412 189.46–464 077.16	2–4	5.66+00	6.30−01	7.99+00	0.100	B+	2,3
				1 913.186	410 976.94–463 245.76	8–8	6.89−01	3.78−02	1.91+00	−0.519	B+	2,3
				1 917.343	411 536.38–463 691.90	6–6	1.65+00	9.07−02	3.44+00	−0.264	B+	2,3
				1 918.451	411 951.78–464 077.16	4–4	2.29+00	1.27−01	3.20+00	−0.294	B+	2,3
				1 896.995	410 976.94–463 691.90	8–6	1.83−02	7.42−04	3.71−02	−2.227	C	2,3
				1 903.284	411 536.38–464 077.16	6–4	9.39−02	3.40−03	1.28−01	−1.690	C+	2,3
42		$^4D^\circ-^2F$										
				1 907.140	411 536.38–463 970.92	6–8	1.68+00	1.22−01	4.60+00	−0.135	B	2,3
				1 887.007	410 976.94–463 970.92	8–8	2.31−01	1.23−02	6.12−01	−1.007	C+	2,3
43		$^4D^\circ-^2D$										
				1 892.012	411 536.38–464 390.17	6–6	2.21−01	1.19−02	4.43−01	−1.146	C+	2,3
				1 884.444	411 951.78–465 017.83	4–4	2.58−01	1.38−02	3.41−01	−1.258	C+	2,3
				1 872.195	410 976.94–464 390.17	8–6	4.18−02	1.65−03	8.11−02	−1.879	C	2,3
				1 869.807	411 536.38–465 017.83	6–4	9.37−03	3.27−04	1.21−02	−2.707	D	2,3
				1 907.000	411 951.78–464 390.17	4–6	1.70+00	1.39−01	3.49+00	−0.255	B	2,3
				1 892.922	412 189.46–465 017.83	2–4	1.75−01	1.88−02	2.34−01	−1.425	C	2,3
44		$^4D^\circ-^4P$		*1 876.50*	*411 461.0–464 751.8*	20–12	5.06−01	1.60−02	1.98+00	−0.495	C+	2,3
				1 852.935	410 976.94–464 945.37	8–6	1.30−01	5.03−03	2.45−01	−1.395	C+	2,3
				1 883.420	411 536.38–464 631.29	6–4	1.07−01	3.79−03	1.41−01	−1.643	C+	2,3
				1 906.208	411 951.78–464 411.94	4–2	5.38−02	1.47−03	3.68−02	−2.231	C	2,3
				1 872.344	411 536.38–464 945.37	6–6	1.32−01	6.95−03	2.57−01	−1.380	C	2,3
				1 898.271	411 951.78–464 631.29	4–4	6.12−03	3.31−04	8.27−03	−2.878	D+	2,3
				1 914.884	412 189.46–464 411.94	2–2	2.19−01	1.20−02	1.52−01	−1.620	C+	2,3
				1 887.021	411 951.78–464 945.37	4–6	3.55−02	2.84−03	7.07−02	−1.945	E+	2,3
				1 906.875	412 189.46–464 631.29	2–4	7.82−01	8.52−02	1.07+00	−0.769	B	2,3
45		$^4D^\circ-^2P$										
				1 809.901	411 536.38–466 788.03	6–4	4.19−03	1.37−04	4.90−03	−3.085	D	2,3
				1 849.792	411 951.78–466 011.91	4–2	5.09−04	1.30−05	3.18−04	−4.284	E+	2,3
				1 823.611	411 951.78–466 788.03	4–4	2.04−03	1.02−04	2.45−03	−3.389	D	2,3
				1 857.961	412 189.46–466 011.91	2–2	4.10−03	2.12−04	2.59−03	−3.373	D	2,3
				1 831.550	412 189.46–466 788.03	2–4	8.74−03	8.79−04	1.06−02	−2.755	D	2,3
46		$^2D^\circ-^4D$										
			2 167.208	2 167.888	414 281.85–460 409.70	6–6	7.26−03	5.11−04	2.19−02	−2.513	D+	2,3
			2 200.921	2 201.608	415 172.28–460 593.62	4–4	4.63−04	3.36−05	9.75−04	−3.872	E+	2,3
			2 158.600	2 159.278	414 281.85–460 593.62	6–4	3.67−03	1.71−04	7.29−03	−2.989	D	2,3

TABLE 12. Transition probabilities of allowed lines for Na III (references for this table are as follows: 1=Butler and Zeippen,[15] 2=Tachiev and Froese Fischer,[97] and 3=McPeake and Hibbert[57])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
			2 193.514	2 194.200	415 172.28–460 746.98	4–2	1.06−03	3.82−05	1.10−03	−3.816	E+	2,3
			2 174.397	2 175.078	414 281.85–460 257.21	6–8	4.67−04	4.42−04	1.90−02	−2.576	D+	2,3
			2 209.870	2 210.559	415 172.28–460 409.70	4–6	1.48−06	1.63−07	4.74−06	−6.186	E	2,3
47		^{2}D°−^{4}F										
			2 041.665	2 042.321	414 281.85–463 245.76	6–8	1.64+00	1.36−01	5.50+00	−0.088	B	2,3
			2 060.363	2 061.022	415 172.28–463 691.90	4–6	8.12−01	7.75−02	2.10+00	−0.509	B	2,3
			2 023.228	2 023.880	414 281.85–463 691.90	6–6	3.29−01	2.02−02	8.08−01	−0.916	C+	2,3
			2 044.130	2 044.786	415 172.28–464 077.16	4–4	1.05−01	6.57−03	1.77−01	−1.580	C	2,3
			2 007.572	2 008.221	414 281.85–464 077.16	6–4	1.93−02	7.79−04	3.09−02	−2.330	D+	2,3
48		^{2}D°−^{2}F				10–14						
			2 011.865	2 012.515	414 281.85–463 970.92	6–8	6.37+00	5.16−01	2.05+01	0.491	B+	2,3
49		^{2}D°−^{2}D		*1 999.87*	*414 638.0–464 641.2*	10–10	3.12+00	1.87−01	1.23+01	0.272	C	2,3
				1 995.677	414 281.85–464 390.17	6–6	8.12−01	4.85−02	1.91+00	−0.536	E	2,3
			2 005.548	2 006.197	415 172.28–465 017.83	4–4	1.50+08	9.05−02	2.39+00	−0.441	B+	2,3
				1 970.988	414 281.85–465 017.83	6–4	2.44−01	9.49−03	3.69−01	−1.245	C+	2,3
			2 031.128	2 031.782	415 172.28–464 390.17	4–6	3.08+00	2.86−01	7.66+00	0.058	C+	2,3
50		^{2}D°−^{4}P										
				1 986.119	414 281.85–464 631.29	6–4	8.79−02	3.47−03	1.36−01	−1.682	C	2,3
			2 030.230	2 030.883	415 172.28–464 411.94	4–2	6.48−03	2.00−04	5.36−03	−3.097	D	2,3
				1 973.807	414 281.85–464 945.37	6–6	2.44−01	1.42−02	5.55−01	−1.070	E	2,3
			2 021.225	2 021.876	415 172.28–464 631.29	4–4	2.97−01	1.82−02	4.84−01	−1.138	C+	2,3
			2 008.468	2 009.118	415 172.28–464 945.37	4–6	1.45+00	1.32−01	3.49+00	−0.277	D	2,3
51		^{2}D°−^{2}P		*1 927.11*	*414 638.0–466 529.3*	10–6	3.96−01	1.32−02	8.40−01	−0.879	C+	2,3
				1 904.538	414 281.85–466 788.03	6–4	1.72−01	6.25−03	2.35−01	−1.426	C+	2,3
				1 966.969	415 172.28–466 011.91	4–2	4.61−01	1.34−02	3.46−01	−1.271	C+	2,3
				1 937.393	415 172.28–466 788.03	4–4	1.80−01	1.01−02	2.59−01	−1.394	C+	2,3
52		^{2}S°−^{4}D										
			2 288.446	2 289.151	416 909.31–460 593.62	2–4	3.11−03	4.88−04	7.36−03	−3.011	D	2,3
			2 280.439	2 281.143	416 909.31–460 746.98	2–2	7.58−03	5.92−04	8.88−03	−2.927	D	2,3
53		^{2}S°−^{4}P										
			2 094.805	2 095.470	416 909.31–464 631.29	2–4	3.09−01	4.07−02	5.62−01	−1.089	C+	2,3
			2 104.479	2 105.147	416 909.31–464 411.94	2–2	2.37−02	1.57−03	2.18−02	−2.503	D+	2,3
54		^{2}S°−^{2}P	*2 014.67*	*2 015.32*	416 909.31–466 529.3	2–6	3.50+00	6.39−01	8.48+00	0.107	B+	2,3
			2 004.214	2 004.863	416 909.31–466 788.03	2–4	2.07+00	2.49−01	3.29+00	−0.303	B+	2,3
			2 035.898	2 036.552	416 909.31–466 011.91	2–2	6.23+00	3.87−01	5.20+00	−0.111	B+	2,3
55		^{4}S°−^{2}D										
			2 127.613	2 128.285	417 403.98–464 390.17	4–6	1.37−01	1.40−02	3.91−01	−1.252	C+	2,3
			2 099.563	2 100.229	417 403.98–465 017.83	4–4	8.62−01	5.70−02	1.58+00	−0.642	B	2,3
56		^{4}S°−^{4}P	*2 111.36*	*2 112.03*	417 403.98–464 751.8	4–12	2.79+00	5.60−01	1.56+01	0.350	B+	2,3
			2 102.763	2 103.430	417 403.98–464 945.37	4–6	2.31+00	2.30−01	6.37+00	−0.036	B+	2,3
			2 116.749	2 117.419	417 403.98–464 631.29	4–4	3.03+00	2.04−01	5.68+00	−0.088	B+	2,3
			2 126.627	2 127.299	417 403.98–464 411.94	4–2	3.71+00	1.26−01	3.52+00	−0.298	B+	2,3
57		^{4}S°−^{2}P										
			2 024.293	2 024.945	417 403.98–466 788.03	4–4	9.33−03	5.74−04	1.53−02	−2.639	D+	2,3
			2 056.619	2 057.277	417 403.98–466 011.91	4–2	1.69−02	5.36−04	1.45−02	−2.669	D+	2,3
58		^{2}P°−^{4}D										
			2 380.668	2 381.395	418 417.50 -460 409.70	4–6	2.86−04	3.65−05	1.14−03	−3.836	E+	2,3

TABLE 12. Transition probabilities of allowed lines for Na III (references for this table are as follows: 1=Butler and Zeippen,[15] 2=Tachiev and Froese Fischer,[97] and 3=McPeake and Hibbert[57])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	$E_i - E_k$ (cm^{-1})	$g_i - g_k$	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
			2 378.127	2 378.852	418 556.54–460 593.62	2–4	1.43−06	2.43−07	3.80−06	−6.313	E	2,3
			2 370.286	2 371.010	418 417.50–460 593.62	4–4	8.01−04	6.75−05	2.11−03	−3.569	D	2,3
			2 369.481	2 370.205	418 556.54–460 746.98	2–2	4.75−05	4.00−06	6.25−05	−5.097	E	2,3
			2 361.698	2 362.420	418 417.50–460 746.98	4–2	3.81−04	1.59−05	4.96−04	−4.197	E+	2,3
59		${}^2P^\circ - {}^4F$										
			2 208.065	2 208.754	418 417.50–463 691.90	4–6	2.63−01	2.88−02	8.39−01	−0.939	C+	2,3
			2 196.121	2 196.807	418 556.54–464 077.16	2–4	1.67−01	2.42−02	3.50−01	−1.315	C+	2,3
			2 189.432	2 190.117	418 417.50–464 077.16	4–4	9.47−02	6.81−03	1.96−01	−1.565	C	2,3
60		${}^2P^\circ - {}^2D$	*2 164.88*	*2 165.56*	*418 463.8–464 641.2*	6–10	1.46+00	1.71−01	7.31+00	0.011	C+	2,3
			2 174.524	2 175.205	418 417.50–464 390.17	4–6	1.00+00	1.07−01	3.06+00	−0.369	D+	2,3
			2 151.653	2 152.329	418 556.54–465 017.83	2–4	1.34+00	1.86−01	2.64+00	−0.429	B+	2,3
			2 145.232	2 145.908	418 417.50–465 017.83	4–4	8.27−01	5.71−02	1.61+00	−0.641	B	2,3
61		${}^2P^\circ - {}^4P$										
			2 163.177	2 163.856	418 417.50–464 631.29	4–4	2.37−01	1.66−02	4.74−01	−1.178	C+	2,3
			2 180.086	2 180.768	418 556.54–464 411.94	2–2	1.77−04	1.26−05	1.81−04	−4.599	E+	2,3
			2 173.494	2 174.176	418 417.50–464 411.94	4–2	4.45−03	1.58−04	4.51−03	−3.199	D	2,3
			2 148.573	2 149.249	418 417.50–464 945.37	4–6	1.54+00	1.60−01	4.52+00	−0.194	C	2,3
			2 169.706	2 170.386	418 556.54–464 631.29	2–4	1.81−01	2.55−02	3.65−01	−1.292	C	2,3
62		${}^2P^\circ - {}^2P$	*2 079.83*	*2 080.49*	*418 463.8–466 529.3*	6–6	3.63+00	2.35−01	9.68+00	0.149	B+	2,3
			2 066.714	2 067.374	418 417.50–466 788.03	4–4	1.53+00	9.81−02	2.67+00	−0.406	B+	2,3
			2 106.575	2 107.243	418 556.54–466 011.91	2–2	1.52−01	1.01−02	1.41−01	−1.695	C+	2,3
			2 100.420	2 101.087	418 417.50–466 011.91	4–2	7.41−01	2.45−02	6.78−01	−1.009	B	2,3
			2 072.673	2 073.334	418 556.54–466 788.03	2–4	3.52+00	4.53−01	6.19+00	−0.043	B+	2,3
63	$2p^4({}^3P)3p - 2p^4({}^3P)4s$	${}^4P^\circ - {}^4P$		*1 350.42*	*406 422.8–480 473.8*	12–12	4.97+00	1.36−01	7.25+00	0.213	D	1
				1 355.286	406 190.15–479 975.34	6–6	3.44+00	9.48−02	2.54+00	−0.245	D+	LS
				1 347.190	406 550.63–480 779.21	4–4	6.69−01	1.82−02	3.23−01	−1.138	E+	LS
				1 342.398	406 865.11–481 358.65	2–2	8.44−01	2.28−02	2.02−01	−1.341	E	LS
				1 340.679	406 190.15–480 779.21	6–4	2.29+00	4.11−02	1.09+00	−0.608	D	LS
				1 336.755	406 550.63–481 358.65	4–2	4.27+00	5.72−02	1.01+00	−0.641	D	LS
				1 361.939	406 550.63–479 975.34	4–6	1.45+00	6.06−02	1.09+00	−0.615	D	LS
				1 352.922	406 865.11–480 779.21	2–4	2.06+00	1.13−01	1.01+00	−0.646	D	LS
64		${}^4D^\circ - {}^4P$		*1 449.01*	*411 461.0–480 473.8*	20–12	6.40+00	1.21−01	1.15+01	0.384	D	1
				1 449.309	410 976.94–479 975.34	8–6	5.12+00	1.21−01	4.62+00	−0.014	D+	LS
				1 444.193	411 536.38–480 779.21	6–4	4.07+00	8.49−02	2.42+00	−0.293	D+	LS
				1 440.780	411 951.78–481 358.65	4–2	3.26+00	5.07−02	9.62−01	−0.693	D	LS
				1 461.156	411 536.38–479 975.34	6–6	1.12+00	3.60−02	1.04+00	−0.666	D	LS
				1 452.909	411 951.78–480 779.21	4–4	2.03+00	6.43−02	1.23+00	−0.590	D	LS
				1 445.730	412 189.46–481 358.65	2–2	3.22+00	1.01−01	9.61−01	−0.695	D	LS
				1 470.079	411 951.78–479 975.34	4–6	1.23−01	5.96−03	1.15−01	−1.623	E	LS
				1 457.944	412 189.46–480 779.21	2–4	3.14−01	2.00−02	1.92−01	−1.398	E	LS
65		${}^2D^\circ - {}^2P$		*1 468.58*	*414 638.0–482 731.0*	10–6	6.02+00	1.17−01	5.65+00	0.068	D+	1
				1 467.990	414 281.85–482 402.20	6–4	5.43+00	1.17−01	3.39+00	−0.154	D+	LS
				1 465.926	415 172.28–483 388.55	4–2	6.04+00	9.73−02	1.88+00	−0.410	D	LS
				1 487.433	415 172.28–482 402.20	4–4	5.79−01	1.92−02	3.76−01	−1.115	E+	LS
66		${}^4S^\circ - {}^4P$		*1 585.54*	417 403.98–*480 473.8*	4–12	8.15−01	9.21−02	1.92+00	−0.434	E+	1
				1 598.175	417 403.98–479 975.34	4–6	7.96−01	4.57−02	9.62−01	−0.738	D	LS
				1 577.904	417 403.98–480 779.21	4–4	8.25−01	3.08−02	6.40−01	−0.909	E+	LS
				1 563.607	417 403.98–481 358.65	4–2	8.51−01	1.56−02	3.21−01	−1.205	E+	LS

TABLE 12. Transition probabilities of allowed lines for Na III (references for this table are as follows: 1=Butler and Zeippen,[15] 2=Tachiev and Froese Fischer,[97] and 3=McPeake and Hibbert[57])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
67		^{2}P°–^{2}P		*1 556.01*	*418 463.8–482 731.0*	6–6	3.62+00	1.31−01	4.03+00	−0.105	D	1
				1 562.874	418 417.50–482 402.20	4–4	2.98+00	1.09−01	2.24+00	−0.361	D+	LS
				1 542.448	418 556.54–483 388.55	2–2	2.47+00	8.81−02	8.95−01	−0.754	D	LS
				1 539.147	418 417.50–483 388.55	4–2	1.24+00	2.21−02	4.48−01	−1.054	E+	LS
				1 566.277	418 556.54–482 402.20	2–4	5.90−01	4.34−02	4.48−01	−1.061	E+	LS
68	$2p^4(^3\mathrm{P})3p-2p^4(^1\mathrm{D})3d$	^{2}D°–^{2}P		*1 272.46*	*414 638.0–493 226.0*	10–6	3.82−02	5.57−04	2.33−02	−2.254	D+	2,3
				1 267.263	414 281.85–493 192.06	6–4	2.20−02	3.53−04	8.83−03	−2.674	D+	2,3
				1 280.054	415 172.28–493 293.98	4–2	6.42−03	7.88−05	1.33−03	−3.501	D	2,3
				1 281.726	415 172.28–493 192.06	4–4	3.17−02	7.80−04	1.32−02	−2.506	D+	2,3
69		^{2}D°–^{2}D		*1 250.03*	*414 638.0–494 636.0*	10–10	1.26−01	2.95−03	1.21−01	−1.530	C	2,3
				1 245.006	414 281.85–494 602.73	6–6	1.12−01	2.59−03	6.37−02	−1.809	C	2,3
				1 257.647	415 172.28–494 685.86	4–4	8.84−02	2.10−03	3.47−02	−2.076	C	2,3
				1 243.719	414 281.85–494 685.86	6–4	1.26−02	1.94−04	4.78−03	−2.934	D	2,3
				1 258.963	415 172.28–494 602.73	4–6	3.09−02	1.10−03	1.83−02	−2.357	D+	2,3
70		^{2}D°–^{2}F		*1 237.70*	*414 638.0–495 432.9*	10–14	4.28−03	1.38−04	5.60−03	−2.860	D	2,3
				1 232.235	414 281.85–495 435.20	6–8	4.49−03	1.36−04	3.32−03	−3.088	D	2,3
				1 245.990	415 172.28–495 429.75	4–6	3.56−03	1.24−04	2.04−03	−3.305	D	2,3
				1 232.318	414 281.85–495 429.75	6–6	4.47−04	1.02−05	2.48−04	−4.213	E	2
71		^{2}S°–^{2}P		*1 310.33*	*416 909.31–493 226.0*	2–6	2.12−01	1.64−02	1.41−01	−1.484	C+	2,3
				1 310.912	416 909.31–493 192.06	2–4	3.16−01	1.63−02	1.40−01	−1.487	C+	2,3
				1 309.163	416 909.31–493 293.98	2–2	4.23−03	1.09−04	9.37−04	−3.662	D	2,3
72		^{2}P°–^{2}P		*1 337.57*	*418 463.8–493 226.0*	6–6	1.89+00	5.06−02	1.34+00	−0.518	B	2,3
				1 337.353	418 417.50–493 192.06	4–4	1.61+00	4.32−02	7.61−01	−0.762	B	2,3
				1 338.017	418 556.54–493 293.98	2–2	1.28+00	3.43−02	3.02−01	−1.164	C+	2,3
				1 335.533	418 417.50–493 293.98	4–2	8.77−01	1.17−02	2.06−01	−1.330	C+	2,3
				1 339.845	418 556.54–493 192.06	2–4	1.44−01	7.74−03	6.82−02	−1.810	C	2,3
73		^{2}P°–^{2}S		*1 326.52*	*418 463.8–493 849.24*	6–2	3.52+00	3.10−02	8.11−01	−0.730	B	2,3
				1 325.702	418 417.50–493 849.24	4–2	2.29+00	3.02−02	5.28−01	−0.918	B	2,3
				1 328.150	418 556.54–493 849.24	2–2	1.23+00	3.24−02	2.84−01	−1.188	C+	2,3
74		^{2}P°–^{2}D		*1 312.82*	*418 463.8–494 636.0*	6–10	7.11−01	3.06−02	7.94−01	−0.736	C+	2,3
				1 312.590	418 417.50–494 602.73	4–6	7.27−01	2.82−02	4.87−01	−0.948	B	2,3
				1 313.554	418 556.54–494 685.86	2–4	5.24−01	2.71−02	2.34−01	−1.266	C+	2,3
				1 311.160	418 417.50–494 685.86	4–4	1.64−01	4.22−03	7.29−02	−1.773	C	2,3
75	$2p^4(^3\mathrm{P})3p-2p^4(^1\mathrm{S})3d$	^{2}P°–^{2}D		*900.80*	*418 463.8–529 476.1*	6–10	5.26−02	1.07−03	1.90−02	−2.192	D	3
				900.543	418 417.50–529 461.64	4–6	5.48−02	1.00−03	1.19−02	−2.398	D	3
				901.379	418 556.54–529 497.70	2–4	4.10−02	1.00−03	5.93−03	−2.699	D	3
				900.250	418 417.50–529 497.70	4–4	8.23−03	1.00−04	1.19−03	−3.398	E+	3
76	$2p^4(^1\mathrm{S})3s-2p^4(^1\mathrm{D})3p$	^{2}S–^{2}P°	*7 867.9*	*7 870.0*	*435 028.00–447 734.4*	2–6	2.83−04	7.89−04	4.09−02	−2.802	D+	2,3
			7 985.05	7 987.25	435 028.00–447 547.96	2–4	2.92−04	5.59−04	2.94−02	−2.952	D+	2,3
			7 643.56	7 645.66	435 028.00–448 107.31	2–2	2.61−04	2.28−04	1.15−02	−3.341	D+	2,3
77	$2p^4(^1\mathrm{S})3s-2p^4(^1\mathrm{S})3p$	^{2}S–^{2}P°	*2 280.19*	*2 280.90*	*435 028.00–478 870.4*	2–6	3.40+00	7.95−01	1.19+01	0.201	B+	2,3
			2 279.482	2 280.186	435 028.00–478 884.07	2–4	3.40+00	5.30−01	7.96+00	0.025	B+	2,3
			2 281.620	2 282.324	435 028.00–478 842.99	2–2	3.39+00	2.65−01	3.98+00	−0.276	B+	2,3

TABLE 12. Transition probabilities of allowed lines for Na III (references for this table are as follows: 1 = Butler and Zeippen,[15] 2 = Tachiev and Froese Fischer,[97] and 3 = McPeake and Hibbert[57])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})$^{\mathrm{a}}$	$E_i - E_k$ (cm^{-1})	$g_i - g_k$	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
78	$2p^4(^1\mathrm{D})3p-2p^4(^3\mathrm{P})3d$	$^2\mathrm{D}^\circ-{}^2\mathrm{F}$				10–14						
			5 524.023	5 525.558	445 873.20–463 970.92	6–8	3.03−04	1.85−04	2.02−02	−2.955	D+	2,3
79		$^2\mathrm{D}^\circ-{}^2\mathrm{D}$	*5 318.15*	*5 319.63*	*445 842.9–464 641.2*	10–10	1.62−03	6.87−04	1.20−01	−2.163	D+	2,3
			5 398.951	5 400.452	445 873.20–464 390.17	6–6	4.88−04	2.13−04	2.28−02	−2.893	D	2,3
			5 201.381	5 202.830	445 797.52–465 017.83	4–4	2.73−03	1.11−03	7.58−02	−2.353	C	2,3
			5 221.943	5 223.397	445 873.20–465 017.83	6–4	3.65−04	9.95−05	1.03−02	−3.224	D+	2,3
			5 376.974	5 378.469	445 797.52–464 390.17	4–6	2.51−04	1.63−04	1.16−02	−3.186	E	2,3
80		$^2\mathrm{D}^\circ-{}^2\mathrm{P}$	*4 832.74*	*4 834.09*	*445 842.9–466 529.3*	10–6	1.52−03	3.20−04	5.09−02	−2.495	D+	2,3
			4 779.960	4 781.296	445 873.20–466 788.03	6–4	8.37−04	1.91−04	1.81−02	−2.941	D+	2,3
			4 945.591	4 946.971	445 797.52–466 011.91	4–2	2.31−03	4.25−04	2.77−02	−2.770	C	2,3
			4 762.726	4 764.058	445 797.52–466 788.03	4–4	2.42−04	8.24−05	5.17−03	−3.482	D+	2,3
81		$^2\mathrm{P}^\circ-{}^4\mathrm{F}$										
			6 192.56	6 194.27	447 547.96–463 691.90	4–6	4.35−03	3.75−03	3.06−01	−1.824	D+	2,3
			6 260.07	6 261.80	448 107.31–464 077.16	2–4	3.24−03	3.81−03	1.57−01	−2.118	D	2,3
			6 048.22	6 049.90	447 547.96–464 077.16	4–4	1.32−05	7.25−04	5.77−02	−2.538	E+	2,3
82		$^2\mathrm{P}^\circ-{}^2\mathrm{D}$	*5 913.1*	*5 914.8*	*447 734.4–464 641.2*	6–10	2.19−02	1.91−02	2.23+00	−0.941	B	2,3
			5 935.82	5 937.46	447 547.96–464 390.17	4–6	1.27−02	1.01−02	7.87−01	−1.394	B	2,3
			5 911.84	5 913.48	448 107.31–465 017.83	2–4	2.55+02	2.68−02	1.04+00	−1.271	B	2,3
			5 722.55	5 724.14	447 547.96–465 017.83	4–4	1.09−02	5.36−03	4.04−01	−1.669	C+	2,3
83		$^2\mathrm{P}^\circ-{}^4\mathrm{P}$										
			5 852.04	5 853.66	447 547.96–464 631.29	4–4	3.29−03	1.69−03	1.30−01	−2.170	D	2,3
			6 131.53	6 133.23	448 107.31–464 411.94	2–2	5.88−05	3.32−05	1.34−03	−4.178	E	2,3
			5 928.16	5 929.80	447 547.96–464 411.94	4–2	5.74−05	1.51−05	1.18−03	−4.219	E	2,3
			5 746.39	5 747.98	447 547.96–464 945.37	4–6	1.66−02	1.23−02	9.31−01	−1.308	D	2,3
			6 050.14	6 051.81	448 107.31–464 631.29	2–4	4.32−03	4.74−03	1.89−01	−2.023	D	2,3
84		$^2\mathrm{P}^\circ-{}^2\mathrm{P}$	*5 319.11*	*5 320.59*	*447 734.4–466 529.3*	6–6	2.91−02	1.23−02	1.30+00	−1.132	C+	2,3
			5 196.039	5 197.486	447 547.96–466 788.03	4–4	1.44−02	5.85−03	4.00−01	−1.631	C+	2,3
			5 583.607	5 585.157	448 107.31–466 011.91	2–2	1.44−02	6.76−03	2.48−01	−1.869	C+	2,3
			5 414.454	5 415.959	447 547.96–466 011.91	4–2	7.74−03	1.70−03	1.21−01	−2.167	C	2,3
			5 351.624	5 353.113	448 107.31–466 788.03	2–4	1.74−02	1.49−02	5.26−01	−1.526	B	2,3
85	$2p^4(^1\mathrm{D})3p-2p^4(^3\mathrm{P})4s$	$^2\mathrm{P}^\circ-{}^2\mathrm{P}$	*2 856.58*	*2 857.42*	*447 734.4–482 731.0*	6–6	5.93−01	7.26−02	4.10+00	−0.361	D	1
			2 868.249	2 869.091	447 547.96–482 402.20	4–4	4.88−01	6.02−02	2.27+00	−0.618	D+	LS
			2 833.534	2 834.367	448 107.31–483 388.55	2–2	4.05−01	4.88−02	9.11−01	−1.011	D	LS
			2 789.310	2 790.133	447 547.96–483 388.55	4–2	2.12−01	1.24−02	4.56−01	−1.305	E+	LS
			2 915.033	2 915.886	448 107.31–482 402.20	2–4	9.30−02	2.37−02	4.55−01	−1.324	E+	LS
86	$2p^4(^1\mathrm{D})3p-2p^4(^1\mathrm{D})3d$	$^2\mathrm{F}^\circ-{}^2\mathrm{G}$		*1 948.98*	*441 006.2–492 315.0*	14–18	8.57+00	6.27−01	5.64+01	0.943	A	2,3
				1 950.906	441 055.67–492 313.91	8–10	8.55+00	6.10−01	3.13+01	0.688	A	2,3
				1 946.426	440 940.20–492 316.41	6–8	8.28+00	6.27−01	2.41+01	0.575	A	2,3
				1 950.811	441 055.67–492 316.41	8–8	3.11−01	1.77−02	9.10−01	−0.849	B	2,3
87		$^2\mathrm{F}^\circ-{}^2\mathrm{D}$		*1 864.63*	*441 006.2–494 636.0*	14–10	4.77−01	1.78−02	1.53+00	−0.603	B	2,3
				1 867.516	441 055.67–494 602.73	8–6	4.31−01	1.69−02	8.31−01	−0.869	B	2,3
				1 860.615	440 940.20–494 685.86	6–4	4.97−01	1.72−02	6.32−01	−0.986	B	2,3
				1 863.498	440 940.20–494 602.73	6–6	3.27−02	1.70−03	6.26−02	−1.991	C	2,3
88		$^2\mathrm{F}^\circ-{}^2\mathrm{F}$		*1 837.33*	*441 006.2–495 432.9*	14–14	3.45+00	1.74−01	1.48+01	0.387	B+	2,3

TABLE 12. Transition probabilities of allowed lines for Na III (references for this table are as follows: 1 = Butler and Zeippen,[15] 2 = Tachiev and Froese Fischer,[97] and 3 = McPeake and Hibbert[57])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				1 838.927	441 055.67–495 435.20	8–8	3.31+00	1.68−01	8.13+00	0.128	B+	2,3
				1 835.214	440 940.20–495 429.75	6–6	3.31+00	1.67−01	6.06+00	0.001	B+	2,3
				1 839.112	441 055.67–495 429.75	8–6	1.86−01	7.06−03	3.42−01	−1.248	C+	2,3
				1 835.031	440 940.20–495 435.20	6–8	1.01−01	6.80−03	2.46−01	−1.389	C+	2,3
89		$^{2}\mathrm{D}^{\circ}-{}^{2}\mathrm{P}$	*2 109.79*	*2 110.46*	*445 842.9–493 226.0*	10–6	1.74+00	6.98−02	4.85+00	−0.156	B+	2,3
			2 112.653	2 113.322	445 873.20–493 192.06	6–4	1.54+00	6.89−02	2.88+00	−0.384	B+	2,3
			2 104.753	2 105.420	445 797.52–493 293.98	4–2	1.34+00	4.46−02	1.24+00	−0.749	B	2,3
			2 109.279	2 109.948	445 797.52–493 192.06	4–4	3.97−01	2.65−02	7.37−01	−0.975	B	2,3
90		$^{2}\mathrm{D}^{\circ}-{}^{2}\mathrm{D}$	*2 048.82*	*2 049.47*	*445 842.9–494 636.0*	10–10	4.79+00	3.02−01	2.04+01	0.480	B+	2,3
			2 051.486	2 052.144	445 873.20–494 602.73	6–6	4.36+00	2.75−01	1.12+01	0.217	A	2,3
			2 044.821	2 045.478	445 797.52–494 685.86	4–4	4.00+00	2.51−01	6.75+00	0.002	B+	2,3
			2 047.992	2 048.649	445 873.20–494 685.86	6–4	4.69−01	1.97−02	7.96−01	−0.927	B	2,3
			2 048.305	2 048.962	445 797.52–494 602.73	4–6	6.54−01	6.17−02	1.67+00	−0.608	B+	2,3
91		$^{2}\mathrm{D}^{\circ}-{}^{2}\mathrm{F}$	*2 015.89*	*2 016.54*	*445 842.9–495 432.9*	10–14	5.39+00	4.60−01	3.05+01	0.663	A	2,3
			2 017.024	2 017.675	445 873.20–495 435.20	6–8	5.44+00	4.43−01	1.76+01	0.425	A	2,3
			2 014.169	2 014.820	445 797.52–495 429.75	4–6	4.88+00	4.46−01	1.18+01	0.251	A	2,3
			2 017.246	2 017.897	445 873.20–495 429.75	6–6	4.31−01	2.63−02	1.05+00	−0.802	B	2,3
92		$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{P}$	*2 197.52*	*2 198.21*	*447 734.4–493 226.0*	6–6	4.14+00	3.00−01	1.30+01	0.255	B+	2,3
			2 190.179	2 190.864	447 547.96–493 192.06	4–4	3.28+00	2.36−01	6.81+00	−0.025	B+	2,3
			2 212.353	2 213.042	448 107.31–493 293.98	2–2	2.42+00	1.78−01	2.59+00	−0.449	B+	2,3
			2 185.299	2 185.983	447 547.96–493 293.98	4–2	2.06+00	7.39−02	2.13+00	−0.529	B+	2,3
			2 217.354	2 218.045	448 107.31–493 192.06	2–4	6.86−01	1.01−01	1.48+00	−0.695	B	2,3
93		$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{S}$	*2 167.82*	*2 168.50*	*447 734.4–493 849.24*	6–2	5.15+00	1.21−01	5.18+00	−0.139	B+	2,3
			2 159.089	2 159.768	447 547.96–493 849.24	4–2	3.11+00	1.09−01	3.09+00	−0.361	B+	2,3
			2 185.494	2 186.178	448 107.31–493 849.24	2–2	2.02+00	1.45−01	2.09+00	−0.538	B+	2,3
94		$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{D}$	*2 131.45*	*2 132.12*	*447 734.4–494 636.0*	6–10	2.05+00	2.32−01	9.79+00	0.144	B+	2,3
			2 124.512	2 125.183	447 547.96–494 602.73	4–6	1.86+00	1.89−01	5.29+00	−0.121	B+	2,3
			2 146.235	2 146.911	448 107.31–494 685.86	2–4	1.68+00	2.33−01	3.29+00	−0.332	B+	2,3
			2 120.765	2 121.435	447 547.96–494 685.86	4–4	6.44−01	4.34−02	1.21+00	−0.760	B	2,3
95	$2p^4(^1\mathrm{D})3p-2p^4(^1\mathrm{D})4s$	$^{2}\mathrm{F}^{\circ}-{}^{2}\mathrm{D}$		*1 419.89*	*441 006.2–511 434*	14–10	6.01+00	1.30−01	8.50+00	0.260	D+	1
				1 420.886	441 055.67–511 434.3	8–6	5.73+00	1.30−01	4.86+00	0.017	C	LS
				1 418.568	440 940.20–511 433.8	6–4	6.02+00	1.21−01	3.39+00	−0.139	D+	LS
				1 418.558	440 940.20–511 434.3	6–6	2.87−01	8.65−03	2.42−01	−1.285	E+	LS
96		$^{2}\mathrm{D}^{\circ}-{}^{2}\mathrm{D}$		*1 524.60*	*445 842.9–511 434*	10–10	2.82+00	9.82−02	4.93+00	−0.008	D	1
				1 525.295	445 873.20–511 434.3	6–6	2.63+00	9.16−02	2.76+00	−0.260	D+	LS
				1 523.548	445 797.52–511 433.8	4–4	2.54+00	8.85−02	1.78+00	−0.451	D	LS
				1 525.306	445 873.20–511 433.8	6–4	2.82−01	6.55−03	1.97−01	−1.406	E	LS
				1 523.536	445 797.52–511 434.3	4–6	1.88−01	9.83−03	1.97−01	−1.405	E	LS
97		$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{D}$		*1 569.87*	*447 734.4–511 434*	6–10	2.35+00	1.45−01	4.50+00	−0.060	D	1
				1 565.280	447 547.96–511 434.3	4–6	2.38+00	1.31−01	2.70+00	−0.281	D+	LS
				1 579.118	448 107.31–511 433.8	2–4	1.93+00	1.44−01	1.50+00	−0.541	D	LS
				1 565.292	447 547.96–511 433.8	4–4	3.95−01	1.45−02	2.99−01	−1.237	E+	LS
98	$2p^4(^1\mathrm{D})3p-2p^4(^1\mathrm{S})3d$	$^{2}\mathrm{F}^{\circ}-{}^{2}\mathrm{D}$		*1 130.33*	*441 006.2–529 476.1*	14–10	5.43−02	7.43−04	3.87−02	−1.983	D	3

TABLE 12. Transition probabilities of allowed lines for Na III (references for this table are as follows: 1 = Butler and Zeippen,[15] 2 = Tachiev and Froese Fischer,[97] and 3 = McPeake and Hibbert[57])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})$^{\mathrm{a}}$	$E_i - E_k$ (cm^{-1})	$g_i - g_k$	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				1 131.145	441 055.67–529 461.64	8–6	4.87−02	7.00−04	2.09−02	−2.252	D	3
				1 129.210	440 940.20–529 497.70	6–4	5.49−02	7.00−04	1.56−02	−2.377	D	3
				1 129.670	440 940.20–529 461.64	6–6	5.23−03	1.00−04	2.23−03	−3.222	E+	3
99		$^2D^{\circ}-{}^2D$		*1 195.70*	*445 842.9–529 476.1*	10–10	6.35−02	1.36−03	5.35−02	−1.866	D	3
				1 196.338	445 873.20–529 461.64	6–6	6.06−02	1.30−03	3.07−02	−2.108	D+	3
				1 194.741	445 797.52–529 497.70	4–4	5.14−02	1.10−03	1.73−02	−2.357	D	3
				1 195.822	445 873.20–529 497.70	6–4	7.00−03	1.00−04	2.36−03	−3.222	E+	3
				1 195.256	445 797.52–529 461.64	4–6	6.23−03	2.00−04	3.15−03	−3.097	E+	3
100		$^2P^{\circ}-{}^2D$		*1 223.37*	*447 734.4–529 476.1*	6–10	2.85−02	1.07−03	2.58−02	−2.192	D	3
				1 220.797	447 547.96–529 461.64	4–6	2.09−02	7.00−04	1.13−02	−2.553	D	3
				1 228.646	448 107.31–529 497.70	2–4	3.09−02	1.40−03	1.13−02	−2.553	D	3
				1 220.260	447 547.96–529 497.70	4–4	8.96−03	2.00−04	3.21−03	−3.097	E+	3
101	$2p^4(^3P)3d-2p^4(^1S)3p$	$^2D-{}^2P^{\circ}$	*7 025.9*	*7 027.8*	*464 641.2–478 870.4*	10–6	1.27−03	5.65−04	1.31−01	−2.248	D	3
			6 897.55	6 899.45	464 390.17–478 884.07	6–4	8.41−04	4.00−04	5.45−02	−2.620	D	3
			7 231.20	7 233.19	465 017.83–478 842.99	4–2	1.27−03	5.00−04	4.76−02	−2.699	D+	3
			7 209.77	7 211.76	465 017.83–478 884.07	4–4	3.85−04	3.00−04	2.85−02	−2.921	D+	3
102		$^2P-{}^2P^{\circ}$	*8 100.8*	*8 103.0*	*466 529.3–478 870.4*	6–6	9.63−04	9.48−04	1.52−01	−2.245	E	3
			8 264.90	8 267.17	466 788.03–478 884.07	4–4	6.99−04	7.16−04	7.79−02	−2.543	E	LS
			7 791.43	7 793.58	466 011.91–478 842.99	2–2	6.59−04	6.00−04	3.08−02	−2.921	D+	3
			8 293.06	8 295.34	466 788.03–478 842.99	4–2	5.82−04	3.00−04	3.28−02	−2.921	D+	3
			7 766.57	7 768.70	466 011.91–478 884.07	2–4	1.11−04	2.00−04	1.02−02	−3.398	D	3
103	$2p^4(^3P)3d-2p^4(^3P_2)4f$	$^4F-{}^2[5]^{\circ}$										1
				1 887.472	462 891.04–515 871.96	10–12	1.25+01	7.98−01	4.96+01	0.902	B	LS′
104		$^4P-{}^2[1]^{\circ}$										1
				1 938.64	464 411.94–515 994.5	2–2	8.39+00	4.73−01	6.04+00	−0.024	C	LS′
				1 946.92	464 631.29–515 994.5	4–2	1.66+00	4.71−02	1.21+00	−0.725	D	LS′
105	$2p^4(^1S)3p-2p^4(^1D)3d$	$^2P^{\circ}-{}^2P$	*6 964.0*	*6 965.9*	*478 870.4–493 226.0*	6–6	6.87−04	5.00−04	6.88−02	−2.523	D+	3
			6 987.17	6 989.10	478 884.07–493 192.06	4–4	5.46−04	4.00−04	3.68−02	−2.796	D+	3
			6 918.03	6 919.94	478 842.99–493 293.98	2–2	2.79−04	2.00−04	9.11−03	−3.398	D	3
			6 937.75	6 939.67	478 884.07–493 293.98	4–2	5.54−04	2.00−04	1.83−02	−3.097	D	3
			6 967.17	6 969.09	478 842.99–493 192.06	2–4	6.87−05	1.00−04	4.59−03	−3.699	E+	3
106		$^2P^{\circ}-{}^2S$	*6 674.2*	*6 676.1*	*478 870.4–493 849.24*	6–2	9.88−03	2.20−03	2.90−01	−1.879	C	3
			6 680.34	6 682.18	478 884.07–493 849.24	4–2	6.57−03	2.20−03	1.94−01	−2.056	C	3
			6 662.05	6 663.89	478 842.99–493 849.24	2–2	3.30−03	2.20−03	9.65−02	−2.357	C	3
107		$^2P^{\circ}-{}^2D$	*6 341.2*	*6 342.9*	*478 870.4–494 636.0*	6–10	2.17−04	2.18−04	2.73−02	−2.883	E	1,3
			6 360.11	6 361.87	478 884.07–494 602.73	4–6	2.20−04	2.00−04	1.68−02	−3.097	D	3
			6 310.24	6 311.99	478 842.99–494 685.86	2–4	1.67−04	2.00−04	8.31−03	−3.398	D	3
			6 326.65	6 328.40	478 884.07–494 685.86	4–4	4.48−05	2.69−05	2.24−03	−3.968	E	LS
108	$2p^4(^1S)3p-2p^4(^3P)4d$	$^2P^{\circ}-{}^2D$	*2 750*	*2 751*	*478 870.4–515 226*	6–10	1.27−01	2.39−02	1.30+00	−0.843	E+	1
			2 740.3	2 741.2	478 884.07–515 365	4–6	1.28−01	2.16−02	7.80−01	−1.063	D	LS
			2 763.6	2 764.4	478 842.99–515 017	2–4	1.04−01	2.38−02	4.33−01	−1.322	E+	LS
			2 766.7	2 767.6	478 884.07–515017	4–4	2.07−02	2.38−03	8.67−02	−2.021	E	LS
109	$2p^4(^1S)3p-2p^4(^1S)3d$	$^2P^{\circ}-{}^2D$		*1 976.06*	*478 870.4–529 476.1*	6–10	8.47+00	8.26−01	3.22+01	0.695	B+	3

TABLE 12. Transition probabilities of allowed lines for Na III (references for this table are as follows: 1=Butler and Zeippen,[15] 2=Tachiev and Froese Fischer,[97] and 3=McPeake and Hibbert[57])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				1 977.161	478 884.07–529 461.64	4–6	8.46+00	7.43−01	1.94+01	0.473	B+	3
				1 974.150	478 842.99–529 497.70	2–4	7.07+00	8.26−01	1.07+01	0.218	B+	3
				1 975.752	478 884.07–529 497.70	4–4	1.41+00	8.27−02	2.15+00	−0.480	B	3
110	$2p^4(^3P)3s-2p^4(^3P)3p$	$^2P-^2D^\circ$	*2 458.89*	*2 459.63*	*3 73981.5–414 638.0*	6–10	2.82+08	4.26−01	2.07+01	0.408	A	2,3
			2 459.309	2 460.053	373 632.32–414 281.85	4–6	2.80+08	3.81−01	1.24+01	0.183	A	2,3
			2 468.855	2 469.601	374 679.91–415 172.28	2–4	2.13+08	3.89−01	6.33+00	−0.109	A	2,3
			2 406.588	2 407.321	373 632.32–415 172.28	4–4	7.37+07	6.40−02	2.03+00	−0.592	A	2,3

[a] Wavelengths (Å) are always given unless cm^{-1} is indicated.

10.3.3. Forbidden Transitions for Na III

Tachiev and Froese Fischer[97] used MCHF–Breit-Pauli calculations. We estimated the accuracies for the forbidden lines by applying the pooling fit parameters (see Sec. 4 of the Introduction) of allowed transitions from lower-lying levels of Na III. Thus the listed accuracies are less well established than for the allowed lines.

10.3.4. References for Forbidden Transitions for Na III

[97] G. Tachiev and C. Froese Fischer, http://www.vuse.vanderbilt.edu/~cff/mchf_collection/ (MCHF, energy adjusted, downloaded on Dec. 3, 2003).

TABLE 13. Wavelength finding list for forbidden lines for Na III

Wavelength (vac) (Å)	Mult. No.	Wavelength (vac) (Å)	Mult. No.	Wavelength (vac) (Å)	Mult. No.	Wavelength (vac) (Å)	Mult. No.
250.512	5	266.894	4	272.449	3	378.136	2
250.517	5	267.643	4	273.109	3	703.751	6
251.372	5	268.625	4	273.467	3	705.541	6
251.377	5	272.072	3	274.132	3		
Wavelength (air) (Å)	**Mult. No.**	**Wavelength (air) (Å)**	**Mult. No.**	**Wavelength (air) (Å)**	**Mult No.**	**Wavelength (air) (Å)**	**Mult. No.**
2 171.577	13	2 530.246	12	3 070.566	14	8 092.27	17
2 182.848	13	2 553.546	12	3 110.326	10	8 470.65	17
2 202.831	13	2 563.304	12	3 111.061	10	8 476.11	17
2 214.208	13	2 587.219	12	3 136.767	14	12 999.67	16
2 225.928	13	2 592.778	15	3 160.427	10	13 012.53	16
2 230.328	13	2 608.861	15	3 172.654	14	13 086.71	8
2 246.710	13	2 637.454	15	3 912.788	11	13 369.06	8
2 251.473	13	2 676.966	15	3 913.952	11	13 553.92	16
2 272.737	13	2 682.192	15	4 080.081	11	13 567.90	16
2 275.320	13	2 712.424	15	7 681.48	17	14 021.92	8
2 455.613	12	3 008.200	14	7 685.96	17	14 250.38	16
2 474.731	12	3 026.862	10	7 824.37	17	14 265.83	16
2 497.015	12	3 027.559	10	7 829.02	17	15 166.54	8
2 510.264	12	3 036.939	14	8 087.30	17	16 437.06	8
Wavenumber (cm^{-1})	**Mult. No.**	**Wavenumber (cm^{-1})**	**Mult. No.**	**Wavenumber (cm^{-1})**	**Mult. No.**	**Wavenumber (cm^{-1})**	**Mult. No.**
1 366.3	1	1 047.59	9	886.25	7	509.51	7

TABLE 14. Transition probabilities of forbidden lines for Na III (reference for this table is as follows: 1=Tachieve and Froese[97])

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i–E_k	g_i–g_k	Type	A_{ki} (s^{-1})	S (a.u.)	Acc.	Source
1	$2p^5-2p^5$	$^2P^\circ-^2P^\circ$									
				1 366.3 cm^{-1}	0.0–1 366.3	4–2	M1	4.59−02	1.33+00	B+	1
				1 366.3 cm^{-1}	0.0–1 366.3	4–2	E2	1.05−07	3.92−01	B	1
2	$2s^22p^5-2s2p^6$	$^2P^\circ-^2S$									
				378.136	0.0–264 455.0	4–2	M2	1.36+01	1.42+01	B+	1
3	$2p^5-2p^4(^3P)3s$	$^2P^\circ-^4P$									
				272.449	0.0–367 040.66	4–4	M2	3.31−01	1.34−01	C	1
				272.072	0.0–367 550.17	4–2	M2	1.35+00	2.71−01	C+	1
				273.109	0.0–366 154.41	4–6	M2	5.57+00	3.40+00	B	1
				273.467	1 366.3–367 040.66	2–4	M2	3.94+00	1.62+00	B	1
				274.132	1 366.3–366 154.41	2–6	M2	1.44+00	8.96−01	B	1
4		$^2P^\circ-^2P$									
				267.643	0.0–373 632.32	4–4	M2	8.96−01	3.30−01	C+	1
				266.894	0.0–374 679.91	4–2	M2	8.36−01	1.52−01	C	1
				268.625	1 366.3–373 632.32	2–4	M2	5.22−01	1.96−01	C+	1
5	$2p^5-2p^4(^1D)3s$	$^2P^\circ-^2D$									
				251.377	1 366.3–399 174.71	2–6	M2	4.07+00	1.64+00	B	1
				250.517	0.0–399 174.71	4–6	M2	3.18+00	1.26+00	B	1
				251.372	1 366.3–399 182.31	2–4	M2	2.63−01	7.09−02	C	1
				250.512	0.0–399 182.31	4–4	M2	9.59−01	2.54−01	C+	1
6	$2s2p^6-$ $2s^22p^4(^3P)3p$	$^2S-^4P^\circ$									
				705.541	264 455.0–406 190.15	2–6	M2	2.35−04	1.65−02	D+	1
				703.751	264 455.0–406 550.63	2–4	M2	4.94−05	2.29−03	D	1
7	$2p^4(^3P)3s-2p^4(^3P)3s$	$^4P-^4P$									
				886.25 cm^{-1}	366 154.41–367 040.66	6–4	M1	1.68−02	3.59+00	B+	1
				509.51 cm^{-1}	367 040.66–367 550.17	4–2	M1	5.93−03	3.32+00	B+	1
8		$^4P-^2P$									
			15 166.54	15 170.69	367 040.66–373 632.32	4–4	M1	1.76−02	9.10−03	C+	1
			14 021.92	14 025.76	367 550.17–374 679.91	2–2	M1	2.73−02	5.58−03	C	1
			13 369.06	13 372.72	366 154.41–373 632.32	6–4	M1	3.77−02	1.34−02	C+	1
			13 086.71	13 090.29	367 040.66–374 679.91	4–2	M1	1.40−03	2.33−04	D+	1
			16 437.06	16 441.55	367 550.17–373 632.32	2–4	M1	8.94−03	5.89−03	C	1
9		$^2P-^2P$									
				1 047.59 cm^{-1}	373 632.32–374 679.91	4–2	M1	2.07−02	1.33+00	B+	1
10	$2p^4(^3P)3s-2p^4(^1D)3s$	$^4P-^2D$									
			3 111.061	3 111.964	367 040.66–399 174.71	4–6	M1	8.79−02	5.89−04	D+	1
			3 160.427	3 161.342	367 550.17–399 182.31	2–4	M1	5.83−02	2.73−04	D+	1
			3 027.559	3 028.440	366 154.41–399 174.71	6–6	M1	6.03−01	3.72−03	C	1
			3 110.326	3 111.228	367 040.66–399 182.31	4–4	M1	2.60−01	1.16−03	C	1
			3 026.862	3 027.743	366 154.41–399 182.31	6–4	M1	6.49−02	2.67−04	D+	1
11		$^2P-^2D$									
			3 913.952	3 915.060	373 632.32–399 174.71	4–6	M1	1.19−01	1.59−03	C	1
			4 080.081	4 081.233	374 679.91–399 182.31	2–4	M1	7.79−02	7.85−04	C	1
			3 912.788	3 913.896	373 632.32–399 182.31	4–4	M1	2.70−01	2.40−03	C	1
12	$2p^4(^3P)3s-2p^4(^3P)3p$	$^4P-^4P^\circ$									
			2 497.015	2 497.768	366 154.41–406 190.15	6–6	M2	2.09−03	8.19+01	A	1
			2 530.246	2 531.007	367 040.66–406 550.63	4–4	M2	8.12−04	2.26+01	B+	1
			2 455.613	2 456.357	366 154.41–406 865.11	6–2	M2	8.74−04	1.05+01	B+	1
			2 474.731	2 475.479	366 154.41–406 550.63	6–4	M2	1.30−04	3.23+00	B	1
			2 510.264	2 511.020	367 040.66–406 865.11	4–2	M2	7.44−04	9.96+00	B+	1
			2 553.546	2 554.312	367 040.66–406 190.15	4–6	M2	1.12−05	4.89−01	C+	1
			2 563.304	2 564.072	367 550.17–406 550.63	2–4	M2	2.59−04	7.71+00	B+	1
			2 587.219	2 587.993	367 550.17–406 190.15	2–6	M2	1.46−04	6.82+00	B+	1
13		$^4P-^4D^\circ$									
			2 275.320	2 276.023	367 040.66–410 976.94	4–8	M2	1.09−03	3.57+01	B+	1
			2 272.737	2 273.440	367 550.17–411 536.38	2–6	M2	8.24−04	2.01+01	B+	1

TABLE 14. Transition probabilities of forbidden lines for Na III (reference for this table is as follows: 1=Tachieve and Froese[97])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i–E_k	g_i–g_k	Type	A_{ki} (s^{-1})	S (a.u.)	Acc.	Source
			2 230.328	2 231.021	366 154.41–410 976.94	6–8	M2	2.98−03	8.82+01	A	1
			2 246.710	2 247.407	367 040.66–411 536.38	4–6	M2	1.62−03	3.73+01	B+	1
			2 251.473	2 252.171	367 550.17–411 951.78	2–4	M2	1.52−03	2.37+01	B+	1
			2 202.831	2 203.518	366 154.41–411 536.38	6–6	M2	3.05−11	6.39−07	E	1
			2 225.928	2 226.620	367 040.66–411 951.78	4–4	M2	6.55−07	9.62−03	D+	1
			2 182.848	2 183.531	366 154.41–411 951.78	6–4	M2	4.29−04	5.71+00	B+	1
			2 214.208	2 214.898	367 040.66–412 189.46	4–2	M2	1.29−03	9.25+00	B+	1
			2 171.577	2 172.258	366 154.41–412 189.46	6–2	M2	2.68−04	1.74+00	B	1
14		^{2}P–^{4}P$^\circ$									
			3 036.939	3 037.823	373 632.32–406 550.63	4–4	M2	3.76−05	2.61+00	B	1
			3 008.200	3 009.076	373 632.32–406 865.11	4–2	M2	1.72−04	5.71+00	B+	1
			3 070.566	3 071.458	373 632.32–406 190.15	4–6	M2	5.46−04	6.00+01	B+	1
			3 136.767	3 137.676	374 679.91–406 550.63	2–4	M2	3.24−04	2.64+01	B+	1
			3 172.654	3 173.572	374 679.91–406 190.15	2–6	M2	9.36−05	1.21+01	B+	1
15		^{2}P–^{4}D$^\circ$									
			2 676.966	2 677.762	373 632.32–410 976.94	4–8	M2	1.78−03	1.32+02	A	1
			2 712.424	2 713.228	374 679.91–411 536.38	2–6	M2	6.04−04	3.57+01	B+	1
			2 637.454	2 638.240	373 632.32–411 536.38	4–6	M2	1.94−04	1.00+01	B+	1
			2 682.192	2 682.989	374 679.91–411 951.78	2–4	M2	2.83−04	1.05+01	B+	1
			2 608.861	2 609.640	373 632.32–411 951.78	4–4	M2	4.85−05	1.58+00	B	1
			2 592.778	2 593.553	373 632.32–412 189.46	4–2	M2	1.04−04	1.64+00	B	1
16	$2p^4(^1\text{D})3s-2p^4(^3\text{P})3p$	^{2}D–^{4}P$^\circ$									
			12 999.67	13 003.22	399 174.71–406 865.11	6–2	M2	3.93−12	1.96−04	E+	1
			13 553.92	13 557.63	399 174.71–406 550.63	6–4	M2	6.86−11	8.43−03	D+	1
			13 012.53	13 016.09	399 182.31–406 865.11	4–2	M2	8.41−10	4.21−02	C	1
			14 250.38	14 254.27	399 174.71–406 190.15	6–6	M2	1.20−10	2.85−02	C	1
			13 567.90	13 571.61	399 182.31–406 550.63	4–4	M2	4.96−10	6.13−02	C	1
			14 265.83	14 269.73	399 182.31–406 190.15	4–6	M2	1.27−10	3.01−02	C	1
17		^{2}D–^{4}D$^\circ$									
			8 087.30	8 089.52	399 174.71–411 536.38	6–6	M2	1.38−10	1.93−03	D	1
			7 829.02	7 831.18	399 182.31–411 951.78	4–4	M2	7.96−10	6.29−03	D+	1
			7 681.48	7 683.59	399 174.71–412 189.46	6–2	M2	1.53−09	5.48−03	D+	1
			7 824.37	7 826.52	399 174.71–411 951.78	6–4	M2	9.17−10	7.22−03	D+	1
			7 685.96	7 688.08	399 182.31–412 189.46	4–2	M2	3.16−10	1.14−03	D	1
			8 470.65	8 472.98	399 174.71–410 976.94	6–8	M2	1.56−10	3.65−03	D	1
			8 092.27	8 094.50	399 182.31–411 536.38	4–6	M2	5.53−10	7.73−03	D+	1
			8 476.11	8 478.43	399 182.31–410 976.94	4–8	M2	3.30−12	7.75−05	E	1

[a] Wavelengths (Å) are always given unless cm^{-1} is indicated.

10.4. Na IV

Oxygen isoelectronic sequence
Ground state: $1s^2 2s^2 2p^4\ {}^3P_2$
Ionization energy: 98.915 eV=797 800 cm^{-1}

10.4.1. Allowed Transitions for Na IV

Only OP (Ref. 15) results were available for transitions from energy levels above the 4*s*. Wherever available we have used the results of Froese Fischer *et al.*,[94] which are based on extensive MCHF calculations with Breit-Pauli corrections to order α^2, and the second-order MBPT data of Vilkas *et al.*[119]

To estimate accuracies, we pooled the relative standard deviation of the mean (RSDM) for each of the lines with transition rates published in two or more references,[15,94,119] as described in the general introduction. For this purpose the spin-allowed (non-OP) and intercombination data were treated separately and each of these was in turn divided into two upper-level energy groups below and above 580 000 cm^{-1}. OP lines constituted a fifth group and have been used only when more accurate sources were not available, because spin-orbit effects are often significant for this spectrum. For the higher energy groups, only one data source was available.

Vilkas *et al.*[119] provide data for transitions between lower levels. To estimate the accuracy of the higher-lying lines for Tachiev and Froese Fischer[94] and separately for OP (Ref. 15) for the lines unique to it, we isoelectronically averaged the "logarithmic quality factors" (see Sec. 4.1 of the Introduction) observed for lines from the lower-lying levels of O-like ions of Na, Mg, and Si, and scaled them for lines from high-lying levels, as described in the introduction. Thus the listed accuracies for these higher-lying transitions are less well established than for those from lower levels. The energy level labeled $2p^3(^2P)3p\ ^1P_1$ also has a significant component of the same configuration except with the ^{2}D parent, and therefore transitions from it were assigned lower accuracies.

10.4.2. References for Allowed Transitions for Na IV

[15] K. Butler and C. J. Zeippen, http://legacy.gsfc.nasa.gov/topbase, downloaded on Aug. 8, 1995 (Opacity Project).
[89] G. Tachiev and C. Froese Fischer, Astron. Astrophys. **385**, 716 (2002).
[94] G. Tachiev and C. Froese Fischer, http://www.vuse.vanderbilt.edu/~cff/mchf_collection/ (MCHF, *ab initio*, downloaded on May 6, 2002). See Tachiev and Froese Fischer (Ref. 89).
[119] M. J. Vilkas, G. Merkelis, R. Kisielius, G. Gaigalas, A. Bernotas, and Z. Rudzikas, Phys. Scr. **49**, 592 (1994).

TABLE 15. Wavelength finding list for allowed lines for Na IV

Wavelength (vac) (Å)	Mult. No.
136.430	37
136.547	36
136.551	36
136.636	37
136.724	37
136.754	36
136.758	36
136.842	36
136.847	35
136.850	35
136.855	35
137.055	35
137.057	35
137.143	35
137.712	41
142.231	40
142.359	39
142.685	38
146.062	33
146.064	33
146.065	33
146.299	33
146.302	33
146.399	33
150.286	27
150.292	27
150.298	27
150.458	26
150.536	27
150.543	27
150.642	27
150.688	25
150.709	26
150.714	25
150.940	25
150.966	25
151.050	25
151.073	25
151.299	34
155.082	24
155.239	19
155.349	24
155.446	18
155.462	24
155.507	19
155.508	18
155.620	19
155.687	18
155.690	31
155.714	18
155.776	18
155.828	18
156.493	17
156.508	17
156.537	17
156.764	17
156.780	17
156.880	17
157.084	30
157.589	29
157.597	29
157.603	29
157.779	28
162.448	22
163.189	21
163.840	20
164.841	32
168.086	16
168.096	16
168.099	16
168.409	16
168.412	16
168.545	16
174.005	23
181.757	12
181.766	12
182.123	12
182.132	12
182.133	12
182.288	12
188.179	9
188.571	9
190.130	14
190.426	8
190.434	8
190.445	8
190.828	8
190.836	8
190.999	8
192.550	13
192.561	13
199.772	11
202.307	10
202.316	10
202.329	10
203.957	15
205.486	7
205.955	7
206.154	7
280.202	48
280.228	48
280.247	48

TABLE 15. Wavelength finding list for allowed lines for Na IV—Continued

Wavelength (vac) (Å)	Mult. No.
280.994	48
281.020	48
281.429	48
290.962	2
291.901	2
292.302	2
304.077	45
304.218	45
304.231	45
305.151	45
305.165	45
305.679	45
306.621	43
319.644	4
341.884	42
341.907	42
343.056	42
343.064	42
343.087	42
343.737	42
360.761	6
371.854	50
380.022	49
395.427	47
408.684	1
409.614	1
410.371	1
410.541	1
411.334	1
412.243	1
437.243	46
437.270	46
440.267	44
467.622	3
469.832	3
561.194	5
561.790	137
623.38	139
625.13	131
625.19	131
625.21	131
625.27	131
625.86	131
628.12	138
631.46	130
631.52	130
631.58	130
631.68	130
632.18	130
632.29	130
640.47	133
645.27	132
645.33	132
645.44	132
645.55	132
645.66	132
645.93	132
650.83	64
650.91	64
650.92	64
650.94	64
651.00	64
651.15	64
671.35	177
673.49	63
673.55	63
673.58	63
673.60	63
673.62	63
673.64	63
692.60	179
698.45	178
703.71	128
703.78	128
703.79	128
703.86	128
704.54	128
728.12	136
731.48	135
740.16	134
767.94	172
768.00	172
768.09	172
768.20	172
768.24	172
768.28	172
784.54	62
784.66	62
785.24	62
785.36	62
785.40	62
787.54	62
800.94	173
824.35	176
828.66	175
833.82	129
839.82	174
851.58	124
851.69	124
851.72	124
851.82	124
852.08	124
852.93	124
853.19	124
876.89	125
877.03	125
877.21	126
877.31	125
877.40	169
877.44	125
877.59	169
877.70	169
877.72	125
877.85	169
877.96	169
878.22	125
890.79	123
890.90	123
890.98	123
891.01	123
892.19	123
892.22	123

TABLE 15. Wavelength finding list for allowed lines for Na IV—Continued

Wavelength (vac) (Å)	Mult. No.
911.76	170
920.30	61
920.47	61
920.52	61
925.87	60
926.04	60
926.09	60
932.31	59
933.25	59
933.43	59
933.48	59
935.52	59
935.69	59
962.48	171
972.31	58
972.50	58
972.55	58
972.92	58
973.10	58
974.22	58
1 050.40	127
1 075.03	112
1 075.20	112
1 075.38	112
1 075.54	112
1 075.84	112
1 077.31	112
1 077.61	112
1 095.97	110
1 096.14	110
1 097.34	110
1 097.51	110
1 097.97	110
1 100.923	111
1 101.096	111
1 101.534	111
1 101.84	110
1 102.944	111
1 103.384	111
1 103.698	111
1 115.33	117
1 115.67	114
1 116.05	114
1 116.37	114
1 116.71	114
1 117.03	114
1 117.85	114
1 141.72	116
1 142.06	116
1 143.585	113
1 144.057	113
1 144.277	113
1 144.750	113
1 145.088	113
1 145.611	113
1 145.949	113
1 151.35	115
1 177.16	167
1 188.77	166
1 188.83	166
1 188.98	166

TABLE 15. Wavelength finding list for allowed lines for Na IV—Continued

Wavelength (vac) (Å)	Mult. No.
1 189.12	166
1 189.18	166
1 189.45	166
1 189.65	166
1 231.51	77
1 263.10	168
1 306.15	122
1 325.37	74
1 325.40	74
1 325.76	74
1 325.83	74
1 325.89	76
1 325.96	74
1 326.35	74
1 326.39	74
1 377.30	156
1 377.94	156
1 403.586	96
1 403.867	96
1 406.873	96
1 407.65	95
1 409.81	95
1 410.10	95
1 411.17	121
1 414.98	95
1 415.26	95
1 415.398	100
1 416.459	100
1 417.776	100
1 418.32	95
1 445.97	75
1 446.67	75
1 447.19	75
1 453.04	120
1 453.20	94
1 453.51	94
1 453.68	120
1 454.23	120
1 456.942	104
1 469.33	119
1 494.04	155
1 494.59	155
1 500.747	118
1 500.88	93
1 501.20	93
1 501.560	118
1 502.32	93
1 502.65	93
1 505.32	93
1 506.09	93
1 508.09	160
1 508.77	93
1 518.767	103
1 523.401	92
1 534.47	73
1 541.64	154
1 541.77	154
1 542.36	154
1 542.39	154
1 542.44	154
1 542.97	154

TABLE 15. Wavelength finding list for allowed lines for Na IV—Continued

Wavelength (vac) (Å)	Mult. No.
1 543.16	154
1 559.40	153
1 559.99	153
1 560.81	153
1 580.233	91
1 580.498	91
1 581.31	99
1 582.121	56
1 582.181	56
1 582.331	56
1 582.617	91
1 582.91	99
1 582.975	91
1 583.817	56
1 583.968	56
1 584.043	91
1 584.141	56
1 584.23	99
1 584.45	151
1 585.06	151
1 585.87	99
1 585.91	151
1 586.783	56
1 586.798	91
1 586.956	56
1 587.047	56
1 587.20	99
1 587.93	151
1 588.78	151
1 588.86	99
1 594.825	152
1 595.449	152
1 595.744	152
1 596.304	152
1 596.368	152
1 596.401	152
1 598.23	151
1 601.18	85
1 601.92	85
1 606.973	52
1 607.482	52
1 613.947	98
1 615.326	98
1 615.924	98
1 617.040	98
1 617.639	98
1 618.568	98
1 652.10	165
1 655.467	102
1 666.772	97
1 668.597	97
1 669.240	97
1 670.715	97
1 672.300	97
1 672.548	97
1 673.780	97
1 701.98	57
1 702.415	57
1 702.736	57
1 702.986	57
1 703.308	57
1 703.485	57
1 707.39	159
1 708.26	159
1 723.113	101
1 727.328	101
1 729.92	158
1 730.604	101
1 760.81	157
1 764.35	157
1 764.48	84
1 764.51	84
1 765.38	84
1 776.01	157
1 791.6	88
1 823.8	164
1 894.3	163
1 895.4	163
1 896.3	163
1 897.6	69
1 898.8	69
1 922.1	162
1 960.76	51
1 965.08	51
1 967.60	51
1 968.4	68
1 971.0	68
1 972.2	68
1 973.0	68
1 974.3	68
1 975.1	68
1 976.2	161
1 977.6	161
1 983.7	83
1 984.8	83
1 985.0	83
1 986.2	83
1 987.1	83
1 998.6	87
Wavelength (air) (Å)	Mult. No.
2 005.74	109
2 018.14	54
2 018.38	54
2 019.19	54
2 106.3	67
2 107.7	67
2 113.1	67
2 114.5	67
2 115.2	67
2 115.5	67
2 116.2	67
2 124.88	108
2 139.2	107
2 151.1	107
2 153.5	80
2 154.8	80
2 155.8	72
2 177.49	145
2 178.66	145

TABLE 15. Wavelength finding list for allowed lines for Na IV—Continued

Wavelength (air) (Å)	Mult. No.
2 240.7	106
2 251.0	71
2 253.7	71
2 283.9	86
2 285.6	86
2 318.61	144
2 319.93	144
2 321.74	144
2 332.9	143
2 337.0	143
2 338.8	143
2 349.9	143
2 351.2	143
2 353.1	143
2 356.2	105
2 359.8	105
2 366.4	105
2 430.2	70
2 439.2	70
2 440.1	70
2 512.9	82
2 598.5	142
2 600.7	142
2 601.1	142
2 602.8	142
2 605.1	142
2 609.1	142
2 610.8	142
2 617.81	53
2 622.30	53
2 717.0	147
2 831.42	141
2 842.82	141
2 844.80	141
2 851.71	141
2 853.70	141
2 856.44	141
2 909.3	146
2 957.0	150
3 223.4	149
3 497.7	148
3 622.6	79
4 435.3	89
4 439.31	89
4 441.50	89
4 442.13	89
4 444.32	89
4 465.4	89
4 471.0	78
4 472.38	89
4 495.8	78
4 498.7	78
4 498.9	78
4 501.7	78
4 504.6	78
5 216.1	90
5 225.64	90
5 228.67	90
5 230.6	90
5 240.13	90
5 248.6	90
6 409	81
6 415	81
7 127	55
7 137	55
7 141	55
7 142	55
7 152	55
7 155	55
9 012	65
9 038	65
9 051	65
9 054	65
9 056	65
9 072	65
17 602.1	140
17 636.5	140
17 706.8	140
17 741.7	140
17 819	140
17 852	140
17 930	140

Wavenumber (cm^{-1})	Mult. No.
4 769	66
4 749	66

TABLE 16. Transition probabilities of allowed lines for Na IV (references for this table are as follows: 1 = Butler and Zeippen,[15] 2 = Tachiev and Froese Fischer,[94] and 3 = Vilkas *et al.*[119])

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	$E_i - E_k$ (cm^{-1})	$g_i - g_k$	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
1	$2s^2 2p^4 - 2s2p^5$	$^3P - ^3P^\circ$		*410.43*	*544–244 190*	9–9	6.30+01	1.59−01	1.94+00	0.156	B+	2,3
				410.371	0.0–243 681.9	5–5	4.73+01	1.19−01	8.07−01	−0.225	B+	2,3
				410.541	1 106.3–244 687.6	3–3	1.57+01	3.98−02	1.61−01	−0.923	B+	2,3
				408.684	0.0–244 687.6	5–3	2.66+01	4.00−02	2.69−01	−0.699	B+	2,3
				409.614	1 106.3–245 238.8	3–1	6.34+01	5.32−02	2.15−01	−0.797	B+	2,3
				412.243	1 106.3–243 681.9	3–5	1.55+01	6.60−02	2.69−01	−0.703	B+	2,3
				411.334	1 576.0–244 687.6	1–3	2.09+01	1.59−01	2.15−01	−0.799	B+	2,3

TABLE 16. Transition probabilities of allowed lines for Na IV (references for this table are as follows: 1 = Butler and Zeippen,[15] 2 = Tachiev and Froese Fischer,[94] and 3 = Vilkas *et al.*[119])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log *gf*	Acc.	Source
2		^{3}P – ^{1}P°										
				291.901	1 106.3–343 688	3–3	2.34−03	2.98−06	8.60−06	−5.049	D	2,3
				290.962	0.0–343 688	5–3	1.31−01	9.98−05	4.78−04	−3.302	C	2,3
				292.302	1 576.0–343 688	1–3	4.19−03	1.61−05	1.55−05	−4.793	D+	2,3
3		^{1}D – ^{3}P°										
				467.622	30 839.8–244 687.6	5–3	1.16−03	2.27−06	1.75−05	−4.945	D	2,3
				469.832	30 839.8–243 681.9	5–5	1.60−02	5.28−05	4.08−04	−3.578	C	2,3
4		^{1}D – ^{1}P°		319.644	30 839.8–343 688	5–3	2.52+02	2.32−01	1.22+00	0.064	B+	2,3
5		^{1}S – ^{3}P°										
				561.194	66 496–244 687.6	1–3	2.33−03	3.30−05	6.10−05	−4.481	D	2,3
6		^{1}S – ^{1}P°		360.761	66 496–343 688	1–3	1.38+01	8.07−02	9.59−02	−1.093	B+	2,3
7	$2p^4$–$2p^3(^4$S°$)3s$	^{3}P – ^{3}S°		*205.72*	*544–486 650.2*	9–3	2.48+02	5.25−02	3.20−01	−0.326	B	2
				205.486	0.0–486 650.2	5–3	1.39+02	5.29−02	1.79−01	−0.578	B+	2
				205.955	1 106.3–486 650.2	3–3	8.19+01	5.21−02	1.06−01	−0.806	B	2
				206.154	1 576.0–486 650.2	1–3	2.72+01	5.20−02	3.53−02	−1.284	B	2
8	$2p^4$–$2p^3(^2$D°$)3s$	^{3}P – ^{3}D°		*190.64*	*544–525 106*	9–15	8.19+01	7.44−02	4.20−01	−0.174	B	2
				190.445	0.0–525 085	5–7	8.21+01	6.25−02	1.96−01	−0.505	B+	2
				190.836	1 106.3–525 117	3–5	5.87+01	5.34−02	1.01−01	−0.795	B	2
				190.999	1 576.0–525 139	1–3	4.33+01	7.11−02	4.47−02	−1.148	B	2
				190.434	0.0–525 117	5–5	2.31+01	1.26−02	3.93−02	−1.201	B	2
				190.828	1 106.3–525 139	3–3	3.56+01	1.94−02	3.66−02	−1.235	B	2
				190.426	0.0–525 139	5–3	2.72+00	8.86−04	2.78−03	−2.354	B	2
9		^{3}P – ^{1}D°										
				188.571	1 106.3–531 410	3–5	2.71−02	2.41−05	4.49−05	−4.141	E+	2
				188.179	0.0–531 410	5–5	4.43−01	2.35−04	7.29−04	−2.930	D+	2
10		^{1}D – ^{3}D°										
				202.316	30 839.8–525 117	5–5	2.16−02	1.33−05	4.42−05	−4.177	E+	2
				202.307	30 839.8–525 139	5–3	5.58−02	2.06−05	6.85−05	−3.987	E+	2
				202.329	30 839.8–525 085	5–7	4.33−02	3.72−05	1.24−04	−3.730	D	2
11		^{1}D – ^{1}D°		199.772	30 839.8–531 410	5–5	2.05+02	1.23−01	4.04−01	−0.211	B+	2
12	$2p^4$–$2p^3(^2$P°$)3s$	^{3}P – ^{3}P°		*181.94*	*544–550 173*	9–9	8.48+01	4.21−02	2.27−01	−0.421	C	2
				181.757	0.0–550 186	5–5	6.07+01	3.00−02	8.99−02	−0.824	C	2
				182.133	1 106.3–550 157	3–3	2.04+01	1.02−02	1.83−02	−1.514	D+	2
				181.766	0.0–550 157	5–3	3.33+01	9.89−03	2.96−02	−1.306	D+	2
				[182.13]	1 106.3–550 158	3–1	8.44+01	1.40−02	2.52−02	−1.377	D+	2
				182.123	1 106.3–550 186	3–5	2.42+01	2.01−02	3.61−02	−1.220	C	2
				182.288	1 576.0–550 157	1–3	3.10+01	4.63−02	2.78−02	−1.334	D+	2
13		^{1}D – ^{3}P°										
				192.561	30 839.8–550 157	5–3	1.88−02	6.27−06	1.99−05	−4.504	E+	2
				192.550	30 839.8–550 186	5–5	6.42−01	3.57−04	1.13−03	−2.748	D+	2
14		^{1}D – ^{1}P°		190.130	30 839.8–556 796	5–3	9.39+01	3.05−02	9.55−02	−0.817	C	2
15		^{1}S – ^{1}P°		203.957	66 496–556 796	1–3	9.54+01	1.78−01	1.20−01	−0.750	C	2

TABLE 16. Transition probabilities of allowed lines for Na IV (references for this table are as follows: 1 = Butler and Zeippen,[15] 2 = Tachiev and Froese Fischer,[94] and 3 = Vilkas *et al.*[119])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
16	$2p^4$–$2p^3(^4S^\circ)3d$	^3P–$^3D^\circ$		*168.25*	*544–594 913*	9–15	3.30+02	2.33−01	1.16+00	0.322	C+	2
				168.086	0.0–594 934	5–7	3.33+02	1.97−01	5.46−01	−0.007	C+	2
				168.409	1 106.3–594 899.2	3–5	2.45+02	1.73−01	2.88−01	−0.285	C+	2
				168.545	1 576.0–594 888.1	1–3	1.81+02	2.31−01	1.28−01	−0.636	C	2
				168.096	0.0–594 899.2	5–5	8.38+01	3.55−02	9.82−02	−0.751	C	2
				168.412	1 106.3–594 888.1	3–3	1.37+02	5.81−02	9.67−02	−0.759	C	2
				168.099	0.0–594 888.1	5–3	9.35+00	2.38−03	6.57−03	−1.924	D+	2
17	$2p^4$–$2p^3(^2D^\circ)3d$	^3P–$^3D^\circ$		*156.65*	*544–638 901*	9–15	2.81+02	1.73−01	8.01−01	0.192	C	2
				156.537	0.0–638 825	5–7	2.92+02	1.50−01	3.87−01	−0.125	C+	2
				156.780	1 106.3–638 943	3–5	2.12+02	1.30−01	2.02−01	−0.409	C	2
				156.880	1 576.0–639 007	1–3	1.52+02	1.68−01	8.67−02	−0.775	C	2
				156.508	0.0–638 943	5–5	6.45+01	2.37−02	6.10−02	−0.926	C	2
				156.764	1 106.3–639 007	3–3	1.07+02	3.94−02	6.10−02	−0.927	C	2
				156.493	0.0–639 007	5–3	6.26+00	1.38−03	3.55−03	−2.161	D	2
18		^3P–$^3P^\circ$		*155.61*	*544–643 179*	9–9	6.17+02	2.24−01	1.03+00	0.304	C	2
				155.508	0.0–643 052	5–5	4.81+02	1.74−01	4.46−01	−0.060	C+	2
				155.714	1 106.3–643 311	3–3	1.00+02	3.64−02	5.60−02	−0.962	C	2
				155.446	0.0–643 311	5–3	3.45+02	7.50−02	1.92−01	−0.426	C	2
				[155.69]	1 106.3–643 420	3–1	5.93+02	7.19−02	1.11−01	−0.666	C	2
				155.776	1 106.3–643 052	3–5	1.50+02	9.08−02	1.40−01	−0.565	C	2
				155.828	1 576.0–643 311	1–3	1.57+02	1.71−01	8.79−02	−0.767	C	2
19		^3P–$^3S^\circ$		*155.37*	*544–644 166*	9–3	3.79+02	4.57−02	2.11−01	−0.386	C	2
				155.239	0.0–644 166	5–3	1.88+02	4.07−02	1.04−01	−0.691	C	2
				155.507	1 106.3–644 166	3–3	1.40+02	5.07−02	7.78−02	−0.818	C	2
				155.620	1 576.0–644 166	1–3	5.13+01	5.59−02	2.86−02	−1.253	D+	2
20		^1D–$^1P^\circ$		163.840	30 839.8–641 193	5–3	3.56+02	8.60−02	2.32−01	−0.367	C	2
21		^1D–$^1D^\circ$		163.189	30 839.8–643 625.6	5–5	4.32+02	1.73−01	4.64−01	−0.063	C+	2
22		^1D–$^1F^\circ$		162.448	30 839.8–646 419.6	5–7	6.04+02	3.35−01	8.95−01	0.224	C+	2
23		^1S–$^1P^\circ$		174.005	66 496–641 193	1–3	4.33+01	5.89−02	3.38−02	−1.230	C	2
24	$2p^4$–$2p^3(^4S^\circ)4s$	^3P–$^3S^\circ$		155.21	544–644 819	9–3	3.44+02	4.15−02	1.91−01	−0.428	C	2
				155.082	0.0–644 819	5–3	1.33+02	2.87−02	7.32−02	−0.843	C	2
				155.349	1 106.3–644 819	3–3	1.48+02	5.37−02	8.24−02	−0.793	C	2
				155.462	1 576.0–644 819	1–3	6.30+01	6.85−02	3.51−02	−1.164	C	2
25	$2p^4$–$2p^3(^2P^\circ)3d$	^3P–$^3P^\circ$		*150.83*	*544–663 531*	9–9	1.41+02	4.81−02	2.15−01	−0.364	C	2
				150.688	0.0–663 623	5–5	9.87+01	3.36−02	8.34−02	−0.775	C	2
				150.966	1 106.3–663 509	3–3	4.70+01	1.61−02	2.39−02	−1.316	D+	2
				150.714	0.0–663 509	5–3	5.51+01	1.13−02	2.79−02	−1.248	D+	2
				[151.05]	1 106.3–663 137	3–1	1.71+02	1.94−02	2.90−02	−1.235	D+	2
				150.940	1 106.3–663 623	3–5	2.73+01	1.55−02	2.31−02	−1.333	D+	2
				151.073	1 576.0–663 509	1–3	5.40+01	5.54−02	2.76−02	−1.256	D+	2
26		^3P–$^1D^\circ$										
				150.709	1 106.3–664 637	3–5	3.10+01	1.76−02	2.62−02	−1.277	D	2

TABLE 16. Transition probabilities of allowed lines for Na IV (references for this table are as follows: 1 = Butler and Zeippen,[15] 2 = Tachiev and Froese Fischer,[94] and 3 = Vilkas *et al.*[119])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	$E_i - E_k$ (cm^{-1})	$g_i - g_k$	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				150.458	0.0–664 637	5–5	3.32+00	1.13−03	2.79−03	−2.248	E+	2
27		^{3}P−^{3}D$^\circ$		*150.42*	*544–665 364*	9–15	2.41+02	1.36−01	6.06−01	0.088	C	2
				150.298	0.0–665 344	5–7	2.38+02	1.13−01	2.79−01	−0.248	C+	2
				150.543	1 106.3–665 370	3–5	1.71+02	9.70−02	1.44−01	−0.536	C	2
				150.642	1 576.0–665 400	1–3	1.56+02	1.59−01	7.88−02	−0.799	C	2
				150.292	0.0–665 370	5–5	5.41+01	1.83−02	4.54−02	−1.039	C	2
				150.536	1 106.3–665 400	3–3	1.10+02	3.74−02	5.56−02	−0.950	C	2
				150.286	0.0–665 400	5–3	6.42+00	1.30−03	3.23−03	−2.187	D	2
28		^{1}D−^{1}D$^\circ$		157.779	30 839.8–664 637	5–5	1.99+02	7.42−02	1.93−01	−0.431	C	2
29		^{1}D−^{3}D$^\circ$										
				157.597	30 839.8–665 370	5–5	3.50+01	1.30−02	3.38−02	−1.187	D	2
				157.589	30 839.8–665 400	5–3	9.90−02	2.21−05	5.74−05	−3.957	E	2
				157.603	30 839.8–665 344	5–7	9.21−01	4.80−04	1.25−03	−2.620	E	2
30		^{1}D−^{1}F$^\circ$		157.084	30 839.8–667 442	5–7	3.66+02	1.89−01	4.90−01	−0.025	C+	2
31		^{1}D−^{1}P$^\circ$		155.690	30 839.8–673 140	5–3	1.79+01	3.90−03	9.98−03	−1.710	D+	2
32		^{1}S−^{1}P$^\circ$		164.841	66 496–673 140	1–3	7.02+02	8.58−01	4.65−01	−0.067	C+	2
33	$2p^4-2p^3(^4S^\circ)4d$	^{3}P−^{3}D$^\circ$		*146.18*	*544–684 631*	9–15	2.67+02	1.43−01	6.18−01	0.110	D+	1
				146.064	0.0–684 630	5–7	2.68+02	1.20−01	2.89−01	−0.222	C	LS
				146.302	1 106.3–684 626	3–5	2.00+02	1.07−01	1.55−01	−0.493	C	LS
				146.399	1 576.0–684 640	1–3	1.47+02	1.42−01	6.84−02	−0.848	D+	LS
				146.065	0.0–684 626	5–5	6.69+01	2.14−02	5.15−02	−0.971	D	LS
				146.299	1 106.3–684 640	3–3	1.11+02	3.55−02	5.13−02	−0.973	D	LS
				146.062	0.0–684 640	5–3	7.40+00	1.42−03	3.41−03	−2.149	E	LS
34	$2p^4-2p^3(^2D^\circ)4s$	^{1}D−^{1}D$^\circ$		*151.299*	30 839.8–691 781	5–5	6.70+01	2.30−02	5.73−02	−0.939	D	1
35	$2p^4-2p^3(^2D^\circ)4d$	^{3}P−^{3}D$^\circ$		*136.95*	*544–730 719*	9–15	1.55+02	7.28−02	2.95−01	−0.184	D+	1
				136.855	0.0–730 702	5–7	1.56+02	6.12−02	1.38−01	−0.514	D+	LS
				137.057	1 106.3–730 728	3–5	1.16+02	5.46−02	7.39−02	−0.786	D+	LS
				137.143	1 576.0–730 742	1–3	8.59+01	7.27−02	3.28−02	−1.138	D	LS
				136.850	0.0–730 728	5–5	3.88+01	1.09−02	2.46−02	−1.264	D	LS
				137.055	1 106.3–730 742	3–3	6.46+01	1.82−02	2.46−02	−1.263	D	LS
				136.847	0.0–730 742	5–3	4.33+00	7.29−04	1.64−03	−2.438	E	LS
36		^{3}P−^{3}P$^\circ$				9–9						1
				136.551	0.0–732 325	5–5	2.08+02	5.81−02	1.31−01	−0.537	D+	LS
				136.754	1 106.3–732 346	3–3	6.88+01	1.93−02	2.61−02	−1.237	D	LS
				136.547	0.0–732 346	5–3	1.16+02	1.94−02	4.36−02	−1.013	D	LS
				136.758	1 106.3–732 325	3–5	6.89+01	3.22−02	4.35−02	−1.015	D	LS
				136.842	1 576.0–732 346	1–3	9.18+01	7.73−02	3.48−02	−1.112	D	LS
37		^{3}P−^{3}S$^\circ$		*136.53*	*544–732 979*	9–3	3.12+02	2.91−02	1.18−01	−0.582	D	1
				136.430	0.0–732 979	5–3	1.74+02	2.91−02	6.54−02	−0.837	D+	LS
				136.636	1 106.3–732 979	3–3	1.04+02	2.91−02	3.93−02	−1.059	D	LS
				136.724	1 576.0–732 979	1–3	3.46+01	2.91−02	1.31−02	−1.536	E+	LS

TABLE 16. Transition probabilities of allowed lines for Na IV (references for this table are as follows: 1=Butler and Zeippen,[15] 2=Tachiev and Froese Fischer,[94] and 3=Vilkas *et al.*[119])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
38		^{1}D$-^1$P$^\circ$		142.685	30 839.8–731 684	5–3	1.70+02	3.12−02	7.33−02	−0.807	D+	1
39		^{1}D$-^1$D$^\circ$		142.359	30 839.8–733 288	5–5	2.77+02	8.43−02	1.98−01	−0.375	C	1
40		^{1}D$-^1$F$^\circ$		142.231	30 839.8–733 919	5–7	3.06+02	1.30−01	3.04−01	−0.187	C	1
41	$2p^4-2p^3(^2\mathrm{P}^\circ)4d$	^{1}D$-^1$F$^\circ$		137.712	30 839.8–756 995	5–7	1.68+02	6.67−02	1.51−01	−0.477	C	1
42	$2s2p^5-2s^22p^3(^4\mathrm{S}^\circ)3p$	^{3}P$^\circ-^3$P		*342.49*	*244 190–536 173*	9–9	1.18−01	2.07−04	2.10−03	−2.730	E+	2
				341.884	243 681.9–536 178.8	5–5	8.73−02	1.53−04	8.61−04	−3.116	D	2
				343.087	244 687.6–536 159.1	3–3	2.34−02	4.14−05	1.40−04	−3.906	E+	2
				341.907	243 681.9–536 159.1	5–3	5.55−02	5.83−05	3.28−04	−3.535	E+	2
				343.056	244 687.6–536 184.9	3–1	1.12−01	6.59−05	2.23−04	−3.704	E+	2
				343.064	244 687.6–536 178.8	3–5	3.27−02	9.63−05	3.26−04	−3.539	E+	2
				343.737	245 238.8–536 159.1	1–3	3.72−02	1.98−04	2.24−04	−3.703	E+	2
43	$2s2p^5-2p^6$	^{3}P$^\circ-^1$S										
				306.621	244 687.6–570 823	3–1	2.51−02	1.18−05	3.57−05	−4.451	D	2,3
44		^{1}P$^\circ-^1$S		440.267	343 688–570 823	3–1	1.69+02	1.63−01	7.11−01	−0.311	C+	2
45	$2s2p^5-2s^22p^3(^2\mathrm{D}^\circ)3p$	^{3}P$^\circ-^3$D		*304.63*	*244 190–572 462*	9–15	3.37−01	7.81−04	7.05−03	−2.153	D	2
				304.077	243 681.9–572 546.0	5–7	3.56−01	6.91−04	3.46−03	−2.462	D	2
				305.151	244 687.6–572 393.8	3–5	2.54−01	5.92−04	1.78−03	−2.751	D	2
				305.679	245 238.8–572 379.5	1–3	1.77−01	7.44−04	7.49−04	−3.128	E+	2
				304.218	243 681.9–572 393.8	5–5	7.69−02	1.07−04	5.34−04	−3.272	E+	2
				305.165	244 687.6–572 379.5	3–3	1.15−01	1.61−04	4.86−04	−3.316	E+	2
				304.231	243 681.9–572 379.5	5–3	8.76−03	7.30−06	3.65−05	−4.438	E	2
46		^{1}P$^\circ-^3$D										
				437.243	343 688–572 393.8	3–5	6.78−05	3.24−07	1.40−06	−6.012	E	2
				437.270	343 688–572 379.5	3–3	4.97−02	1.42−04	6.15−04	−3.371	D+	2
47		^{1}P$^\circ-^1$D		395.427	343 688–596 578.9	3–5	1.12+00	4.39−03	1.71−02	−1.880	D+	2
48	$2s2p^5-2s^22p^3(^2\mathrm{P}^\circ)3p$	^{3}P$^\circ-^3$D		*280.63*	*244 190–600 529*	9–15	2.04+00	4.02−03	3.34−02	−1.442	D+	2
				280.247	243 681.9–600 509.6	5–7	2.04+00	3.36−03	1.55−02	−1.775	D+	2
				281.020	244 687.6–600 534.1	3–5	1.52+00	3.00−03	8.34−03	−2.046	D+	2
				281.429	245 238.8–600 567.7	1–3	1.14+00	4.07−03	3.77−03	−2.390	D	2
				280.228	243 681.9–600 534.1	5–5	5.15−01	6.07−04	2.80−03	−2.518	D	2
				280.994	244 687.6–600 567.7	3–3	8.66−01	1.03−03	2.84−03	−2.510	D	2
				280.202	243 681.9–600 567.7	5–3	5.55−02	3.92−05	1.81−04	−3.708	E+	2
49		^{1}P$^\circ-^1$P		[380.02]	343 688–606 831	3–3	1.51+00	3.27−03	1.23−02	−2.008	D+	2
50		^{1}P$^\circ-^1$D		[371.85]	343 688–612 611	3–5	9.03−01	3.12−03	1.15−02	−2.029	D+	2
51	$2p^3(^4\mathrm{S}^\circ)3s-2p^3(^4\mathrm{S}^\circ)3p$	^{5}S$^\circ-^5$P		*1 963.6*	473 950.0–*524 878*	5–15	3.69+00	6.40−01	2.07+01	0.505	B+	2
				1 960.76	473 950.0–524 950.6	5–7	3.71+00	2.99−01	9.65+00	0.175	B+	2
				1 965.08	473 950.0–524 838.6	5–5	3.68+00	2.13−01	6.89+00	0.027	B+	2
				1 967.60	473 950.0–524 773.3	5–3	3.67+00	1.28−01	4.13+00	−0.194	B+	2
52		^{5}S$^\circ-^3$P										
				[1 606.97]	473 950.0–536 178.8	5–5	2.25−03	8.70−05	2.30−03	−3.362	D+	2

TABLE 16. Transition probabilities of allowed lines for Na IV (references for this table are as follows: 1 = Butler and Zeippen,[15] 2 = Tachiev and Froese Fischer,[94] and 3 = Vilkas *et al.*[119])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				[1 607.48]	473 950.0–536 159.1	5–3	1.09−03	2.54−05	6.72−04	−3.896	D+	2
53		$^3S^\circ-{}^5P$										
			[2 617.8]	[2 618.6]	486 650.2–524 838.6	3–5	5.08−04	8.70−05	2.25−03	−3.583	D+	2
			[2 622.3]	[2 623.1]	486 650.2–524 773.3	3–3	2.45−04	2.52−05	6.54−04	−4.121	D+	2
54		$^3S^\circ-{}^3P$	*2 018.6*	*2 019.3*	486 650.2–*536 173*	3–9	3.44+00	6.31−01	1.26+01	0.277	B	2
			2 018.38	2 019.04	486 650.2–536 178.8	3–5	3.44+08	3.50−01	6.99+00	0.021	B+	2
			2 019.19	2 019.84	486 650.2–536 159.1	3–3	3.44+00	2.11−01	4.20+00	−0.199	B	2
			2 018.14	2 018.79	486 650.2–536 184.9	3–1	3.45+00	7.03−02	1.40+00	−0.676	B	2
55	$2p^3(^4S^\circ)3p-2p^3(^2P^\circ)3s$	$^3P-{}^3P^\circ$	*7140*	*7 143*	*536 173–550 173*	9–9	9.32−04	7.13−04	1.51−01	−2.193	D+	2
			7 137	7 139	536 178.8–550 186	5–5	6.73−04	5.14−04	6.04−02	−2.590	C	2
			7 142	7 144	536 159.1–550 157	3–3	2.14−04	1.64−04	1.15−02	−3.308	D+	2
			7 152	7 154	536 178.8–550 157	5–3	3.85−04	1.77−04	2.09−02	−3.053	D+	2
			[7 141]	[7 143]	536 159.1–550 158	3–1	9.23−04	2.35−04	1.66−02	−3.152	D+	2
			7 127	7 129	536 159.1–550 186	3–5	2.64−04	3.35−04	2.36−02	−2.998	D+	2
			7 155	7 157	536 184.9–550 157	1–3	3.27−04	7.54−04	1.78−02	−3.123	D+	2
56	$2p^3(^4S^\circ)3p-2p^3(^4S^\circ)3d$	$^5P-{}^5D^\circ$		*1 585.07*	*524 878–587 967*	15–25	9.49+00	5.96−01	4.66+01	0.951	B+	2
				1 587.047	524 950.6–587 960.7	7–9	9.46+00	4.59−01	1.68+01	0.507	B+	2
				1 584.141	524 838.6–587 964.3	5–7	6.34+00	3.34−01	8.71+00	0.223	B+	2
				1 582.331	524 773.3–587 971.2	3–5	3.34+00	2.09−01	3.26+00	−0.203	B	2
				1 586.956	524 950.6–587 964.3	7–7	3.15+00	1.19−01	4.36+00	−0.079	B	2
				1 583.968	524 838.6–587 971.2	5–5	5.55+00	2.09−01	5.44+00	0.019	B	2
				1 582.181	524 773.3–587 977.2	3–3	7.16+00	2.69−01	4.20+00	−0.093	B	2
				1 586.783	524 950.6–587 971.2	7–5	6.31−01	1.70−02	6.22−01	−0.924	C+	2
				1 583.817	524 838.6–587 977.2	5–3	2.38+00	5.37−02	1.40+00	−0.571	B	2
				1 582.121	524 773.3–587 979.6	3–1	9.54+00	1.19−01	1.87+00	−0.447	B	2
57		$^3P-{}^3D^\circ$		*1 702.41*	*536 173–594 913*	9–15	7.92+00	5.74−01	2.89+01	0.713	B+	2
				1 701.98	536 178.8–594 934	5–7	7.93+00	4.82−01	1.35+01	0.382	B+	2
				1 702.415	536 159.1–594 899.2	3–5	5.95+00	4.31−01	7.24+00	0.112	B+	2
				1 703.485	536 184.9–594 888.1	1–3	4.40+00	5.74−01	3.22+00	−0.241	B	2
				1 702.986	536 178.8–594 899.2	5–5	1.98+00	8.59−02	2.41+00	−0.367	B	2
				1 702.736	536 159.1–594 888.1	3–3	3.30+00	1.43−01	2.41+00	−0.368	B	2
				1 703.308	536 178.8–594 888.1	5–3	2.19−01	5.72−03	1.61−01	−1.544	C	2
58	$2p^3(^4S^\circ)3p-2p^3(^2D^\circ)3d$	$^3P-{}^3D^\circ$		*973.4*	*536 173–638 901*	9–15	9.20−03	2.18−04	6.28−03	−2.707	D	2
				974.22	536 178.8–638 825	5–7	1.02−02	2.04−04	3.27−03	−2.991	D	2
				972.92	536 159.1–638 943	3–5	7.93−03	1.88−04	1.80−03	−3.249	D	2
				972.55	536 184.9–639 007	1–3	5.37−03	2.29−04	7.32−04	−3.640	E+	2
				973.10	536 178.8–638 943	5–5	8.76−04	1.24−05	1.99−04	−4.208	E+	2
				972.31	536 159.1–639 007	3–3	2.05−03	2.91−05	2.79−04	−4.059	E+	2
				972.50	536 178.8–639 007	5–3	7.46−06	6.35−08	1.02−06	−6.498	E	2
59		$^3P-{}^3P^\circ$		*934.5*	*536 173–643 179*	9–9	1.89+00	2.47−02	6.83−01	−0.653	C	2
				935.69	536 178.8–643 052	5–5	1.33+00	1.75−02	2.69−01	−1.058	C+	2
				933.25	536 159.1–643 311	3–3	5.63−02	7.35−04	6.78−03	−2.657	D+	2
				933.43	536 178.8–643 311	5–3	1.85+00	1.45−02	2.22−01	−1.140	C	2
				[932.3]	536 159.1–643 420	3–1	1.68+00	7.30−03	6.72−02	−1.660	C	2

TABLE 16. Transition probabilities of allowed lines for Na IV (references for this table are as follows: 1 = Butler and Zeippen,[15] 2 = Tachiev and Froese Fischer,[94] and 3 = Vilkas *et al.*[119])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				935.52	536 159.1–643 052	3–5	4.34−01	9.48−03	8.76−02	−1.546	C	2
				933.48	536 184.9–643 311	1–3	2.54−01	9.96−03	3.06−02	−2.002	C	2
60		$^3P-^3S^\circ$		*926.0*	*536 173–644 166*	9–3	1.24−01	5.33−04	1.46−02	−2.319	D+	2
				926.04	536 178.8–644 166	5–3	9.14−02	7.05−04	1.07−02	−2.453	D+	2
				925.87	536 159.1–644 166	3–3	2.72−02	3.50−04	3.20−03	−2.979	D	2
				926.09	536 184.9–644 166	1–3	5.66−03	2.18−04	6.66−04	−3.662	E+	2
61	$2p^3(^4S^\circ)3p-2p^3(^4S^\circ)4s$	$^3P-^3S^\circ$		*920.4*	*536 173–644 819*	9–3	2.75+01	1.16−01	3.17+00	0.019	B	2
				920.47	536 178.8–644 819	5–3	1.43+01	1.09−01	1.66+00	−0.264	B	2
				920.30	536 159.1–644 819	3–3	9.71+00	1.23−01	1.12+00	−0.433	B	2
				920.52	536 184.9–644 819	1–3	3.43+00	1.31−01	3.96−01	−0.883	C+	2
62	$2p^3(^4S^\circ)3p-2p^3(^2P^\circ)3d$	$^3P-^3P^\circ$		*785.2*	*536 173–663 531*	9–9	8.74−02	8.08−04	1.88−02	−2.138	D	2
				784.66	536 178.8–663 623	5–5	5.25−02	4.85−04	6.26−03	−2.615	D+	2
				785.24	536 159.1–663 509	3–3	3.38−02	3.13−04	2.43−03	−3.027	D	2
				785.36	536 178.8–663 509	5–3	2.89−02	1.60−04	2.07−03	−3.097	D	2
				[787.5]	536 159.1–663 137	3–1	1.17−01	3.63−04	2.82−03	−2.963	D	2
				784.54	536 159.1–663 623	3–5	1.90−02	2.92−04	2.27−03	−3.057	D	2
				785.40	536 184.9–663 509	1–3	4.11−02	1.14−03	2.95−03	−2.943	D	2
63	$2p^3(^4S^\circ)3p-2p^3(^4S^\circ)4d$	$^3P-^3D^\circ$		*673.6*	*536 173–684 631*	9–15	6.86+00	7.78−02	1.55+00	−0.155	C	1
				673.62	536 178.8–684 630	5–7	6.86+00	6.53−02	7.24−01	−0.486	C+	LS
				673.55	536 159.1–684 626	3–5	5.14+00	5.83−02	3.88−01	−0.757	C	LS
				673.60	536 184.9–684 640	1–3	3.81+00	7.78−02	1.73−01	−1.109	C	LS
				673.64	536 178.8–684 626	5–5	1.72+00	1.17−02	1.30−01	−1.233	D+	LS
				673.49	536 159.1–684 640	3–3	2.85+00	1.94−02	1.29−01	−1.235	D+	LS
				673.58	536 178.8–684 640	5–3	1.91−01	7.78−04	8.63−03	−2.410	E+	LS
64	$2p^3(^4S^\circ)3p-2p^3(^2D^\circ)4s$	$^3P-^3D^\circ$		*651.0*	*536 173–689 776*	9–15	4.08−01	4.32−03	8.33−02	−1.410	E+	1
				651.15	536 178.8–689 753	5–7	4.08−01	3.63−03	3.89−02	−1.741	D	LS
				650.91	536 159.1–689 789	3–5	3.06−01	3.24−03	2.08−02	−2.012	E+	LS
				650.94	536 184.9–689 808	1–3	2.27−01	4.32−03	9.26−03	−2.365	E+	LS
				651.00	536 178.8–689 789	5–5	1.02−01	6.48−04	6.94−03	−2.489	E	LS
				650.83	536 159.1–689 808	3–3	1.70−01	1.08−03	6.94−03	−2.489	E	LS
				650.92	536 178.8–689 808	5–3	1.13−02	4.32−05	4.63−04	−3.666	E	LS
65	$2p^3(^2D^\circ)3s-2p^3(^4S^\circ)3p$	$^3D^\circ-^3P$	*9 030*	*9 036*	*525 106–536 173*	15–9	2.06−03	1.51−03	6.76−01	−1.645	C	2
			9 012	9 014	525 085–536 178.8	7–5	1.74−03	1.51−03	3.14−01	−1.976	C+	2
			9 054	9 056	525 117–536 159.1	5–3	1.47−03	1.08−03	1.61−01	−2.268	C	2
			9 051	9 053	525 139–536 184.9	3–1	1.98−03	8.10−04	7.24−02	−2.614	C	2
			9 038	9 040	525 117–536 178.8	5–5	3.53−04	4.33−04	6.44−02	−2.665	C	2
			9 072	9 074	525 139–536 159.1	3–3	5.36−04	6.61−04	5.92−02	−2.703	C	2
			9 056	9 058	525 139–536 178.8	3–5	2.56−03	5.25−05	4.69−03	−3.803	D	2
66		$^1D^\circ-^3P$										
				4749 cm^{-1}	531 410–536 159.1	5–3	2.21−07	8.81−07	3.05−04	−5.356	D	2
				4769 cm^{-1}	531 410–536 178.8	5–5	1.24−07	8.17−07	2.82−04	−5.389	D	2
67	$2p^3(^2D^\circ)3s-2p^3(^2D^\circ)3p$	$^3D^\circ-^3D$	*2 111*	*2 112*	*525 106–572 462*	15–15	2.87+00	1.92−01	2.00+01	0.459	B	2
			2 106.3	2 107.0	525 085–572 546.0	7–7	2.72+00	1.81−01	8.78+00	0.103	B+	2

TABLE 16. Transition probabilities of allowed lines for Na IV (references for this table are as follows: 1 = Butler and Zeippen,[15] 2 = Tachiev and Froese Fischer,[94] and 3 = Vilkas *et al.*[119])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
			2 114.5	2 115.2	525 117–572 393.8	5–5	2.10+00	1.41−01	4.91+00	−0.152	B	2
			2 116.2	2 116.8	525 139–572 379.5	3–3	2.04+00	1.37−01	2.86+00	−0.386	B	2
			2 113.1	2 113.8	525 085–572 393.8	7–5	4.70−01	2.25−02	1.10+00	−0.803	C+	2
			2 115.2	2 115.8	525 117–572 379.5	5–3	7.03−01	2.83−02	9.86−01	−0.849	C+	2
			2 107.7	2 108.4	525 117–572 546.0	5–7	1.99−01	1.86−02	6.45−01	−1.032	C+	2
			2 115.5	2 116.2	525 139–572 393.8	3–5	3.12−01	3.50−02	7.31−01	−0.979	C+	2
68		$^3D^\circ-^3F$		*1 971*	*525 106–575 837*	15–21	3.80+00	3.10−01	3.01+01	0.667	B+	2
				1 968.4	525 085–575 886.6	7–9	3.82+00	2.85−01	1.29+01	0.300	B+	2
				1 972.2	525 117–575 821.0	5–7	3.51+00	2.87−01	9.31+00	0.157	B+	2
				1 975.1	525 139–575 768.1	3–5	3.32+00	3.24−01	6.31+00	−0.012	B	2
				1 971.0	525 085–575 821.0	7–7	2.70−01	1.57−02	7.13−01	−0.959	C+	2
				1 974.3	525 117–575 768.1	5–5	4.50−01	2.63−02	8.54−01	−0.881	C+	2
				1 973.0	525 085–575 768.1	7–5	7.44−03	3.10−04	1.41−02	−2.664	D+	2
69		$^3D^\circ-^1F$										
				1 898.8	525 117–577 782.7	5–7	1.47−02	1.12−03	3.49−02	−2.252	C+	2
				1 897.6	525 085–577 782.7	7–7	3.51−08	1.89−09	8.28−08	−7.878	E	2
70		$^1D^\circ-^3D$										
			2 439.2	2 440.0	531 410–572 393.8	5–5	3.77−05	3.37−06	1.35−04	−4.773	D	2
			2 440.1	2 440.8	531 410–572 379.5	5–3	8.68−02	4.65−03	1.87−01	−1.634	B	2
			2 430.2	2 431.0	531 410–572 546.0	5–7	6.35−04	7.88−05	3.15−03	−3.405	C	2
71		$^1D^\circ-^3F$										
			2 251.0	2 251.7	531 410–575 821.0	5–7	8.46−03	9.00−04	3.34−02	−2.347	C+	2
			2 253.7	2 254.4	531 410–575 768.1	5–5	3.35−04	2.55−05	9.47−04	−3.894	D+	2
72		$^1D^\circ-^1F$	2 155.8	2 156.4	531 410–577 782.7	5–7	2.97+00	2.90−01	1.03+01	0.161	B+	2
73		$^1D^\circ-^1D$		1 534.47	531 410–596 578.9	5–5	7.14+00	2.52−01	6.37+00	0.100	B	2
74	$2p^3(^2D^\circ)3s-2p^3(^2P^\circ)3p$	$^3D^\circ-^3D$		*1 325.9*	*525 106–600 529*	15–15	3.21−01	8.45−03	5.53−01	−0.897	C	2
				1 325.83	525 085–600 509.6	7–7	2.92−01	7.71−03	2.35−01	−1.268	C	2
				1 325.96	525 117–600 534.1	5–5	2.13−01	5.61−03	1.22−01	−1.552	C	2
				1 325.76	525 139–600 567.7	3–3	2.28−01	6.01−03	7.87−02	−1.744	C	2
				1 325.40	525 085–600 534.1	7–5	5.52−02	1.04−03	3.17−02	−2.138	C	2
				1 325.37	525 117–600 567.7	5–3	8.32−02	1.31−03	2.87−02	−2.184	D+	2
				1 326.39	525 117–600 509.6	5–7	3.59−02	1.33−03	2.89−02	−2.177	D+	2
				1 326.35	525 139–600 534.1	3–5	4.76−02	2.09−03	2.74−02	−2.203	D+	2
75		$^1D^\circ-^3D$										
				1 446.67	531 410–600 534.1	5–5	6.20−02	1.95−03	4.63−02	−2.011	D+	2
				1 445.97	531 410–600 567.7	5–3	9.64−03	1.81−04	4.31−03	−3.043	E+	2
				1 447.19	531 410–600 509.6	5–7	3.66−04	1.61−05	3.84−04	−4.094	E	2
76		$^1D^\circ-^1P$		[1 325.9]	531 410–606 831	5–3	1.16+00	1.83−02	3.99−01	−1.039	C+	2
77		$^1D^\circ-^1D$		[1 231.5]	531 410–612 611	5–5	3.22+00	7.33−02	1.49+00	−0.436	B	2
78	$2p^3(^2P^\circ)3s-2p^3(^2D^\circ)3p$	$^3P^\circ-^3D$	*4 485*	*4 487*	*550 173–572 462*	9–15	8.84−03	4.44−03	5.91−01	−1.398	C	2
			4 471.0	4 472.3	550 186–572 546.0	5–7	9.08−03	3.81−03	2.81−01	−1.720	C+	2
			4 495.8	4 497.0	550 157–572 393.8	3–5	7.00−03	3.53−03	1.57−01	−1.975	C	2

TABLE 16. Transition probabilities of allowed lines for Na IV (references for this table are as follows: 1 = Butler and Zeippen,[15] 2 = Tachiev and Froese Fischer,[94] and 3 = Vilkas *et al.*[119])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
			[4 499]	[4 500]	550 158–572 379.5	1–3	4.87−03	4.44−03	6.57−02	−2.353	C	2
			4 501.7	4 502.9	550 186–572 393.8	5–5	1.78−03	5.42−04	4.02−02	−2.567	C	2
			4 498.7	4 499.9	550 157–572 379.5	3–3	3.29−03	1.00−03	4.45−02	−2.523	C	2
			4 504.6	4 505.8	550 186–572 379.5	5–3	2.10−04	3.83−05	2.84−03	−3.718	D	2
79		$^{3}\mathrm{P}^{\circ}-{}^{1}\mathrm{F}$										
			3 622.6	3 623.6	550 186–577 782.7	5–7	7.55−05	2.08−05	1.24−03	−3.983	D+	2
80		$^{3}\mathrm{P}^{\circ}-{}^{1}\mathrm{D}$										
			2 153.5	2 154.2	550 157–596 578.9	3–5	1.15−02	1.34−03	2.84−02	−2.396	D	2
			2 154.8	2 155.5	550 186–596 578.9	5–5	1.15−02	7.99−04	2.84−02	−2.398	D	2
81		$^{1}\mathrm{P}^{\circ}-{}^{3}\mathrm{D}$										
			6 409	6 411	556 796–572 393.8	3–5	3.01−07	3.10−07	1.96−05	−6.032	E+	2
			6 415	6 417	556 796–572 379.5	3–3	6.15−04	3.79−04	2.40−02	−2.944	C+	2
82		$^{1}\mathrm{P}^{\circ}-{}^{1}\mathrm{D}$	2 512.9	2 513.6	556 796–596 578.9	3–5	2.90−01	4.58−02	1.14+00	−0.862	B	2
83	$2p^{3}(^{2}\mathrm{P}^{\circ})3s-2p^{3}(^{2}\mathrm{P}^{\circ})3p$	$^{3}\mathrm{P}^{\circ}-{}^{3}\mathrm{D}$		*1 986*	*550 173–600 529*	9–15	3.55+00	3.50−01	2.06+01	0.498	B	2
				1 987.1	550 186–600 509.6	5–7	3.56+00	2.95−01	9.65+00	0.169	B+	2
				1 985.0	550 157–600 534.1	3–5	2.72+00	2.68−01	5.26+00	−0.095	B	2
				[1 984]	550 158–600 567.7	1–3	2.00+00	3.54−01	2.31+00	−0.451	B	2
				1 986.2	550 186–600 534.1	5–5	8.20−01	4.85−02	1.59+00	−0.615	B	2
				1 983.7	550 157–600 567.7	3–3	1.47+00	8.66−02	1.70+00	−0.585	B	2
				1 984.8	550 186–600 567.7	5–3	8.87−02	3.14−03	1.03−01	−1.804	C	2
84		$^{3}\mathrm{P}^{\circ}-{}^{1}\mathrm{P}$										
				[1 764.5]	550 157–606 831	3–3	5.11−04	2.39−05	4.16−04	−4.144	E	2
				[1 765.4]	550 186–606 831	5–3	1.06−06	2.96−08	8.61−07	−6.830	E	2
				[1 764.5]	550 158–606 831	1–3	5.18−02	7.26−03	4.22−02	−2.139	D+	2
85		$^{3}\mathrm{P}^{\circ}-{}^{1}\mathrm{D}$										
				[1 601.2]	550 157–612 611	3–5	4.47−03	2.86−04	4.53−03	−3.067	E+	2
				[1 601.9]	550 186–612 611	5–5	3.24−02	1.24−03	3.28−02	−2.208	D	2
86		$^{1}\mathrm{P}^{\circ}-{}^{3}\mathrm{D}$										
			2 285.6	2 286.3	556 796–600 534.1	3–5	4.90−03	6.39−04	1.44−02	−2.717	D	2
			2 283.9	2 284.6	556 796–600 567.7	3–3	1.41−02	1.11−03	2.49−02	−2.478	D	2
87		$^{1}\mathrm{P}^{\circ}-{}^{1}\mathrm{P}$		[1 999]	556 796–606 831	3–3	3.28+00	1.96−01	3.87+00	−0.231	B	2
88		$^{1}\mathrm{P}^{\circ}-{}^{1}\mathrm{D}$		[1 792]	556 796–612 611	3–5	4.47+00	3.59−01	6.35+00	0.032	B	2
89	$2p^{3}(^{2}\mathrm{D}^{\circ})3p-2p^{3}(^{4}\mathrm{S}^{\circ})3d$	$^{3}\mathrm{D}-{}^{3}\mathrm{D}^{\circ}$	*4 452.8*	*4 454.1*	*572 462–594 913*	15–15	1.95−03	5.79−04	1.27−01	−2.061	D+	2
			4 465.4	4 466.7	572 546.0–594 934	7–7	1.69−03	5.07−04	5.22−02	−2.450	C	2
			4 442.13	4 443.38	572 393.8–594 899.2	5–5	1.41−03	4.18−04	3.06−02	−2.680	C	2
			4 441.50	4 442.75	572 379.5–594 888.1	3–3	1.44−03	4.27−04	1.87−02	−2.892	D+	2
			4 472.38	4 473.63	572 546.0–594 899.2	7–5	3.36−04	7.20−05	7.42−03	−3.298	D+	2
			4 444.32	4 445.57	572 393.8–594 888.1	5–3	5.47−04	9.72−05	7.11−03	−3.313	D+	2
			4 435.3	4 436.5	572 393.8–594 934	5–7	1.75−04	7.23−05	5.28−03	−3.442	D	2
			4 439.31	4 440.56	572 379.5–594 899.2	3–5	2.85−04	1.41−04	6.17−03	−3.374	D+	2
90		$^{3}\mathrm{F}-{}^{3}\mathrm{D}^{\circ}$	*5 241*	*5 242*	*575 837–594 913*	21–15	1.33−04	3.93−05	1.42−02	−3.083	D	2
			5 248.6	5 250.1	575 886.6–594 934	9–7	1.18−04	3.78−05	5.89−03	−3.468	D	2

TABLE 16. Transition probabilities of allowed lines for Na IV (references for this table are as follows: 1=Butler and Zeippen,[15] 2=Tachiev and Froese Fischer,[94] and 3=Vilkas *et al.*[119])—Continued

No.	Transition array	Mult.	$\lambda_{\rm air}$ (Å)	$\lambda_{\rm vac}$ (Å) or σ (cm^{-1})[a]	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
			5 240.13	5 241.58	575 821.0–594 899.2	7–5	8.26−05	2.43−05	2.94−03	−3.769	D	2
			5 228.67	5 230.13	575 768.1–594 888.1	5–3	9.14−05	2.25−05	1.94−03	−3.949	D	2
			5 230.6	5 232.0	575 821.0–594 934	7–7	4.07−05	1.67−05	2.01−03	−3.932	D	2
			5 225.64	5 227.09	575 768.1–594 899.2	5–5	3.86−05	1.58−05	1.36−03	−4.102	D	2
			5 216.1	5 217.6	575 768.1–594 934	5–7	1.86−06	1.06−06	9.14−05	−5.276	E+	2
91	$2p^3(^2\mathrm{D}^\circ)3p$–$2p^3(^2\mathrm{D}^\circ)3d$	^{3}D–^{3}F$^\circ$		*1 581.07*	*572 462–635 710*	15–21	6.35+00	3.33−01	2.60+01	0.699	B	2
				1 580.498	572 546.0–635 817.2	7–9	6.27+00	3.02−01	1.10+01	0.325	B+	2
				1 580.233	572 393.8–635 675.6	5–7	5.64+00	2.96−01	7.69+00	0.170	B+	2
				1 582.617	572 379.5–635 566.0	3–5	5.11+00	3.20−01	5.00+00	−0.018	B	2
				1 584.043	572 546.0–635 675.6	7–7	8.48−01	3.19−02	1.16+00	−0.651	B	2
				1 582.975	572 393.8–635 566.0	5–5	1.14+00	4.28−02	1.11+00	−0.670	B	2
				1 586.798	572 546.0–635 566.0	7–5	3.88−02	1.05−03	3.83−02	−2.134	C	2
92		^{3}D–^{1}G$^\circ$										
				1 523.401	572 546.0–638 188.6	7–9	1.25−02	5.60−04	1.97−02	−2.407	D	2
93		^{3}D–^{3}D$^\circ$		*1 505.1*	*572 462–638 901*	15–15	6.15+00	2.09−01	1.55+01	0.496	B	2
				1 508.77	572 546.0–638 825	7–7	5.50+00	1.88−01	6.52+00	0.119	B	2
				1 502.65	572 393.8–638 943	5–5	4.36+00	1.48−01	3.65+00	−0.131	B	2
				1 500.88	572 379.5–639 007	3–3	4.45+00	1.50−01	2.23+00	−0.347	B	2
				1 506.09	572 546.0–638 943	7–5	1.08+00	2.63−02	9.12−01	−0.735	C+	2
				1 501.20	572 393.8–639 007	5–3	1.69+00	3.43−02	8.48−01	−0.766	C+	2
				1 505.32	572 393.8–638 825	5–7	6.07−01	2.89−02	7.16−01	−0.840	C+	2
				1 502.32	572 379.5–638 943	3–5	7.85−01	4.42−02	6.56−01	−0.877	C+	2
94		^{3}D–^{1}P$^\circ$										
				1 453.51	572 393.8–641 193	5–3	3.35−02	6.36−04	1.52−02	−2.498	D	2
				1 453.20	572 379.5–641 193	3–3	4.03−01	1.28−02	1.83−01	−1.416	C	2
95		^{3}D–^{3}P$^\circ$		*1 414.1*	*572 462–643 179*	15–9	3.01+00	5.42−02	3.78+00	−0.090	C+	2
				1 418.32	572 546.0–643 052	7–5	2.54+00	5.48−02	1.79+00	−0.416	B	2
				1 410.10	572 393.8–643 311	5–3	2.29+00	4.09−02	9.50−01	−0.689	C+	2
				[1 407.7]	572 379.5–643 420	3–1	3.01+00	2.98−02	4.14−01	−1.049	C+	2
				1 415.26	572 393.8–643 052	5–5	4.10−01	1.23−02	2.86−01	−1.211	C+	2
				1 409.81	572 379.5–643 311	3–3	7.94−01	2.37−02	3.30−01	−1.148	C+	2
				1 414.98	572 379.5–643 052	3–5	1.61−02	8.06−04	1.13−02	−2.617	D+	2
96		^{3}D–^{1}D$^\circ$										
				1 403.867	572 393.8–643 625.6	5–5	7.50−03	2.22−04	5.12−03	−2.955	E+	2
				1 406.873	572 546.0–643 625.6	7–5	3.64−04	7.72−06	2.50−04	−4.267	E	2
				1 403.586	572 379.5–643 625.6	3–5	3.80−01	1.87−02	2.59−01	−1.251	C	2
97		^{3}F–^{3}F$^\circ$		*1 670.18*	*575 837–635 710*	21–21	2.62+00	1.10−01	1.27+01	0.364	B	2
				1 668.597	575 886.6–635 817.2	9–9	2.65+00	1.11−01	5.48+00	−0.000	B	2
				1 670.715	575 821.0–635 675.6	7–7	2.20+00	9.21−02	3.55+00	−0.191	B	2
				1 672.300	575 768.1–635 566.0	5–5	2.17+00	9.09−02	2.50+00	−0.342	B	2
				1 672.548	575 886.6–635 675.6	9–7	2.11−01	6.88−03	3.41−01	−1.208	C+	2
				1 673.780	575 821.0–635 566.0	7–5	2.72−01	8.15−03	3.14−01	−1.244	C+	2
				1 666.772	575 821.0–635 817.2	7–9	1.14−01	6.10−03	2.34−01	−1.370	C	2
				1 669.240	575 768.1–635 675.6	5–7	1.51−01	8.85−03	2.43−01	−1.354	C	2

TABLE 16. Transition probabilities of allowed lines for Na IV (references for this table are as follows: 1 = Butler and Zeippen,[15] 2 = Tachiev and Froese Fischer,[94] and 3 = Vilkas *et al.*[119])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
98		^{3}F–^{3}G°		*1 616.55*	*575 837–637 697*	21–27	9.26+00	4.66−01	5.21+01	0.991	B+	2
				1 618.568	575 886.6–637 669.6	9–11	9.23+00	4.43−01	2.13+01	0.601	B+	2
				1 615.924	575 821.0–637 705.1	7–9	8.89+00	4.47−01	1.67+01	0.495	B+	2
				1 613.947	575 768.1–637 728.0	5–7	8.74+00	4.78−01	1.27+01	0.378	B+	2
				1 617.639	575 886.6–637 705.1	9–9	3.81−01	1.49−02	7.16−01	−0.873	C+	2
				1 615.326	575 821.0–637 728.0	7–7	5.56−01	2.17−02	8.09−01	−0.818	C+	2
				1 617.040	575 886.6–637 728.0	9–7	6.13−03	1.87−04	8.95−03	−2.774	D+	2
99		^{3}F–^{3}D°		*1 585.7*	*575 837–638 901*	21–15	6.36−01	1.71−02	1.88+00	−0.445	C+	2
				1 588.86	575 886.6–638 825	9–7	5.74−01	1.69−02	7.96−01	−0.818	C+	2
				1 584.23	575 821.0–638 943	7–5	4.72−01	1.27−02	4.63−01	−1.051	C+	2
				1 581.31	575 768.1–639 007	5–3	5.31−01	1.19−02	3.11−01	−1.225	C+	2
				1 587.20	575 821.0–638 825	7–7	1.28−01	4.83−03	1.77−01	−1.471	C	2
				1 582.91	575 768.1–638 943	5–5	1.29−01	4.86−03	1.27−01	−1.614	C	2
				1 585.87	575 768.1–638 825	5–7	3.10−03	1.64−04	4.27−03	−3.086	D	2
100		^{3}F–^{1}F°										
				1 416.459	575 821.0–646 419.6	7–7	2.31−02	6.96−04	2.27−02	−2.312	D	2
				1 417.776	575 886.6–646 419.6	9–7	6.02−05	1.41−06	5.93−05	−4.897	E	2
				1 415.398	575 768.1–646 419.6	5–7	1.09−03	4.60−05	1.07−03	−3.638	E	2
101		^{1}F–^{3}F°										
				1 727.328	577 782.7–635 675.6	7–7	6.69−03	2.99−04	1.19−02	−2.679	D	2
				1 730.604	577 782.7–635 566.0	7–5	1.46−03	4.69−05	1.87−03	−3.484	E+	2
				1 723.113	577 782.7–635 817.2	7–9	1.37−02	7.82−04	3.11−02	−2.262	D	2
102		^{1}F–^{1}G°		1 655.467	577 782.7–638 188.6	7–9	8.72+00	4.61−01	1.76+01	0.509	B+	2
103		^{1}F–^{1}D°		1 518.767	577 782.7–643 625.6	7–5	6.70−01	1.65−02	5.79−01	−0.937	C+	2
104		^{1}F–^{1}F°		1 456.942	577 782.7–646 419.6	7–7	4.35+00	1.39−01	4.65+00	−0.012	B	2
105		^{1}D–^{3}D°										
			2 359.8	2 360.5	596 578.9–638 943	5–5	5.50−03	4.59−04	1.78−02	−2.639	D	2
			2 356.2	2 356.9	596 578.9–639 007	5–3	8.09−05	4.04−06	1.57−04	−4.695	E	2
			2 366.4	2 367.1	596 578.9–638 825	5–7	1.06−05	1.24−06	4.84−05	−5.208	E	2
106		^{1}D–^{1}P°	2 240.7	2 241.4	596 578.9–641 193	5–3	9.39−01	4.24−02	1.56+00	−0.674	B	2
107		^{1}D–^{3}P°										
			2 139.2	2 139.9	596 578.9–643 311	5–3	4.36−03	1.80−04	6.33−03	−3.046	E+	2
			2 151.1	2 151.8	596 578.9–643 052	5–5	7.51−03	5.21−04	1.85−02	−2.584	D	2
108		^{1}D–^{1}D°	2 124.88	2 125.55	596 578.9–643 625.6	5–5	2.34+00	1.58−01	5.54+00	−0.102	B	2
109		^{1}D–^{1}F°	2 005.74	2 006.39	596 578.9–646 419.6	5–7	3.12+00	2.64−01	8.71+00	0.121	B+	2
110	$2p^3(^2\mathrm{D}^\circ)3p-2p^3(^2\mathrm{P}^\circ)3d$	^{3}D–^{3}P°		*1 098.1*	*572 462–663 531*	15–9	2.33−01	2.53−03	1.37−01	−1.421	C	2
				1 097.97	572 546.0–663 623	7–5	2.09−01	2.70−03	6.84−02	−1.724	C	2
				1 097.51	572 393.8–663 509	5–3	1.56−01	1.69−03	3.05−02	−2.073	C	2
				[1 101.8]	572 379.5–663 137	3–1	1.86−01	1.13−03	1.23−02	−2.470	D+	2
				1 096.14	572 393.8–663 623	5–5	4.30−02	7.74−04	1.40−02	−2.412	D+	2
				1 097.34	572 379.5–663 509	3–3	5.44−02	9.83−04	1.07−02	−2.530	D+	2
				1 095.97	572 379.5–663 623	3–5	3.68−03	1.10−04	1.20−03	−3.481	D	2

TABLE 16. Transition probabilities of allowed lines for Na IV (references for this table are as follows: 1 = Butler and Zeippen,[15] 2 = Tachiev and Froese Fischer,[94] and 3 = Vilkas *et al.*[119])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
111		^{3}D−^{3}F$^\circ$		*1 102.39*	*572 462–663 174*	15–21	3.16−03	8.06−05	4.39−03	−2.918	D	2
				1 103.698	572 546.0–663 150.5	7–9	1.71−03	4.02−05	1.02−03	−3.551	D	2
				1 101.534	572 393.8–663 176.3	5–7	2.31−03	5.88−05	1.07−03	−3.532	D	2
				1 100.923	572 379.5–663 212.4	3–5	1.92−03	5.82−05	6.33−04	−3.758	E+	2
				1 103.384	572 546.0–663 176.3	7–7	2.55−03	4.66−05	1.19−03	−3.487	D	2
				1 101.096	572 393.8–663 212.4	5–5	1.23−03	2.24−05	4.07−04	−3.951	E+	2
				1 102.944	572 546.0–663 212.4	7–5	2.24−04	2.91−06	7.41−05	−4.691	E	2
112		^{3}D−^{3}D$^\circ$		*1 076.4*	*572 462–665 364*	15–15	1.56−01	2.71−03	1.44−01	−1.391	D+	2
				1 077.61	572 546.0–665 344	7–7	1.41−01	2.46−03	6.11−02	−1.764	C	2
				1 075.54	572 393.8–665 370	5–5	8.49−02	1.47−03	2.61−02	−2.134	D+	2
				1 075.03	572 379.5–665 400	3–3	1.08−01	1.86−03	1.98−02	−2.253	D+	2
				1 077.31	572 546.0–665 370	7–5	3.51−02	4.36−04	1.08−02	−2.515	D+	2
				1 075.20	572 393.8–665 400	5–3	5.14−02	5.34−04	9.45−03	−2.573	D+	2
				1 075.84	572 393.8–665 344	5–7	2.17−02	5.27−04	9.33−03	−2.579	D+	2
				1 075.38	572 379.5–665 370	3–5	2.36−02	6.82−04	7.24−03	−2.689	D+	2
113		^{3}F−^{3}F$^\circ$		*1 144.99*	*575 837–663 174*	21–21	2.82−01	5.54−03	4.39−01	−0.934	C	2
				1 145.949	575 886.6–663 150.5	9–9	2.72−01	5.35−03	1.82−01	−1.317	C	2
				1 144.750	575 821.0–663 176.3	7–7	2.25−01	4.43−03	1.17−01	−1.508	C	2
				1 143.585	575 768.1–663 212.4	5–5	2.35−01	4.62−03	8.69−02	−1.636	C	2
				1 145.611	575 886.6–663 176.3	9–7	3.20−02	4.90−04	1.66−02	−2.356	D+	2
				1 144.277	575 821.0–663 212.4	7–5	3.93−02	5.51−04	1.45−02	−2.414	D+	2
				1 145.088	575 821.0–663 150.5	7–9	1.68−02	4.24−04	1.12−02	−2.528	D+	2
				1 144.057	575 768.1–663 176.3	5–7	2.09−02	5.74−04	1.08−02	−2.542	D+	2
114		^{3}F−^{3}D$^\circ$		*1 117.0*	*575 837–665 364*	21–15	2.20−01	2.94−03	2.27−01	−1.209	C	2
				1 117.85	575 886.6–665 344	9–7	2.01−01	2.92−03	9.68−02	−1.580	C	2
				1 116.71	575 821.0–665 370	7–5	1.72−01	2.29−03	5.90−02	−1.795	C	2
				1 115.67	575 768.1–665 400	5–3	2.15−01	2.40−03	4.41−02	−1.921	C	2
				1 117.03	575 821.0–665 344	7–7	2.88−02	5.38−04	1.39−02	−2.424	D+	2
				1 116.05	575 768.1–665 370	5–5	3.65−02	6.82−04	1.25−02	−2.467	D+	2
				1 116.37	575 768.1–665 344	5–7	1.20−03	3.13−05	5.76−04	−3.805	E+	2
115		^{1}F−^{1}D$^\circ$		1 151.35	577 782.7–664 637	7–5	4.92−01	6.99−03	1.85−01	−1.310	C	2
116		^{1}F−^{3}D$^\circ$										
				1 141.72	577 782.7–665 370	7–5	5.41−02	7.55−04	1.99−02	−2.277	D	2
				1 142.06	577 782.7–665 344	7–7	1.04−03	2.03−05	5.34−04	−3.847	E	2
117		^{1}F−^{1}F$^\circ$		1 115.33	577 782.7–667 442	7–7	7.09−03	1.32−04	3.40−03	−3.034	D	2
118		^{1}D−^{3}F$^\circ$										
				1 501.560	596 578.9–663 176.3	5–7	7.93−02	3.75−03	9.28−02	−1.727	D+	2
				1 500.747	596 578.9–663 212.4	5–5	1.32−02	4.47−04	1.11−02	−2.651	D	2
119		^{1}D−^{1}D$^\circ$		1 469.33	596 578.9–664 637	5–5	1.95−03	6.31−05	1.53−03	−3.501	D	2
120		^{1}D−^{3}D$^\circ$										
				1 453.68	596 578.9–665 370	5–5	4.77−02	1.51−03	3.61−02	−2.122	D	2
				1 453.04	596 578.9–665 400	5–3	8.18−03	1.55−04	3.71−03	−3.111	E+	2
				1 454.23	596 578.9–665 344	5–7	1.73−04	7.70−06	1.84−04	−4.415	E	2

TABLE 16. Transition probabilities of allowed lines for Na IV (references for this table are as follows: 1 = Butler and Zeippen,[15] 2 = Tachiev and Froese Fischer,[94] and 3 = Vilkas *et al.*[119])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
121		^{1}D−^{1}F°		1 411.17	596 578.9–667 442	5–7	2.14+00	8.96−02	2.08+00	−0.349	B	2
122		^{1}D−^{1}P°		1 306.15	596 578.9–673 140	5–3	1.22−02	1.87−04	4.02−03	−3.029	D	2
123	$2p^3(^2D°)3p-2p^3(^4S°)4d$	^{3}D−^{3}D°		*891.5*	*572 462–684 631*	15–15	2.07−01	2.47−03	1.09−01	−1.431	E+	1
				892.19	572 546.0–684 630	7–7	1.84−01	2.19−03	4.50−02	−1.814	D	LS
				891.01	572 393.8–684 626	5–5	1.45−01	1.72−03	2.52−02	−2.066	D	LS
				890.79	572 379.5–684 640	3–3	1.56−01	1.85−03	1.63−02	−2.256	E+	LS
				892.22	572 546.0–684 626	7–5	3.23−02	2.75−04	5.65−03	−2.716	E	LS
				890.90	572 393.8–684 640	5–3	5.18−02	3.70−04	5.43−03	−2.733	E	LS
				890.98	572 393.8–684 630	5–7	2.31−02	3.85−04	5.65−03	−2.716	E	LS
				890.90	572 379.5–684 626	3–5	3.11−02	6.17−04	5.43−03	−2.733	E	LS
124	$2p^3(^2D°)3p-2p^3(^2D°)4s$	^{3}D−^{3}D°		*852.4*	*572 462–689 776*	15–15	9.79+00	1.07−01	4.49+00	0.205	C+	1
				853.19	572 546.0–689 753	7–7	8.67+00	9.46−02	1.86+00	−0.179	B	LS
				851.82	572 393.8–689 789	5–5	6.82+00	7.42−02	1.04+00	−0.431	B	LS
				851.58	572 379.5–689 808	3–3	7.36+00	8.00−02	6.73−01	−0.620	C+	LS
				852.93	572 546.0–689 789	7–5	1.53+00	1.19−02	2.34−01	−1.079	C	LS
				851.69	572 393.8–689 808	5–3	2.45+00	1.60−02	2.24−01	−1.097	C	LS
				852.08	572 393.8–689 753	5–7	1.09+00	1.66−02	2.33−01	−1.081	C	LS
				851.72	572 379.5–689 789	3–5	1.47+00	2.67−02	2.25−01	−1.096	C	LS
125		^{3}F−^{3}D°		*877.7*	*575 837–689 776*	21–15	1.36+01	1.12−01	6.82+00	0.371	B	1
				878.22	575 886.6–689 753	9–7	1.25+01	1.12−01	2.91+00	0.003	B+	LS
				877.44	575 821.0–689 789	7–5	1.21+01	1.00−01	2.02+00	−0.155	B	LS
				876.89	575 768.1–689 808	5–3	1.37+01	9.46−02	1.37+00	−0.325	B	LS
				877.72	575 821.0–689 753	7–7	1.08+00	1.25−02	2.53−01	−1.058	C	LS
				877.03	575 768.1–689 789	5–5	1.53+00	1.76−02	2.54−01	−1.056	C	LS
				877.31	575 768.1–689 753	5–7	3.06−02	4.95−04	7.15−03	−2.606	E+	LS
126		^{1}F−^{1}D°		877.21	577 782.7–691 781	7–5	1.26+01	1.04−01	2.10+00	−0.138	B	1
127		^{1}D−^{1}D°		1 050.40	596 578.9–691 781	5–5	7.44+00	1.23−01	2.13+00	−0.211	B	1
128	$2p^3(^2D°)3p-2p^3(^2P°)4s$	^{3}D−^{3}P°		*704.2*	*572 462–714 476*	15–9	9.19−01	4.10−03	1.43−01	−1.211	D	1
				704.54	572 546.0–714 483	7–5	7.71−01	4.10−03	6.66−02	−1.542	D+	LS
				703.86	572 393.8–714 468	5–3	6.89−01	3.07−03	3.56−02	−1.814	D	LS
				[703.79]	572 379.5–714 468	3–1	9.21−01	2.28−03	1.58−02	−2.165	E+	LS
				703.78	572 393.8–714 483	5–5	1.39−01	1.03−03	1.19−02	−2.288	E+	LS
				703.79	572 379.5–714 468	3–3	2.30−01	1.71−03	1.19−02	−2.290	E+	LS
				703.71	572 379.5–714 483	3–5	9.21−03	1.14−04	7.92−04	−3.466	E	LS
129		^{1}D−^{1}P°		833.82	596 578.9–716 509	5–3	1.44+00	9.01−03	1.24−01	−1.346	D+	1
130	$2p^3(^2D°)3p-2p^3(^2D°)4d$	^{3}D−^{3}D°		*631.9*	*572 462–730 719*	15–15	3.26+00	1.95−02	6.09−01	−0.534	D+	1
				632.29	572 546.0–730 702	7–7	2.89+00	1.73−02	2.52−01	−0.917	C	LS
				631.58	572 393.8–730 728	5–5	2.27+00	1.36−02	1.41−01	−1.167	D+	LS
				631.46	572 379.5–730 742	3–3	2.46+00	1.47−02	9.17−02	−1.356	D+	LS
				632.18	572 546.0–730 728	7–5	5.07−01	2.17−03	3.16−02	−1.818	D	LS
				631.52	572 393.8–730 742	5–3	8.17−01	2.93−03	3.05−02	−1.834	D	LS
				631.68	572 393.8–730 702	5–7	3.64−01	3.05−03	3.17−02	−1.817	D	LS
				631.52	572 379.5–730 728	3–5	4.90−01	4.88−03	3.04−02	−1.834	D	LS

TABLE 16. Transition probabilities of allowed lines for Na IV (references for this table are as follows: 1 = Butler and Zeippen,[15] 2 = Tachiev and Froese Fischer,[94] and 3 = Vilkas *et al.*[119])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})$^{\mathrm{a}}$	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
131		$^{3}\mathrm{D}-{}^{3}\mathrm{P}^{\circ}$				15–9						1
				625.86	572 546.0–732 325	7–5	8.27−01	3.47−03	5.00−02	−1.615	D	LS
				625.19	572 393.8–732 346	5–3	7.40−01	2.60−03	2.68−02	−1.886	D	LS
				625.27	572 393.8–732 325	5–5	1.48−01	8.67−04	8.92−03	−2.363	E+	LS
				625.13	572 379.5–732 346	3–3	2.47−01	1.45−03	8.95−03	−2.362	E+	LS
				625.21	572 379.5–732 325	3–5	9.87−03	9.64−05	5.95−04	−3.539	E	LS
132		$^{3}\mathrm{F}-{}^{3}\mathrm{D}^{\circ}$		*645.7*	*575 837–730 719*	21–15	4.32−01	1.93−03	8.61−02	−1.392	E+	1
				645.93	575 886.6–730 702	9–7	3.97−01	1.93−03	3.69−02	−1.760	D	LS
				645.55	575 821.0–730 728	7–5	3.83−01	1.71−03	2.54−02	−1.922	D	LS
				645.27	575 768.1–730 742	5–3	4.33−01	1.62−03	1.72−02	−2.092	E+	LS
				645.66	575 821.0–730 702	7–7	3.44−02	2.15−04	3.20−03	−2.822	E	LS
				645.33	575 768.1–730 728	5–5	4.82−02	3.01−04	3.20−03	−2.822	E	LS
				645.44	575 768.1–730 702	5–7	9.71−04	8.49−06	9.02−05	−4.372	E	LS
133		$^{1}\mathrm{F}-{}^{1}\mathrm{F}^{\circ}$		640.47	577 782.7–733 919	7–7	1.21+00	7.43−03	1.10−01	−1.284	D+	1
134		$^{1}\mathrm{D}-{}^{1}\mathrm{P}^{\circ}$		740.16	596 578.9–731 684	5–3	2.74+00	1.35−02	1.64−01	−1.171	C	1
135		$^{1}\mathrm{D}-{}^{1}\mathrm{D}^{\circ}$		731.48	596 578.9–733 288	5–5	5.42+00	4.35−02	5.24−01	−0.663	C+	1
136		$^{1}\mathrm{D}-{}^{1}\mathrm{F}^{\circ}$		728.12	596 578.9–733 919	5–7	4.71+00	5.24−02	6.28−01	−0.582	C+	1
137	$2p^3(^2\mathrm{D}^\circ)3p-2p^3(^2\mathrm{P}^\circ)4d$	$^{1}\mathrm{F}-{}^{1}\mathrm{D}^{\circ}$		561.790	577 782.7–755 785	7–5	7.28−01	2.46−03	3.18−02	−1.764	D	1
138		$^{1}\mathrm{D}-{}^{1}\mathrm{D}^{\circ}$		628.12	596 578.9–755 785	5–5	2.15+00	1.27−02	1.31−01	−1.197	D+	1
139		$^{1}\mathrm{D}-{}^{1}\mathrm{F}^{\circ}$		623.38	596 578.9–756 995	5–7	7.30−01	5.95−03	6.11−02	−1.527	D	1
140	$2p^3(^4\mathrm{S}^\circ)3d-2p^3(^2\mathrm{P}^\circ)3p$	$^{3}\mathrm{D}^{\circ}-{}^{3}\mathrm{D}$	*17 800*	*17 806*	594 913–600 529	15–15	7.23−06	3.44−05	3.02−02	−3.287	D+	2
			17 930	17 935	594 934–600 509.6	7–7	6.13−06	2.95−05	1.22−02	−3.685	D+	2
			17 741.7	17 746.5	594 899.2–600 534.1	5–5	5.38−06	2.54−05	7.43−03	−3.896	D+	2
			17 602.1	17 606.9	594 888.1–600 567.7	3–3	5.95−06	2.76−05	4.81−03	−4.082	D	2
			17 852	17 857	594 934–600 534.1	7–5	7.36−07	2.51−06	1.03−03	−4.755	D	2
			17 636.5	17 641.4	594 899.2–600 567.7	5–3	1.81−06	5.07−06	1.47−03	−4.596	D	2
			17 819	17 824	594 899.2–600 509.6	5–7	8.36−07	5.57−06	1.64−03	−4.555	D	2
			17 706.8	17 711.7	594 888.1–600 534.1	3–5	1.20−06	9.42−06	1.65−03	−4.549	D	2
141	$2p^3(^2\mathrm{P}^\circ)3p-2p^3(^2\mathrm{D}^\circ)3d$	$^{3}\mathrm{D}-{}^{3}\mathrm{F}^{\circ}$	*2 841.6*	*2 842.4*	600 529–635 710	15–21	3.63−04	6.16−05	8.65−03	−3.034	D	2
			2 831.42	2 832.25	600 509.6–635 817.2	7–9	3.80−04	5.87−05	3.83−03	−3.386	D	2
			2 844.80	2 845.64	600 534.1–635 675.6	5–7	3.21−04	5.45−05	2.55−03	−3.565	D	2
			2 856.44	2 857.28	600 567.7–635 566.0	3–5	3.11−04	6.34−05	1.79−03	−3.721	D	2
			2 842.82	2 843.66	600 509.6–635 675.6	7–7	3.86−05	4.68−06	3.06−04	−4.485	E+	2
			2 853.70	2 854.54	600 534.1–635 566.0	5–5	2.88−05	3.52−06	1.65−04	−4.754	E+	2
			2 851.71	2 852.55	600 509.6–635 566.0	7–5	1.03−06	8.94−08	5.88−06	−6.204	E	2
142		$^{3}\mathrm{D}-{}^{3}\mathrm{D}^{\circ}$	*2 605*	*2 606*	*600 529–638 901*	15–15	4.98−02	5.07−03	6.53−01	−1.119	C	2
			2 609.1	2 609.9	600 509.6–638 825	7–7	4.51−02	4.60−03	2.77−01	−1.492	C+	2
			2 602.8	2 603.6	600 534.1–638 943	5–5	3.32−02	3.37−03	1.44−01	−1.773	C	2
			2 600.7	2 601.5	600 567.7–639 007	3–3	3.72−02	3.77−03	9.69−02	−1.947	C	2
			2 601.1	2 601.9	600 509.6–638 943	7–5	7.87−03	5.71−04	3.42−02	−2.398	C	2
			2 598.5	2 599.2	600 534.1–639 007	5–3	1.28−02	7.79−04	3.33−02	−2.409	C	2
			2 610.8	2 611.6	600 534.1–638 825	5–7	5.61−03	8.03−04	3.45−02	−2.396	C	2
			2 605.1	2 605.8	600 567.7–638 943	3–5	7.41−03	1.26−03	3.24−02	−2.423	C	2

TABLE 16. Transition probabilities of allowed lines for Na IV (references for this table are as follows: 1 = Butler and Zeippen,[15] 2 = Tachiev and Froese Fischer,[94] and 3 = Vilkas *et al.*[119])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	$E_i - E_k$ (cm^{-1})	$g_i - g_k$	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
143		^{3}D–^{3}P$^\circ$	*2344*	*2 345*	600 529–643 179	15–9	1.23−01	6.10−03	7.07−01	−1.039	C	2
			2 349.9	2 350.6	600 509.6–643 052	7–5	1.05−01	6.21−03	3.37−01	−1.362	C+	2
			2 337.0	2 337.7	600 534.1–643 311	5–3	9.85−02	4.84−03	1.86−01	−1.616	C	2
			[2 333]	[2 334]	600 567.7–643 420	3–1	1.25−01	3.41−03	7.87−02	−1.990	C	2
			2 351.2	2 352.0	600 534.1–643 052	5–5	1.42−02	1.17−03	4.55−02	−2.233	C	2
			2 338.8	2 339.5	600 567.7–643 311	3–3	3.00−02	2.46−03	5.68−02	−2.132	C	2
			2 353.1	2 353.8	600 567.7–643 052	3–5	9.50−04	1.31−04	3.06−03	−3.406	D	2
144		^{3}D–^{1}D$^\circ$										
			2 319.93	2 320.64	600 534.1–643 625.6	5–5	1.91−02	1.54−03	5.90−02	−2.114	D+	2
			2 318.61	2 319.32	600 509.6–643 625.6	7–5	1.35−04	7.78−06	4.16−04	−4.264	E	2
			2 321.74	2 322.45	600 567.7–643 625.6	3–5	5.62−02	7.58−07	1.74−05	−5.643	E	2
145		^{3}D–^{1}F$^\circ$										
			2 178.66	2 179.34	600 534.1–646 419.6	5–7	1.61−02	1.60−03	5.74−02	−2.097	D+	2
			2 177.49	2 178.17	600 509.6–646 419.6	7–7	6.39−05	4.54−06	2.28−04	−4.498	E	2
146		^{1}P–^{1}P$^\circ$	[2 909]	[2 910]	606 831–641 193	3–3	1.11−01	1.41−02	4.06−01	−1.374	C+	2
147		^{1}P–^{1}D$^\circ$	[2 717]	[2 718]	606 831–643 625.6	3–5	3.31−03	6.12−04	1.64−02	−2.736	D+	2
148	^{1}D–^{1}P$^\circ$		[3 498]	[3 499]	612 611–641 193	5–3	8.03−03	8.84−04	5.09−02	−2.355	C	2
149		^{1}D–^{1}D$^\circ$	[3 223]	[3 224]	612 611–643 625.6	5–5	5.12−02	7.98−03	4.24−01	−1.399	C+	2
150		^{1}D–^{1}F$^\circ$	[2 957]	[2 958]	612 611–646 419.6	5–7	1.84−01	3.38−02	1.65+00	−0.772	B	2
151	$2p^3(^2\text{P}^\circ)3p-2p^3(^2\text{P}^\circ)3d$	^{3}D–^{3}P$^\circ$		*1 587.3*	*600 529–663 531*	15–9	1.90−01	4.31−03	3.38−01	−1.189	C	2
				1 584.45	600 509.6–663 623	7–5	1.57−01	4.23−03	1.55−01	−1.529	C	2
				1 587.93	600 534.1–663 509	5–3	1.28−01	2.91−03	7.60−02	−1.837	C	2
				[1 598.2]	600 567.7–663 137	3–1	1.79−01	2.28−03	3.60−02	−2.165	C	2
				1 585.06	600 534.1–663 623	5–5	3.98−02	1.50−03	3.91−02	−2.125	C	2
				1 588.78	600 567.7–663 509	3–3	5.38−02	2.03−03	3.19−02	−2.215	C	2
				1 585.91	600 567.7–663 623	3–5	2.51−04	1.58−05	2.47−04	−4.324	E+	2
152		^{3}D–^{3}F$^\circ$		*1 596.31*	600 529–663 174	15–21	9.53+00	5.10−01	4.02+01	0.884	B+	2
				1 596.401	600 509.6–663 150.5	7–9	9.55+00	4.69−01	1.73+01	0.516	B+	2
				1 596.368	600 534.1–663 176.3	5–7	8.59+00	4.59−01	1.21+01	0.361	B+	2
				1 596.304	600 567.7–663 212.4	3–5	8.16+00	5.20−01	8.19+00	0.193	B+	2
				1 595.744	600 509.6–663 176.3	7–7	9.00−01	3.43−02	1.26+00	−0.620	B	2
				1 595.449	600 534.1–663 212.4	5–5	1.35+00	5.13−02	1.35+00	−0.591	B	2
				1 594.825	600 509.6–663 212.4	7–5	3.35−02	9.14−04	3.36−02	−2.194	C	2
153		^{3}D–^{1}D$^\circ$										
				1 559.99	600 534.1–664 637	5–5	1.62−01	5.91−03	1.52−01	−1.529	C	2
				1 559.40	600 509.6–664 637	7–5	2.01−02	5.24−04	1.88−02	−2.436	D	2
				1 560.81	600 567.7–664 637	3–5	4.22−02	2.57−03	3.96−02	−2.113	D+	2
154		^{3}D–^{3}D$^\circ$		*1 542.4*	600 529–665 364	15–15	2.55+00	9.10−02	6.93+00	0.135	B	2
				1 542.39	600 509.6–665 344	7–7	2.53+00	9.01−02	3.20+00	−0.200	B	2
				1 542.36	600 534.1–665 370	5–5	1.73+00	6.16−02	1.56+00	−0.511	B	2
				1 542.44	600 567.7–665 400	3–3	1.93+00	6.88−02	1.05+00	−0.685	C+	2
				1 541.77	600 509.6–665 370	7–5	3.80−01	9.67−03	3.43−01	−1.169	C+	2

TABLE 16. Transition probabilities of allowed lines for Na IV (references for this table are as follows: 1 = Butler and Zeippen,[15] 2 = Tachiev and Froese Fischer,[94] and 3 = Vilkas *et al.*[119])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				1 541.64	600 534.1–665 400	5–3	6.19−01	1.32−02	3.36−01	−1.180	C+	2
				1 542.97	600 534.1–665 344	5–7	1.75−01	8.76−03	2.23−01	−1.359	C	2
				1 543.16	600 567.7–665 370	3–5	2.34−01	1.39−02	2.12−01	−1.380	C	2
155		^{3}D−^{1}F$^\circ$										
				1 494.59	600 534.1–667 442	5–7	3.99−02	1.87−03	4.60−02	−2.029	D+	2
				1 494.04	600 509.6–667 442	7–7	2.61−04	8.72−06	3.00−04	−4.214	E	2
156		^{3}D−^{1}P$^\circ$										
				1 377.30	600 534.1–673 140	5–3	3.43−04	5.85−06	1.33−04	−4.534	E	2
				1 377.94	600 567.7–673 140	3–3	3.86−02	1.10−03	1.49−02	−2.481	D	2
157		^{1}P−^{3}P$^\circ$										
				[1 764.3]	606 831–663 509	3–3	1.42−03	6.61−05	1.15−03	−3.703	E	2
				[1 776.0]	606 831–663 137	3–1	8.30−05	1.31−06	2.29−05	−5.406	E	2
				[1 760.81]	606 831–663 623	3–5	1.72−02	1.33−03	2.32−02	−2.399	D	2
158		^{1}P−^{1}D$^\circ$		[1 729.9]	606 831–664 637	3–5	5.28+00	3.95−01	6.75+00	0.074	B	2
159		^{1}P−^{3}D$^\circ$										
				[1 708.3]	606 831–665 370	3–5	4.67−01	3.41−02	5.75−01	−0.990	C	2
				[1 707.4]	606 831–665 400	3–3	2.10−06	9.16−08	1.55−06	−6.561	E	2
160		^{1}P−^{1}P$^\circ$		[1 508.1]	606 831–673 140	3–3	5.30+00	1.81−01	2.69+00	−0.265	B	2
161		^{1}D−^{3}F$^\circ$										
				[1 978]	612 611–663 176.3	5–7	2.12−03	1.74−04	5.67−03	−3.060	E+	2
				[1 976]	612 611–663 212.4	5–5	9.50−03	5.56−04	1.81−02	−2.556	D	2
162		^{1}D−^{1}D$^\circ$		[1 922]	612 611–664 637	5–5	1.29+00	7.14−02	2.26+00	−0.447	B	2
163		^{1}D−^{3}D$^\circ$										
				[1 895]	612 611–665 370	5–5	2.50−01	1.35−02	4.21−01	−1.171	C	2
				[1 894]	612 611–665 400	5–3	2.80−04	9.05−06	2.82−04	−4.344	E	2
				[1 896]	612 611–665 344	5–7	1.13−02	8.54−04	2.67−02	−2.370	D	2
164		^{1}D−^{1}F$^\circ$		[1 824]	612 611–667 442	5–7	5.85+00	4.09−01	1.23+01	0.311	B+	2
165		^{1}D−^{1}P$^\circ$		[1 652.1]	612 611–673 140	5–3	2.69−01	6.60−03	1.79−01	−1.481	C	2
166	$2p^3(^2$P$^\circ)3p$–$2p^3(^4$S$^\circ)4d$	^{3}D−^{3}D$^\circ$		*1 189.0*	*600 529–684 631*	15–15	1.34−01	2.84−03	1.67−01	−1.371	D	1
				1 188.77	600 509.6–684 630	7–7	1.19−01	2.52−03	6.90−02	−1.754	D+	LS
				1 189.18	600 534.1–684 626	5–5	9.34−02	1.98−03	3.88−02	−2.004	D	LS
				1 189.45	600 567.7–684 640	3–3	1.00−01	2.13−03	2.50−02	−2.194	D	LS
				1 188.83	600 509.6–684 626	7–5	2.09−02	3.16−04	8.66−03	−2.655	E+	LS
				1 188.98	600 534.1–684 640	5–3	3.35−02	4.26−04	8.34−03	−2.672	E+	LS
				1 189.12	600 534.1–684 630	5–7	1.49−02	4.43−04	8.67−03	−2.655	E+	LS
				1 189.65	600 567.7–684 626	3–5	2.00−02	7.09−04	8.33−03	−2.672	E+	LS
167	$2p^3(^2$P$^\circ)3p$–$2p^3(^2$D$^\circ)4s$	^{1}P−^{1}D$^\circ$		[1 177.2]	606 831–691 781	3–5	8.78−02	3.04−03	3.53−02	−2.040	D	1
168		^{1}D−^{1}D$^\circ$		[1 263.1]	612 611–691 781	5–5	2.50+00	5.98−02	1.24+00	−0.524	B	1
169	$2p^3(^2$P$^\circ)3p$–$2p^3(^2$P$^\circ)4s$	^{3}D−^{3}P$^\circ$		*877.6*	*600 529–714 476*	15–9	1.53+01	1.06−01	4.59+00	0.201	B	1
				877.40	600 509.6–714 483	7–5	1.29+01	1.06−01	2.14+00	−0.130	B	LS

TABLE 16. Transition probabilities of allowed lines for Na IV (references for this table are as follows: 1 = Butler and Zeippen,[15] 2 = Tachiev and Froese Fischer,[94] and 3 = Vilkas *et al.*[119])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^{a}	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				877.70	600 534.1–714 468	5–3	1.15+01	7.95−02	1.15+00	−0.401	B	LS
				[878.0]	600 567.7–714 468	3–1	1.53+01	5.89−02	5.11−01	−0.753	C+	LS
				877.59	600 534.1–714 483	5–5	2.30+00	2.65−02	3.83−01	−0.878	C	LS
				877.96	600 567.7–714 468	3–3	3.82+00	4.41−02	3.82−01	−0.878	C	LS
				877.85	600 567.7–714 483	3–5	1.53−01	2.94−03	2.55−02	−2.055	D	LS
170		$^{1}\mathrm{P}-{}^{1}\mathrm{P}^{\circ}$		[911.8]	606 831–716 509	3–3	6.27+00	7.82−02	7.04−01	−0.630	C+	1
171		$^{1}\mathrm{D}-{}^{1}\mathrm{P}^{\circ}$		[962.5]	612 611–716 509	5–3	1.45+00	1.21−01	1.92+00	−0.218	B	1
172	$2p^3(^2\mathrm{P}^{\circ})3p-2p^3(^2\mathrm{D}^{\circ})4d$	$^{3}\mathrm{D}-{}^{3}\mathrm{D}^{\circ}$		*768.1*	*600 529–730 719*	15–15	2.64−01	2.33−03	8.85−02	−1.457	E+	1
				768.09	600 509.6–730 702	7–7	2.34−01	2.07−03	3.66−02	−1.839	D	LS
				768.09	600 534.1–730 728	5–5	1.83−01	1.62−03	2.05−02	−2.092	E+	LS
				768.20	600 567.7–730 742	3–3	1.98−01	1.75−03	1.33−02	−2.280	E+	LS
				767.94	600 509.6–730 728	7–5	4.12−02	2.60−04	4.60−03	−2.740	E	LS
				768.00	600 534.1–730 742	5–3	6.60−02	3.50−04	4.42−03	−2.757	E	LS
				768.24	600 534.1–730 702	5–7	2.94−02	3.64−04	4.60−03	−2.740	E	LS
				768.28	600 567.7–730 728	3–5	3.95−02	5.83−04	4.42−03	−2.757	E	LS
173		$^{1}\mathrm{P}-{}^{1}\mathrm{P}^{\circ}$		[800.9]	606 831–731 684	3–3	4.77−01	4.59−03	3.63−02	−1.861	D	1
174		$^{1}\mathrm{D}-{}^{1}\mathrm{P}^{\circ}$		[839.8]	612 611–731 684	5–3	2.81−01	1.78−03	2.46−02	−2.051	D	1
175		$^{1}\mathrm{D}-{}^{1}\mathrm{D}^{\circ}$		[828.7]	612 611–733 288	5–5	8.72−01	8.98−03	1.22−01	−1.348	D+	1
176		$^{1}\mathrm{D}-{}^{1}\mathrm{F}^{\circ}$		[824.4]	612 611–733 919	5–7	1.61+00	2.29−02	3.11−01	−0.941	C	1
177	$2p^3(^2\mathrm{P}^{\circ})3p-2p^3(^2\mathrm{P}^{\circ})4d$	$^{1}\mathrm{P}-{}^{1}\mathrm{D}^{\circ}$		[671.4]	606 831–755 785	3–5	3.81+00	4.29−02	2.84−01	−0.890	C	1
178		$^{1}\mathrm{D}-{}^{1}\mathrm{D}^{\circ}$		[698.5]	612 611–755 785	5–5	6.03−01	4.41−03	5.07−02	−1.657	D	1
179		$^{1}\mathrm{D}-{}^{1}\mathrm{F}^{\circ}$		[692.6]	612 611–756 995	5–7	6.63+00	6.68−02	7.62−01	−0.476	C+	1

[a] Wavelengths (Å) are always given unless cm^{-1} is indicated.

10.4.3. Forbidden Transitions for Na IV

We have compiled the MCHF results of Tachiev and Froese Fischer[94] and the second-order MBPT results of Gaigalas *et al.*[39] As part of the Iron Project, Galavis *et al.*[40] used the SUPERSTRUCTURE code with CI, relativistic effects, and semiempirical energy corrections.

To estimate accuracies, we pooled the relative standard deviation of the mean (RSDM) for each of the lines with transition rates published in two or more references,[39,40,94] as described in the general introduction.

10.4.4. References for Forbidden Transitions for Na IV

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[40] M. E. Galavis, C. Mendoza, and C. J. Zeippen, Astron. Astrophys., Suppl. Ser. **123**, 159 (1997).

[89] G. Tachiev and C. Froese Fischer, Astron. Astrophys. **385**, 716 (2002).

[94] G. Tachiev and C. Froese Fischer, http://www.vuse.vanderbilt.edu/~cff/mchf_collection/ (MCHF, *ab initio*, downloaded on May 6, 2002). See Tachiev and Froese Fischer (Ref. 89).

TABLE 17. Wavelength finding list for forbidden lines for Na IV

Wavelength (vac) (Å)	Mult. No.
175.186	26
175.526	26
179.599	22
179.957	22
181.757	21
181.766	21
182.123	21
182.133	21
182.279	21
185.191	27
188.179	16
188.571	16
188.738	16
190.130	24
190.426	15

TABLE 17. Wavelength finding list for forbidden lines for Na IV—Continued

Wavelength (vac) (Å)	Mult. No.
190.434	15
190.445	15
190.828	15
190.836	15
190.847	15
191.007	15
192.550	23
192.560	23
192.561	23
199.772	18
202.307	17
202.316	17
202.329	17
205.486	11
205.955	11
206.744	25
210.993	10
211.486	10
211.697	10
215.094	20
218.045	19
219.389	13
225.677	12
245.426	14
290.962	6
291.901	6
305.678	40
319.372	38
319.644	8
320.402	38
320.968	38
326.260	37
326.290	37
326.291	37
327.334	37
327.364	37
327.365	37
327.926	37
327.957	37
347.550	35
348.769	35
349.441	35
355.294	34
355.322	34
355.362	34
356.568	34
356.596	34
356.637	34
357.270	34
357.298	34
407.766	5
408.684	5
410.371	5
410.541	5
411.576	31
412.243	5
413.042	5
413.287	31
414.231	31
434.276	30
436.181	30
437.233	30
466.420	7
467.622	7
469.832	7
484.266	39
484.332	39
484.334	39
551.113	36
551.180	36
551.277	36
564.38	9
699.49	33
767.68	32
999.94	29
1 010.10	29
1 015.75	29
1 311.72	46
1 312.22	46
1 425.60	48
1 503.85	3
1 529.29	3
1 573.92	47
1 574.61	47
1 574.63	47
1 740.34	43
1 953.5	42
1 954.4	42
1 955.6	42

Wavelength (air) (Å)	Mult. No.
2 233.5	45
2 536.5	54
2 597.4	44
2 598.9	44
2 803.7	4
3 155.8	52
3 157.9	52
3 241.63	2
3 362.24	2
3 416.21	2
3 982.8	51
3 987.9	51
3 991.4	51
3 992.5	51
3 995.8	51
3 996.0	51
4 844.3	57
5 324.5	53
5 332.7	53
7 871.7	41
15 058	56
15 061	56
15 124	56
15 806	50
15 886	50
15 942	50

TABLE 17. Wavelength finding list for forbidden lines for Na IV—Continued

Wavenumber (cm^{-1})	Mult. No.
1 576.0	1
1 556.9	28
1 106.3	1
1 005.7	28
551.2	28
469.7	1
49	22
32	49
29	55

TABLE 18. Transition probabilities of forbidden lines for Na IV (references for this table are as follows: 1=Tachiev and Froese Fischer,[94] 2=Gaigalas *et al.*,[39] and 3=Galavis *et al.*[40])

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	Type	A_{ki} (s^{-1})	S (a.u.)	Acc.	Source
1	$2p^4-2p^4$	^{3}P–^{3}P									
				1 576.0 cm^{-1}	0.0–1 576.0	5–1	E2	1.62−07	1.49−01	B+	1,2,3
				1 106.3 cm^{-1}	0.0–1 106.3	5–3	M1	3.05−02	2.50+00	A	1,2,3
				1 106.3 cm^{-1}	0.0–1 106.3	5–3	E2	2.07−08	3.34−01	B+	1,2
				469.7 cm^{-1}	1 106.3–1 576.0	3–1	M1	5.64−03	2.02+00	A	1,2,3
2		^{3}P–^{1}D									
			3 416.21	3 417.19	1 576.0–30 839.8	1–5	E2	2.19−05	4.57−05	C+	2,3
			3 362.24	3 363.21	1 106.3–30 839.8	3–5	M1	1.83−01	1.29−03	B	1,2,3
			3 362.24	3 363.21	1 106.3–30 839.8	3–5	E2	8.97−05	1.72−04	C+	1,2
			3 241.63	3 242.56	0.0–30 839.8	5–5	M1	6.13−01	3.87−03	B	1,2,3
			3 241.63	3 242.56	0.0–30 839.8	5–5	E2	7.10−04	1.14−03	B	1,2
3		^{3}P–^{1}S									
				1 503.85	0.0–66 496	5–1	E2	1.04−02	7.15−05	C+	1,2,3
				1 529.29	1 106.3–66 496	3–1	M1	7.13+00	9.45−04	B	1,2,3
4		^{1}D–^{1}S									
			2 803.7	2 804.6	30 839.8–66 496	5–1	E2	3.33+00	5.17−01	B+	1,2,3
5	$2s^22p^4-2s2p^5$	^{3}P–^{3}P$^\circ$									
				410.371	0.0–243 681.9	5–5	M2	4.09+00	1.60+01	B+	1
				410.541	1 106.3–244 687.6	3–3	M2	2.71+00	6.36+00	B	1
				407.766	0.0–245 238.8	5–1	M2	2.61+00	1.98+00	B	1
				408.684	0.0–244 687.6	5–3	M2	8.53−04	1.96−03	C	1
				412.243	1 106.3–243 681.9	3–5	M2	4.24−04	1.69−03	D+	1
				413.042	1 576.0–243 681.9	1–5	M2	5.62−01	2.26+00	B	1
6		^{3}P–^{1}P$^\circ$									
				291.901	1 106.3–343 688	3–3	M2	6.93+00	2.95+00	B	1
				290.962	0.0–343 688	5–3	M2	2.06+01	8.63+00	B	1
7		^{1}D–^{3}P$^\circ$									
				466.420	30 839.8–245 238.8	5–1	M2	2.53+00	3.75+00	B	1
				467.622	30 839.8–244 687.6	5–3	M2	1.81+00	8.15+00	B	1
				469.832	30 839.8–243 681.9	5–5	M2	7.69−01	5.90+00	B	1
8		^{1}D–^{1}P$^\circ$									
				319.644	30 839.8–343 688	5–3	M2	2.62−01	1.76−01	C+	1
9		^{1}S–^{3}P$^\circ$									
				564.38	66 496–243 681.9	1–5	M2	3.54−01	6.79+00	B	1
10	$2p^4-2p^3(^4S^\circ)3s$	^{3}P–^{5}S$^\circ$									
				[210.99]	0.0–473 950.0	5–5	M2	7.77+00	1.09+00	B	1
				[211.49]	1 106.3–473 950.0	3–5	M2	9.59+00	1.36+00	B	1
				[211.70]	1 576.0–473 950.0	1–5	M2	4.20+00	5.99−01	C+	1

TABLE 18. Transition probabilities of forbidden lines for Na IV (references for this table are as follows: 1=Tachiev and Froese Fischer,[94] 2=Gaigalas *et al.*,[39] and 3=Galavis *et al.*[40])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	Type	A_{ki} (s^{-1})	S (a.u.)	Acc.	Source
11		$^3P-^3S^\circ$									
				205.486	0.0–486 650.2	5–3	M2	3.95+00	2.91−01	C+	1
				205.955	1 106.3–486 650.2	3–3	M2	1.25+00	9.35−02	C+	1
12		$^1D-^5S^\circ$									
				[225.68]	30 839.8–473 950.0	5–5	M2	6.79−04	1.33−04	D	1
13		$^1D-^3S^\circ$									
				219.389	30 839.8–486 650.2	5–3	M2	1.64−04	1.68−05	D	1
14		$^1S-^5S^\circ$									
				[245.43]	66 496–473 950.0	1–5	M2	2.75−05	8.21−06	D	1
15	$2p^4-2p^3(^3D^\circ)3s$	$^3P-^3D^\circ$									
				190.847	1 106.3–525 085	3–7	M2	4.41+00	5.24−01	C+	1
				191.007	1 576.0–525 117	1–5	M2	4.13+00	3.52−01	C+	1
				190.445	0.0–525 085	5–7	M2	9.18+00	1.08+00	B	1
				190.836	1 106.3–525 117	3–5	M2	4.72+00	4.01−01	C+	1
				190.434	0.0–525 117	5–5	M2	8.57−02	7.20−03	C	1
				190.828	1 106.3–525 139	3–3	M2	1.79+00	9.13−02	C+	1
				190.426	0.0–525 139	5–3	M2	1.92+00	9.69−02	C+	1
16		$^3P-^1D^\circ$									
				188.738	1 576.0–531 410	1–5	M2	2.32+00	1.86−01	C+	1
				188.571	1 106.3–531 410	3–5	M2	5.77+00	4.62−01	C+	1
				188.179	0.0–531 410	5–5	M2	5.27+00	4.17−01	C+	1
17		$^1D-^3D^\circ$									
				202.316	30 839.8–525 117	5–5	M2	1.29+01	1.47+00	B	1
				202.307	30 839.8–525 139	5–3	M2	5.51+00	3.76−01	C+	1
				202.329	30 839.8–525 085	5–7	M2	1.46+01	2.32+00	B	1
18		$^1D-^1D^\circ$									
				199.772	30 839.8–531 410	5–5	M2	9.25−02	9.87−03	C	1
19		$^1S-^3D^\circ$									
				218.045	66 496–525 117	1–5	M2	3.55−03	5.86−04	D+	1
20		$^1S-^1D^\circ$									
				215.094	66 496–531 410	1–5	M2	3.72−03	5.74−04	D+	1
21	$2p^4-2p^3(^2P^\circ)3s$	$^3P-^3P^\circ$									
				181.757	0.0–550 186	5–5	M2	1.78+01	1.18+00	B	1
				182.133	1 106.3–550 157	3–3	M2	1.42+01	5.73−01	C+	1
				[181.77]	0.0–550 158	5–1	M2	1.37+01	1.82−01	C+	1
				181.766	0.0–550 157	5–3	M2	1.76−02	7.02−04	D+	1
				182.123	1 106.3–550 186	3–5	M2	3.92−03	2.63−04	D+	1
				182.279	1 576.0–550 186	1–5	M2	3.33+00	2.25−01	C+	1
22		$^3P-^1P^\circ$									
				179.957	1 106.3–556 796	3–3	M2	6.82+00	2.59−01	C+	1
				179.599	0.0–556 796	5–3	M2	2.04+01	7.66−01	B	1
23		$^1D-^3P^\circ$									
				[192.56]	30 839.8–550 158	5–1	M2	1.98+01	3.52−01	C+	1
				192.561	30 839.8–550 157	5–3	M2	1.38+01	7.36−01	B	1
				192.550	30 839.8–550 186	5–5	M2	5.49+00	4.87−01	C+	1
24		$^1D-^1P^\circ$									
				190.130	30 839.8–556 796	5–3	M2	8.02−01	4.01−02	C	1

TABLE 18. Transition probabilities of forbidden lines for Na IV (references for this table are as follows: 1 = Tachiev and Froese Fischer,[94] 2 = Gaigalas *et al.*,[39] and 3 = Galavis *et al.*[40])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	Type	A_{ki} (s^{-1})	S (a.u.)	Acc.	Source
25		^{1}S–^{3}P°									
				206.744	66 496–550 186	1–5	M2	7.26+00	9.19−01	B	1
26	$2s^22p^4-2p^6$	^{3}P–^{1}S									
				175.186	0.0–570 823	5–1	E2	1.78+02	2.62−05	C	1,2
				175.526	1 106.3–570 823	3–1	M1	2.00+00	4.02−07	C	1,2
27		^{1}D–^{1}S									
				185.191	30 839.8–570 823	5–1	E2	2.54+05	4.94−02	B+	1,2
28	$2s2p^5-2s2p^5$	^{3}P°–^{3}P°									
				1 556.9 cm^{-1}	243 681.9–245 238.8	5–1	E2	1.49−07	1.45−01	B	2
				1 005.7 cm^{-1}	243 681.9–244 687.6	5–3	M1	2.31−02	2.53+00	A	1,2
				1 005.7 cm^{-1}	243 681.9–244 687.6	5–3	E2	1.28−08	3.33−01	B+	2
				551.2 cm^{-1}	244 687.6–245 238.8	3–1	M1	8.98−03	1.99+00	A	1,2
29		^{3}P°–^{1}P°									
				1 010.10	244 687.6–343 688	3–3	M1	6.58−01	7.55−05	C+	1,2
				1 010.10	244 687.6–343 688	3–3	E2	2.04−02	5.73−05	C	2
				999.94	243 681.9–343 688	5–3	M1	1.13+00	1.26−04	C+	1,2
				999.94	243 681.9–343 688	5–3	E2	6.37−03	1.71−05	C	2
				1 015.75	245 238.8–343 688	1–3	M1	8.39−01	9.78−05	C	1
30	$2s2p^5-2s^22p^3(^4\mathrm{S}^\circ)3s$	^{3}P°–^{5}S°									
				[434.28]	243 681.9–473 950.0	5–5	M1	7.21−05	1.10−09	E+	1
				[434.28]	243 681.9–473 950.0	5–5	E2	2.51−02	1.73−06	D+	1
				[436.18]	244 687.6–473 950.0	3–5	M1	5.68−05	8.74−10	E+	1
				[436.18]	244 687.6–473 950.0	3–5	E2	2.66−02	1.88−06	D+	1
				[437.23]	245 238.8–473 950.0	1–5	E2	1.06−02	7.60−07	D+	1
31		^{3}P°–^{3}S°									
				411.576	243 681.9–486 650.2	5–3	M1	4.27−03	3.31−08	D	1
				411.576	243 681.9–486 650.2	5–3	E2	4.19−02	1.33−06	D+	1
				413.287	244 687.6–486 650.2	3–3	M1	2.92−03	2.29−08	D	1
				413.287	244 687.6–486 650.2	3–3	E2	7.34−03	2.37−07	D	1
				414.231	245 238.8–486 650.2	1–3	M1	3.33−03	2.63−08	D	1
32		^{1}P°–^{5}S°									
				[767.7]	343 688–473 950.0	3–5	M1	1.68−08	1.41−12	E	1
				[767.7]	343 688–473 950.0	3–5	E2	5.94−06	7.07−09	D	1
33		^{1}P°–^{3}S°									
				699.49	343 688–486 650.2	3–3	M1	1.53−02	5.84−07	D+	1
				699.49	343 688–486 650.2	3–3	E2	9.94−03	4.46−06	D+	1
34	$2s2p^5-2s^22p^3(^2\mathrm{D}^\circ)3s$	^{3}P°–^{3}D°									
				356.637	244 687.6–525 085	3–7	E2	3.83+02	1.38−02	B	1
				357.298	245 238.8–525 117	1–5	E2	3.60+02	9.35−03	B	1
				355.362	243 681.9–525 085	5–7	M1	5.67−04	6.61−09	D	1
				355.362	243 681.9–525 085	5–7	E2	7.75+02	2.74−02	B	1
				356.596	244 687.6–525 117	3–5	M1	8.07−07	6.78−12	E	1
				356.596	244 687.6–525 117	3–5	E2	8.06+01	2.08−03	C+	1
				357.270	245 238.8–525 139	1–3	M1	2.09−04	1.06−09	E+	1
				355.322	243 681.9–525 117	5–5	M1	7.78−04	6.47−09	D	1
				355.322	243 681.9–525 117	5–5	E2	7.16+02	1.81−02	B	1
				356.568	244 687.6–525 139	3–3	M1	8.51−04	4.29−09	E+	1
				356.568	244 687.6–525 139	3–3	E2	8.36+02	1.29−02	B	1
				355.294	243 681.9–525 139	5–3	M1	3.49−04	1.74−09	E+	1
				355.294	243 681.9–525 139	5–3	E2	3.18+02	4.83−03	C+	1

TABLE 18. Transition probabilities of forbidden lines for Na IV (references for this table are as follows: 1 = Tachiev and Froese Fischer,[94] 2 = Gaigalas *et al.*,[39] and 3 = Galavis *et al.*[40])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	Type	A_{ki} (s^{-1})	S (a.u.)	Acc.	Source
35		$^3P^\circ-{}^1D^\circ$									
				349.441	245 238.8–531 410	1–5	E2	3.14−01	7.31−06	C	1
				348.769	244 687.6–531 410	3–5	M1	2.23−03	1.75−08	D	1
				348.769	244 687.6–531 410	3–5	E2	1.28+00	2.96−05	C	1
				347.550	243 681.9–531 410	5–5	M1	7.18−03	5.59−08	D	1
				347.550	243 681.9–531 410	5–5	E2	6.47−01	1.46−05	C	1
36		$^1P^\circ-{}^3D^\circ$									
				551.277	343 688–525 085	3–7	E2	4.53−03	1.44−06	D+	1
				551.180	343 688–525 117	3–5	M1	1.94−03	6.03−08	D	1
				551.180	343 688–525 117	3–5	E2	5.60−04	1.27−07	D	1
				551.113	343 688–525 139	3–3	M1	1.13−03	2.10−08	D	1
				551.113	343 688–525 139	3–3	E2	7.38−02	1.01−05	C	1
37	$2s2p^5-2s^22p^3(^2P^\circ)3s$	$^3P^\circ-{}^3P^\circ$									
				326.260	243 681.9–550 186	5–5	M1	4.45−03	2.87−08	D	1
				326.260	243 681.9–550 186	5–5	E2	4.01+02	6.62−03	C+	1
				327.365	244 687.6–550 157	3–3	M1	1.80−03	7.03−09	D	1
				327.365	244 687.6–550 157	3–3	E2	3.55+02	3.57−03	C+	1
				[326.29]	243 681.9–550 158	5–1	E2	1.29+03	4.27−03	C+	1
				326.291	243 681.9–550 157	5–3	M1	8.24−04	3.18−09	E+	1
				326.291	243 681.9–550 157	5–3	E2	9.33+02	9.24−03	B	1
				[327.36]	244 687.6–550 158	3–1	M1	2.23−03	2.89−09	E+	1
				327.334	244 687.6–550 186	3–5	M1	9.47−06	6.16−11	E+	1
				327.334	244 687.6–550 186	3–5	E2	5.91+02	9.92−03	B	1
				327.957	245 238.8–550 157	1–3	M1	1.97−05	7.74−11	E+	1
				327.926	245 238.8–550 186	1–5	E2	2.80+02	4.75−03	C+	1
38		$^3P^\circ-{}^1P^\circ$									
				320.402	244 687.6–556 796	3–3	M1	5.64−03	2.07−08	D	1
				320.402	244 687.6–556 796	3–3	E2	1.01+00	9.09−06	C	1
				319.372	243 681.9–556 796	5–3	M1	9.80−03	3.55−08	D	1
				319.372	243 681.9–556 796	5–3	E2	4.18−01	3.72−06	D+	1
				320.968	245 238.8–556 796	1–3	M1	7.94−03	2.92−08	D	1
39		$^1P^\circ-{}^3P^\circ$									
				484.334	343 688–550 157	3–3	M1	1.87−04	2.36−09	E+	1
				484.334	343 688–550 157	3–3	E2	4.77−04	3.41−08	D	1
				[484.33]	343 688–550 158	3–1	M1	7.40−04	3.12−09	E+	1
				484.266	343 688–550 186	3–5	M1	1.31−04	2.75−09	E+	1
				484.266	343 688–550 186	3–5	E2	8.39−01	9.97−05	C	1
40	$2s2p^5-2p^6$	$^3P^\circ-{}^1S$									
				305.678	243 681.9–570 823	5–1	M2	5.65+01	1.01+01	B	1
41	$2p^3(^4S^\circ)3s-2p^3(^4S^\circ)3s$	$^5S^\circ-{}^3S^\circ$									
			[7872]	[7874]	473 950.0–486 650.2	5–3	M1	1.04−06	5.66−08	D	1
42	$2p^3(^4S^\circ)3s-2p^3(^2D^\circ)3s$	$^5S^\circ-{}^3D^\circ$									
				[1 956]	473 950.0–525 085	5–7	M1	8.38−04	1.63−06	D+	1
				[1 954]	473 950.0–525 117	5–5	M1	1.31−02	1.81−05	C	1
				[1 954]	473 950.0–525 139	5–3	M1	4.48−03	3.72−06	D+	1
43		$^5S^\circ-{}^1D^\circ$									
				[1 740.3]	473 950.0–531 410	5–5	M1	1.48−02	1.45−05	C	1
44		$^3S^\circ-{}^3D^\circ$									
			2 598.9	2 599.6	486 650.2–525 117	3–5	M1	2.25−03	7.33−06	C	1
			2 597.4	2 598.2	486 650.2–525 139	3–3	M1	1.28−02	2.50−05	C	1

TABLE 18. Transition probabilities of forbidden lines for Na IV (references for this table are as follows: 1 = Tachiev and Froese Fischer,[94] 2 = Gaigalas *et al.*,[39] and 3 = Galavis *et al.*[40])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	Type	A_{ki} (s^{-1})	S (a.u.)	Acc.	Source
45		$^3S^\circ-^1D^\circ$									
			2 233.5	2 234.1	486 650.2–531 410	3–5	M1	2.32−04	4.79−07	D+	1
46	$2p^3(^4S^\circ)3s-2p^3(^2P^\circ)3s$	$^5S^\circ-^3P^\circ$									
				[1 311.7]	473 950.0–550 186	5–5	M1	3.82+00	1.60−03	C+	1
				[1 312.2]	473 950.0–550 157	5–3	M1	2.14+00	5.38−04	C+	1
47		$^3S^\circ-^3P^\circ$									
				1 573.92	486 650.2–550 186	3–5	M1	3.52−01	2.54−04	C	1
				1 574.63	486 650.2–550 157	3–3	M1	3.45−01	1.50−04	C	1
				[1 574.6]	486 650.2–550 158	3–1	M1	1.43+00	2.06−04	C	1
48		$^3S^\circ-^1P^\circ$									
				1 425.60	486 650.2–556 796	3–3	M1	3.12+00	1.01−03	C+	1
49	$2p^3(^2D^\circ)3s-2p^3(^2D^\circ)3s$	$^3D^\circ-^3D^\circ$									
				32 cm^{-1}	525 085–525 117	7–5	M1	8.24−07	4.66+00	B+	1
				22 cm^{-1}	525 117–525 139	5–3	M1	4.30−07	4.49+00	B+	1
50		$^3D^\circ-^1D^\circ$									
			15 886	15 891	525 117–531 410	5–5	M1	4.46−05	3.32−05	C	1
			15 806	15 810	525 085–531 410	7–5	M1	1.07−05	7.80−06	C	1
			15 942	15 946	525 139–531 410	3–5	M1	2.95−05	2.22−05	C	1
51	$2p^3(^2D^\circ)3s-2p^3(^2P^\circ)3s$	$^3D^\circ-^3P^\circ$									
			3 982.8	3 983.9	525 085–550 186	7–5	M1	6.07−01	7.12−03	C+	1
			3 992.5	3 993.6	525 117–550 157	5–3	M1	3.77−08	2.67−10	E+	1
			[3996]	[3 997]	525 139–550 158	3–1	M1	7.15−01	1.69−03	C+	1
			3 987.9	3 989.0	525 117–550 186	5–5	M1	4.28−01	5.03−03	C+	1
			3 996.0	3 997.1	525 139–550 157	3–3	M1	7.13−01	5.07−03	C+	1
			3 991.4	3 992.5	525 139–550 186	3–5	M1	1.15−01	1.36−03	C+	1
52		$^3D^\circ-^1P^\circ$									
			3 155.8	3 156.7	525 117–556 796	5–3	M1	1.35+00	4.73−03	C+	1
			3 157.9	3 158.9	525 139–556 796	3–3	M1	4.53−01	1.59−03	C+	1
53		$^1D^\circ-^3P^\circ$									
			5 332.7	5 334.2	531 410–550 157	5–3	M1	2.71−01	4.58−03	C+	1
			5 324.5	5 325.9	531 410–550 186	5–5	M1	4.91−01	1.37−02	B	1
54	$2s^22p^3(^2D^\circ)3s-2p^6$	$^1D^\circ-^1S$									
			2 536.5	2 537.2	531 410–570 823	5–1	M2	3.02−09	2.13−05	D	1
55	$2p^3(^2P^\circ)3s-2p^3(^2P^\circ)3s$	$^3P^\circ-^3P^\circ$									
				29 cm^{-1}	550 157–550 186	3–5	M1	3.28−07	2.50+00	B+	1
56		$^3P^\circ-^1P^\circ$									
			15 058	15 063	550 157–556 796	3–3	M1	3.71−06	1.41−06	D+	1
			15 124	15 129	550 186–556 796	5–3	M1	7.29−05	2.81−05	C	1
			[15 061]	[15 065]	550 158–556 796	1–3	M1	1.43−05	5.45−06	D+	1
57	$2s^22p^3(^2P^\circ)3s-2p^6$	$^3P^\circ-^1S$									
			4 844.3	4 845.7	550 186–570 823	5–1	M2	9.77−11	1.75−05	D	1

[a] Wavelengths (Å) are always given unless cm^{-1} is indicated.

10.5. Na V

Nitrogen isoelectronic sequence
Ground state: $1s^2 2s^2 2p^3\ {}^4S^{\mathrm{o}}_{3/2}$
Ionization energy: 138.40 eV = 1 116 300 cm^{-1}

10.5.1. Allowed Transitions for Na V

Only OP (Ref. 12) results were available for transitions from energy levels above the $3d$. Wherever available, we have used the data of Tachiev and Froese Fischer,[94] which result from extensive MCHF calculations with Breit-Pauli corrections to order α^2. Also we found the MBPT calculations of Merkelis *et al.*[65] to be in excellent agreement with those of Tachiev and Froese Fischer.[94]

To estimate accuracies, we pooled the relative standard deviation of the mean (RSDM) for each of the lines with transition rates published in two or more references,[12,65,94] as described in the general introduction. For this purpose the spin-allowed (non-OP) and intercombination data were treated separately and each of these was in turn divided into two upper-level energy groups below and above 780 000 cm^{-1}. OP lines constituted a fifth group and have been used only when more accurate sources were not available, because spin-orbit effects are often significant for this spectrum.

Merkelis *et al.*[65] contain only data for transitions from energy levels below 780 000 cm^{-1}. To estimate the accuracy of the higher-lying lines for Tachiev and Froese Fischer[94] and separately for OP (Ref. 12) for the lines unique to it, we isoelectronically averaged the logarithmic quality factors (see Sec. 4.1) observed for lines from the lower-lying levels of N-like ions of Na, Mg, Al, and Si and scaled them for lines from high-lying levels, as described in the introduction. The listed accuracies for these higher-lying transitions are thus less well established than for those from lower levels. All transitions involving the $2s^2 2p^2({}^3P)3d\ {}^4P$ or $2s2p^3({}^5S^{\mathrm{o}})3s\ {}^4S^{\mathrm{o}}_{3/2}$ energy levels were excluded from the fitting because these yielded consistently poorer RSDM's that the other transitions.

10.5.2. References for Allowed Transitions for Na V

[12] V. M. Burke and D. J. Lennon, to be published, http://legacy.gsfc.nasa.gov/topbase, downloaded on Aug. 8, 1995 (Opacity Project).

[65] G. Merkelis, M. J. Vilkas, R. Kisielius, G. Gaigalas, and I. Martinson, Phys. Scr. **56**, 41, (1997).

[89] G. Tachiev and C. Froese Fischer, Astron. Astrophys. **385**, 716 (2002).

[94] G. Tachiev and C. Froese Fischer, http://www.vuse.vanderbilt.edu/~cff/mchf_collection/ (MCHF, *ab initio*, downloaded on May 6, 2002). See Tachiev and Froese Fischer (Ref. 89).

TABLE 19. Wavelength finding list for allowed lines for Na V

Wavelength (vac) (Å)	Mult. No.
100.880	42
100.883	42
106.278	34
106.302	34
107.937	40
107.941	40
108.017	39
108.021	39
110.812	38
110.816	38
110.878	38
110.916	41
110.921	41
111.511	35
111.516	35
111.550	35
111.554	35
114.699	37
114.735	37
114.740	37
115.579	36
115.584	36
117.989	31
122.070	32
122.076	32
125.178	18
125.216	18
125.286	18
125.304	17
125.895	33
125.901	33
126.091	54
126.207	53
126.256	54
126.342	54
126.372	53
126.459	53
126.557	27
126.563	27
126.609	27
126.781	52
126.817	52
126.921	52
126.948	52
126.983	52
127.008	52
127.036	52
127.444	26
127.450	26
127.467	26
127.473	26
128.019	25
128.025	25
128.051	25
129.936	30
129.942	30
130.673	29
130.680	29
130.722	29
130.728	29
131.625	28
131.643	28
131.650	28
133.162	21
133.245	22
133.282	22
133.288	22
133.361	22
133.367	22
133.382	21
133.388	21
133.528	20
133.559	20
133.566	20
134.183	19
134.269	19
134.275	19
138.112	24
138.119	24
138.152	24
138.159	24
138.812	23
138.819	23
138.911	23
138.918	23
140.164	55
140.171	55
140.258	55
142.205	51
142.415	51
142.525	51
144.331	50
144.548	50
144.661	50
147.889	16
147.897	16
148.642	11
148.856	11
149.001	11
150.953	48
151.124	14
151.132	14
151.189	48
151.313	48
157.030	15
157.039	15
157.207	12
157.216	12
157.512	12
163.608	13

TABLE 19. Wavelength finding list for allowed lines for Na V—Continued

Wavelength (vac) (Å)	Mult. No.
163.618	13
163.929	13
163.939	13
167.510	49
167.520	49
170.622	47
170.924	47
171.083	47
267.428	3
268.290	3
283.221	43
283.658	43
283.698	43
284.534	43
284.975	43
285.106	2
296.030	63
296.604	63
297.457	63
307.157	6
308.260	6
308.295	6
332.542	10
332.583	10
333.875	10
333.917	10
360.323	9
360.371	9
367.565	44
369.730	44
369.779	44
400.663	5
400.721	5
400.779	5
403.333	62
404.400	62
405.988	62
445.042	8
445.115	8
445.186	8
456.142	45
459.557	45
459.897	1
461.050	1
463.263	1
468.887	71
469.945	71
471.620	71
472.541	61
472.690	71
473.597	70
474.068	70
474.460	74
475.226	61
475.466	74

TABLE 19. Wavelength finding list for allowed lines for Na V—Continued

Wavelength (vac) (Å)	Mult. No.
476.014	74
476.109	73
477.122	73
477.674	73
482.663	60
484.191	60
484.388	72
484.905	72
485.037	72
485.437	72
485.607	72
485.956	72
486.008	72
486.469	60
506.981	46
510.087	46
511.203	46
514.361	46
541.064	64
552.321	58
557.336	58
591.46	4
593.24	4
593.37	4
596.91	4
597.04	4
635.93	82
636.61	82
637.51	82
690.85	93
693.38	7
693.55	7
695.41	83
696.00	7
696.18	7
697.74	83
701.24	7
705.76	57
713.97	57
719.53	77
720.62	77
764.44	59
768.29	59
774.04	59
819.60	68
821.02	68
827.16	69
830.22	69
831.89	69
861.43	56
862.29	95
870.40	56
873.69	56
874.20	95
882.92	56

TABLE 19. Wavelength finding list for allowed lines for Na V—Continued

Wavelength (vac) (Å)	Mult. No.
1 033.05	67
1 046.41	67
1 088.49	76
1 107.54	76
1 212.12	98
1 219.21	98
1 250.94	92
1 261.83	91
1 445.50	101
1 455.60	101
1 481.70	100
1 486.33	100
1 502.86	102
1 509.89	102
1 520.91	102
1 524.60	78
1 529.12	78
1 564.95	99
1 565.93	99
1 570.11	99
1 570.35	99
1 575.55	99
1 612.54	79
1 616.24	79
1 624.96	87
1 634.76	81
1 636.39	103
1 646.36	87
1 649.35	103
1 650.98	103
1 664.17	103
1 788.9	90
1 806.4	90

TABLE 19. Wavelength finding list for allowed lines for Na V—Continued

Wavelength (air) (Å)	Mult. No.
2 113.9	89
2 192.8	75
2 294.5	88
2 685.9	104
2 721.0	104
2 736.7	105
2 773.1	105
2 942.9	86
3 247.8	80
3 476.1	107
3 535.1	107
3 555.2	106
3 616.9	106
3 726.1	94
3 959.3	94
4 573.3	97
4 617.6	97
4 808.7	96
5 001.1	96
6 450	84
7 182	84
Wavenumber (cm^{-1})	**Mult. No.**
3 891	65
3 776	66
3 330	66
3 088	66
3 050	85
1 855	85

TABLE 20. Transition probabilities of allowed lines for Na V (references for this table are as follows: 1 = Burke and Lennon,[12] 2 = Tachiev and Froese Fischer,[94] and 3 = Merkelis *et al.*[65])

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log *gf*	Acc.	Source
1	$2s^22p^3-2s2p^4$	$^4S^\circ-^4P$		*461.96*	0–*216 469*	4–12	2.17+01	2.08−01	1.27+00	−0.080	B+	2,3
				463.263	0–215 860	4–6	2.15+01	1.04−01	6.34−01	−0.381	B+	2,3
				461.050	0–216 896	4–4	2.19+01	6.97−02	4.23−01	−0.555	B+	2,3
				459.897	0–217 440	4–2	2.20+01	3.49−02	2.11−01	−0.855	B+	2,3
2		$^4S^\circ-^2S$										
				285.106	0–350 747	4–2	1.01−02	6.12−06	2.30−05	−4.611	C	3
3		$^4S^\circ-^2P$										
				268.290	0–372 731	4–4	1.80−02	1.94−05	6.85−05	−4.110	C	3
				267.428	0–373 932	4–2	5.46−03	2.92−06	1.03−05	−4.933	C	3
4		$^2D^\circ-^4P$										
				593.24	48 330–216 896	6–4	8.10−05	2.85−07	3.34−06	−5.767	D	3
				591.46	48 366–217 440	4–2	1.31−04	3.42−07	2.67−06	−5.864	D	3

TABLE 20. Transition probabilities of allowed lines for Na V (references for this table are as follows: 1 = Burke and Lennon,[12] 2 = Tachiev and Froese Fischer,[94] and 3 = Merkelis *et al.*[65])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	$E_i - E_k$ (cm^{-1})	$g_i - g_k$	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				596.91	48 330–215 860	6–6	1.27−03	6.80−06	8.02−05	−4.389	C	3
				593.37	48 366–216 896	4–4	2.53−04	1.33−06	1.04−05	−5.274	D	3
				597.04	48 366–215 860	4–6	1.85−04	1.48−06	1.17−05	−5.228	C	3
5		$^2D^\circ - ^2D$		*400.72*	*48 344–297 894*	10–10	5.22+01	1.26−01	1.66+00	0.100	A	2,3
				400.721	48 330–297 880	6–6	4.87+01	1.17−01	9.28−01	−0.154	A	2,3
				400.721	48 366–297 916	4–4	4.82+01	1.16−01	6.12−01	−0.333	A	2,3
				400.663	48 330–297 916	6–4	4.84+00	7.77−03	6.15−02	−1.331	B+	2,3
				400.779	48 366–297 880	4–6	2.89+00	1.04−02	5.51−02	−1.381	B+	2,3
6		$^2D^\circ - ^2P$		*307.89*	*48 344–373 131*	10–6	2.17+02	1.85−01	1.87+00	0.267	A	2,3
				308.260	48 330–372 731	6–4	1.96+02	1.86−01	1.13+00	0.048	A	2,3
				307.157	48 366–373 932	4–2	2.10+02	1.48−01	6.00−01	−0.228	A	2,3
				308.295	48 366–372 731	4–4	2.46+01	3.51−02	1.42−01	−0.853	B+	2,3
7		$^2P^\circ - ^4P$										
				696.18	73 255–216 896	4–4	9.32−04	6.77−06	6.21−05	−4.567	C	3
				693.38	73 218–217 440	2–2	3.64−04	2.62−06	1.20−05	−5.281	D+	3
				693.55	73 255–217 440	4–2	1.82−05	6.55−08	5.98−07	−6.582	E+	3
				701.24	73 255–215 860	4–6	6.40−04	7.07−06	6.53−05	−4.549	C	3
				696.00	73 218–216 896	2–4	4.61−06	6.70−08	3.07−07	−6.873	E+	3
8		$^2P^\circ - ^2D$		*445.13*	*73 243–297 894*	6–10	7.11+00	3.52−02	3.09−01	−0.675	B+	2,3
				445.186	73 255–297 880	4–6	7.50+00	3.34−02	1.96−01	−0.874	B+	2,3
				445.042	73 218–297 916	2–4	5.83+00	3.46−02	1.01−01	−1.160	B+	2,3
				445.115	73 255–297 916	4–4	6.82+01	2.03−03	1.19−02	−2.090	B	2,3
9		$^2P^\circ - ^2S$		*360.35*	*73 243*–350 747	6–2	1.17+02	7.62−02	5.42−01	−0.340	A	2,3
				360.371	73 255–350 747	4–2	7.54+01	7.34−02	3.49−01	−0.532	A	2,3
				360.323	73 218–350 747	2–2	4.19+01	8.16−02	1.94−01	−0.787	B+	2,3
10		$^2P^\circ - ^2P$		*333.46*	*73 243–373 131*	6–6	5.87+01	9.79−02	6.45−01	−0.231	B+	2,3
				333.917	73 255–372 731	4–4	4.53+01	7.57−02	3.33−01	−0.519	A	2,3
				332.542	73 218–373 932	2–2	3.60+01	5.97−02	1.31−01	−0.923	B+	2,3
				332.583	73 255–373 932	4–2	2.99+01	2.48−02	1.08−01	−1.003	B+	2,3
				333.875	73 218–372 731	2–4	9.94+00	3.32−02	7.30−02	−1.178	B+	2,3
11	$2p^3 - 2p^2(^3P)3s$	$^4S^\circ - ^4P$		*148.77*	0–*672 165*	4–12	1.29+02	1.29−01	2.52−01	−0.287	B+	2
				148.642	0–672 757	4–6	1.30+02	6.46−02	1.26−01	−0.588	B+	2
				148.856	0–671 790	4–4	1.29+02	4.29−02	8.41−02	−0.765	B+	2
				149.001	0–671 136	4–2	1.28+02	2.14−02	4.20−02	−1.068	B+	2
12		$^2D^\circ - ^2P$		*157.31*	*48 344–684 035*	10–6	2.07+02	4.62−02	2.39−01	−0.335	B+	2
				157.207	48 330–684 434	6–4	1.90+02	4.68−02	1.45−01	−0.552	B+	2
				157.512	48 366–683 238	4–2	2.18+02	4.05−02	8.40−02	−0.790	B+	2
				157.216	48 366–684 434	4–4	1.26+01	4.68−03	9.68−03	−1.728	B	2
13		$^2P^\circ - ^2P$		*163.72*	*73 243–684 035*	6–6	1.62+02	6.52−02	2.11−01	−0.408	B+	2
				163.618	73 255–684 434	4–4	1.38+02	5.54−02	1.19−01	−0.654	B+	2
				163.929	73 218–683 238	2–2	1.06+02	4.28−02	4.62−02	−1.068	B+	2
				163.939	73 255–683 238	4–2	4.60+01	9.27−03	2.00−02	−1.431	B+	2
				163.608	73 218–684 434	2–4	2.95+01	2.37−02	2.55−02	−1.324	B+	2
14	$2p^3 - 2p^2(^1D)3s$	$^2D^\circ - ^2D$		*151.13*	*48 344–710 039*	10–10	1.72+02	5.91−02	2.94−01	−0.228	B+	2

TABLE 20. Transition probabilities of allowed lines for Na V (references for this table are as follows: 1 = Burke and Lennon,[12] 2 = Tachiev and Froese Fischer,[94] and 3 = Merkelis *et al.*[65])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				151.124	48 330–710 039	6–6	1.62+02	5.53−02	1.65−01	−0.479	B+	2
				151.132	48 366–710 039	4–4	1.54+02	5.27−02	1.05−01	−0.676	B+	2
				151.124	48 330–710 039	6–4	1.36+01	3.10−03	9.25−03	−1.730	B	2
				151.132	48 366–710 039	4–6	1.43+01	7.36−03	1.47−02	−1.531	B	2
15		^{2}P$^\circ$–^{2}D		*157.04*	*73 243–710 039*	6–10	6.11+01	3.76−02	1.17−01	−0.647	B+	2
				157.039	73 255–710 039	4–6	5.79+01	3.21−02	6.65−02	−0.891	B+	2
				157.030	73 218–710 039	2–4	4.82+01	3.56−02	3.68−02	−1.148	B+	2
				157.039	73 255–710 039	4–4	1.76+01	6.52−03	1.35−02	−1.584	B	2
16	$2p^3-2p^2(^1\mathrm{S})3s$	^{2}P$^\circ$–^{2}S		*147.89*	*73 243*–749 402	6–2	2.26+02	2.47−02	7.22−02	−0.829	B+	2
				147.897	73 255–749 402	4–2	1.48+02	2.42−02	4.72−02	−1.014	B+	2
				147.889	73 218–749 402	2–2	7.83+01	2.57−02	2.50−02	−1.289	B+	2
17	$2p^3-2p^2(^3\mathrm{P})3d$	^{4}S$^\circ$–^{2}F		125.304	0–798 059	4–6	3.82+02	1.35−01	2.22−01	−0.268	C	2
18		^{4}S$^\circ$–^{4}P		*125.24*	*0–798 437*	4–12	1.38+03	9.75−01	1.61+00	0.591	C+	2
				125.286	0–798 174	4–6	1.18+03	4.16−01	6.86−01	0.221	B	2
				125.216	0–798 620	4–4	1.58+03	3.72−01	6.13−01	0.173	B	2
				125.178	0–798 862	4–2	1.60+03	1.88−01	3.10−01	−0.124	C+	2
19		^{2}D$^\circ$–^{2}P		*134.24*	*48 344–793 275*	10–6	1.00+02	1.63−02	7.19−02	−0.788	D+	2
				134.269	48 330–793 104	6–4	9.69+01	1.75−02	4.63−02	−0.979	C	2
				134.183	48 366–793 617	4–2	5.35+01	7.22−03	1.28−02	−1.539	D+	2
				134.275	48 366–793 104	4–4	2.68+01	7.24−03	1.28−02	−1.538	D+	2
20		^{2}D$^\circ$–^{4}D										
				133.559	48 330–797 060	6–6	2.75−02	7.36−06	1.94−05	−4.355	E	2
				133.566	48 366–797 060	4–4	4.77+00	1.28−03	2.25−03	−2.291	E	2
				133.559	48 330–797 060	6–4	1.05+01	1.87−03	4.92−03	−1.950	E+	2
				133.528	48 366–797 270	4–2	5.37+01	7.18−03	1.26−02	−1.542	D	2
				133.566	48 366–797 060	4–6	1.50+00	6.03−04	1.06−03	−2.618	E	2
21		^{2}D$^\circ$–^2F		*133.26*	*48 344–798 765*	10–14	4.64+02	1.73−01	7.59−01	0.238	C+	2
				133.162	48 330–799 295	6–8	5.21+02	1.85−01	4.86−01	0.045	C+	2
				133.388	48 366–798 059	4–6	3.64+02	1.46−01	2.56−01	−0.234	C+	2
				133.382	48 330–798 059	6–6	2.44+01	6.52−03	1.72−02	−1.408	D+	2
22		^{2}D$^\circ$–^{4}P										
				133.282	48 330–798 620	6–4	2.91−01	5.17−05	1.36−04	−3.508	E	2
				133.245	48 366–798 862	4–2	9.76−02	1.30−05	2.28−05	−4.284	E	2
				133.361	48 330–798 174	6–6	8.59+00	2.29−03	6.03−03	−1.862	E+	2
				133.288	48 366–798 620	4–4	2.48−02	6.61−06	1.16−05	−4.578	E	2
				133.367	48 366–798 174	4–6	1.14+02	4.55−02	7.98−02	−0.740	D+	2
23		^{2}P$^\circ$–^{2}P		*138.88*	*73 243–793 275*	6–6	3.49+02	1.01−01	2.77−01	−0.218	C	2
				138.918	73 255–793 104	4–4	3.21+02	9.29−02	1.70−01	−0.430	C	2
				138.812	73 218–793 617	2–2	1.69+02	4.88−02	4.46−02	−1.011	C	2
				138.819	73 255–793 617	4–2	8.71+01	1.26−02	2.30−02	−1.298	D+	2
				138.911	73 218–793 104	2–4	7.45+01	4.31−02	3.94−02	−1.064	D+	2
24		^{2}P$^\circ$–^{4}D										
				138.159	73 255–797 060	4–6	2.75−02	1.18−05	2.15−05	−4.326	E	2
				138.152	73 218–797 060	2–4	1.01+01	5.77−03	5.25−03	−1.938	E+	2
				138.159	73 255–797 060	4–4	4.01+01	1.15−02	2.09−02	−1.337	D	2
				138.112	73 218–797 270	2–2	1.55+02	4.43−02	4.03−02	−1.053	D	2

TABLE 20. Transition probabilities of allowed lines for Na V (references for this table are as follows: 1 = Burke and Lennon,[12] 2 = Tachiev and Froese Fischer,[94] and 3 = Merkelis *et al.*[65])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^{a}	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				138.119	73 255–797 270	4–2	8.02+01	1.15−02	2.09−02	−1.337	D	2
25	$2p^3-2p^2(^1D)3d$	$^2D^\circ-^2F$		*128.04*	*48 344–829 352*	10–14	1.15+03	3.95−01	1.66+00	0.597	B	2
				128.051	48 330–829 269	6–8	9.67+02	3.17−01	8.02−01	0.279	B	2
				128.025	48 366–829 463	4–6	1.25+03	4.62−01	7.78−01	0.267	B	2
				128.019	48 330–829 463	6–6	1.36+02	3.33−02	8.43−02	−0.699	C	2
26		$^2D^\circ-^2D$		*127.46*	*48 344–832 931*	10–10	7.96+02	1.94−01	8.13−01	0.288	C+	2
				127.444	48 330–832 988	6–6	7.02+02	1.71−01	4.30−01	0.011	C+	2
				127.473	48 366–832 846	4–4	7.53+02	1.83−01	3.08−01	−0.135	C+	2
				127.467	48 330–832 846	6–4	8.89+01	1.44−02	3.63−02	−1.063	D+	2
				127.450	48 366–832 988	4–6	6.35+01	2.32−02	3.89−02	−1.032	D+	2
27		$^2D^\circ-^2P$		*126.57*	*48 344–838 390*	10–6	3.11+02	4.48−02	1.87−01	−0.349	C	2
				126.557	48 330–838 485	6–4	2.71+02	4.34−02	1.08−01	−0.584	C	2
				126.609	48 366–838 200	4–2	3.42+02	4.11−02	6.85−02	−0.784	C	2
				126.563	48 366–838 485	4–4	2.43+01	5.84−03	9.74−03	−1.632	D	2
28		$^2P^\circ-^2D$		*131.63*	*73 243–832 931*	6–10	4.64+02	2.01−01	5.22−01	0.081	C+	2
				131.625	73 255–832 988	4–6	4.93+02	1.92−01	3.33−01	−0.115	C+	2
				131.643	73 218–832 846	2–4	3.67+02	1.91−01	1.65−01	−0.418	C	2
				131.650	73 255–832 846	4–4	5.20+01	1.35−02	2.34−02	−1.268	D+	2
29		$^2P^\circ-^2P$		*130.69*	*73 243–838 390*	6–6	6.32+02	1.62−01	4.18−01	−0.012	C	2
				130.680	73 255–838 485	4–4	5.49+02	1.40−01	2.42−01	−0.252	C+	2
				130.722	73 218–838 200	2–2	4.19+02	1.07−01	9.23−02	−0.670	C	2
				130.728	73 255–838 200	4–2	1.74+02	2.23−02	3.83−02	−1.050	D+	2
				130.673	73 218–838 485	2–4	1.04+02	5.32−02	4.57−02	−0.973	C	2
30		$^2P^\circ-^2S$		*129.94*	*73 243*–842 829	6–2	7.51+02	6.34−02	1.63−01	−0.420	C	2
				129.942	73 255–842 829	4–2	5.14+02	6.50−02	1.11−01	−0.585	C	2
				129.936	73 218–842 829	2–2	2.37+02	6.00−02	5.13−02	−0.921	C	2
31	$2s^22p^3-2s2p^3(^5S^\circ)3p$	$^4S^\circ-^4P$		*117.99*	0–*847 539*	4–12	2.27+02	1.42−01	2.21−01	−0.246	C	2
				117.989	0–847 539	4–6	2.28+02	7.14−02	1.11−01	−0.544	C	2
				117.989	0–847 539	4–4	2.26+02	4.71−02	7.32−02	−0.725	C	2
				117.989	0–847 539	4–2	2.24+02	2.34−02	3.64−02	−1.029	D+	2
32	$2p^3-2p^2(^1S)3d$	$^2D^\circ-^2D$		*122.07*	*48 344–867 530*	10–10	8.69+00	1.94−03	7.80−03	−1.712	E+	2
				[122.07]	48 330–867 530	6–6	7.91+00	1.77−03	4.26−03	−1.974	D	2
				[122.07]	48 366–867 530	4–4	6.18+00	1.38−03	2.22−03	−2.258	E+	2
				[122.07]	48 330–867 530	6–4	8.74−01	1.30−04	3.14−04	−3.108	E	2
				[122.08]	48 366–867 530	4–6	1.87+00	6.28−04	1.01−03	−2.600	E+	2
33		$^2P^\circ-^2D$		*125.90*	*73 243–867 530*	6–10	5.65+02	2.24−01	5.56−01	0.128	C+	2
				[125.90]	73 255–867 530	4–6	5.53+02	1.97−01	3.27−01	−0.103	C+	2
				[125.90]	73 218–867 530	2–4	4.87+02	2.31−01	1.92−01	−0.335	C	2
				[125.90]	73 255–867 530	4–4	9.56+01	2.27−02	3.77−02	−1.042	D+	2
34	$2p^3-2p^2(^3P)4d$	$^4S^\circ-^4P$				4–12						1
				106.302	0–940 720	4–6	6.41+02	1.63−01	2.28−01	−0.186	D+	LS
				106.278	0–940 930	4–4	6.44+02	1.09−01	1.53−01	−0.361	D+	LS
35		$^2D^\circ-^2D$		*111.53*	*48 344–944 976*	10–10	1.87+02	3.48−02	1.28−01	−0.458	D	1

TABLE 20. Transition probabilities of allowed lines for Na V (references for this table are as follows: 1 = Burke and Lennon,[12] 2 = Tachiev and Froese Fischer,[94] and 3 = Merkelis *et al.*[65])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				111.511	48 330–945 100	6–6	1.74+02	3.25−02	7.16−02	−0.710	D	LS
				111.554	48 366–944 790	4–4	1.68+02	3.13−02	4.60−02	−0.902	D	LS
				111.550	48 330–944 790	6–4	1.87+01	2.32−03	5.11−03	−1.856	E	LS
				111.516	48 366–945 100	4–6	1.24+01	3.48−03	5.11−03	−1.856	E	LS
36		^{2}P$^\circ-^2$P				6–6						
				[115.58]	73 255–938 430	4–4	1.32+02	2.65−02	4.03−02	−0.975	D	LS
				[115.58]	73 218–93 8 430	2–4	2.65+01	1.06−02	8.07−03	−1.674	E+	LS
37		^{2}P$^\circ-^2$D		*114.71*	*73 243–944 976*	6–10	3.95+02	1.30−01	2.95−01	−0.108	D+	1
				114.699	73 255–945 100	4–6	3.95+02	1.17−01	1.77−01	−0.330	D+	LS
				114.735	73 218–944 790	2–4	3.29+02	1.30−01	9.82−02	−0.585	D	LS
				114.740	73 255–944 790	4–4	6.59+01	1.30−02	1.96−02	−1.284	E+	LS
38	$2s^22p^3$–$2s2p^3(^3\mathrm{D}^\circ)3p$	^{2}D$^\circ-^2$F		*110.85*	*48 344–950 451*	10–14	7.45+02	1.92−01	7.01−01	0.283	C	1
				110.878	48 330–950 220	6–8	7.45+02	1.83−01	4.01−01	0.041	C	LS
				[110.82]	48 366–950 760	4–6	6.95+02	1.92−01	2.80−01	−0.115	D+	LS
				[110.81]	48 330–950 760	6–6	4.97+01	9.15−03	2.00−02	−1.260	E+	LS
39	$2p^3$–$2p^2(^1\mathrm{D})4d$	^{2}D$^\circ-^2$F		*108.02*	*48 344–974 110*	10–14	3.85+02	9.43−02	3.35−01	−0.025	D+	1
				[108.02]	48 330–974 110	6–8	3.85+02	8.98−02	1.92−01	−0.269	D+	LS
				[108.02]	48 366–974 110	4–6	3.59+02	9.43−02	1.34−01	−0.423	D+	LS
				[108.02]	48 330–974 110	6–6	2.57+01	4.49−03	9.58−03	−1.570	E+	LS
40	$2p^3$–$2p^2(^1\mathrm{D})4d$?	^{2}D$^\circ-^2$D?		*[107.9]*	*48 344–974 800*	10–10	2.77+02	4.83−02	1.72−01	−0.316	D	1
				107.937	48 330–974 800	6–6	2.58+02	4.51−02	9.62−02	−0.568	D	LS
				107.941	48 366–974 800	4–4	2.49+02	4.35−02	6.18−02	−0.759	D	LS
				107.937	48 330–974 800	6–4	2.77+01	3.22−03	6.87−03	−1.714	E	LS
				107.941	48 366–974 800	4–6	1.84+01	4.83−03	6.87−03	−1.714	E	LS
41		^{2}P$^\circ-^2$D?		*[110.9]*	73 243–974 800	6–10	1.89+02	5.81−02	1.27−01	−0.458	D	1
				110.921	73 255–974 800	4–6	1.89+02	5.23−02	7.64−02	−0.679	D	LS
				110.916	73 218–974 800	2–4	1.58+02	5.81−02	4.24−02	−0.935	D	LS
				110.921	73 255–974 800	4–4	3.15+01	5.81−03	8.49−03	−1.634	E+	LS
42	$2p^3$–$2p^2(^1\mathrm{D})5d$	^{2}D$^\circ-^2$D		*100.88*	*48 344–1 039 610*	10–10	1.99+02	3.04−02	1.01−01	−0.517	D	1
				[100.88]	48 330–1 039 610	6–6	1.86+02	2.84−02	5.66−02	−0.769	D	LS
				[100.88]	48 366–1 039 610	4–4	1.80+02	2.74−02	3.64−02	−0.960	D	LS
				[100.88]	48 330–1 039 610	6–4	2.00+01	2.03−03	4.05−03	−1.914	E	LS
				[100.88]	48 366–1 039 610	4–6	1.33+01	3.04−03	4.04−03	−1.915	E	LS
43	$2s2p^4$–$2p^5$	^{4}P$-^2$P$^\circ$										
				284.534	216 896–568 348	4–4	3.48−03	4.22−06	1.58−05	−4.773	D	3
				283.658	217 440–569 977	2–2	3.83−03	4.62−06	8.63−06	−5.034	D	3
				283.698	215 860–568 348	6–4	1.45−02	1.16−05	6.53−05	−4.157	D+	3
				283.221	216 896–569 977	4–2	8.90−04	5.35−07	2.00−06	−5.670	E+	3
				284.975	217 440–568 348	2–4	8.83−04	2.15−06	4.03−06	−5.367	D	3
44		^{2}D$-^2$P$^\circ$		*369.01*	*297 894–568 891*	10–6	8.84+01	1.08−01	1.32+00	0.033	A	2,3
				369.730	297 880–568 348	6–4	7.91+01	1.08−01	7.89−01	−0.188	A	2,3
				367.565	297 916–569 977	4–2	8.82+01	8.93−02	4.32−01	−0.447	A	2,3
				369.779	297 916–568 348	4–4	9.40+00	1.93−02	9.38−02	−1.112	B+	2,3
45		^{2}S$-^2$P$^\circ$		*458.41*	*350 747–568 891*	2–6	3.99+00	3.77−02	1.14−01	−1.123	B+	2,3

TABLE 20. Transition probabilities of allowed lines for Na V (references for this table are as follows: 1 = Burke and Lennon,[12] 2 = Tachiev and Froese Fischer,[94] and 3 = Merkelis *et al.*[65])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				459.557	350 747–568 348	2–4	4.47+00	2.83−02	8.57−02	−1.247	B+	2,3
				456.142	350 747–569 977	2–2	3.02+00	9.41−03	2.83−02	−1.725	B+	2,3
46		^{2}P−^{2}P°		*510.83*	*373 131–568 891*	6–6	5.42+01	2.12−01	2.14+00	0.104	B+	2,3
				511.203	372 731–568 348	4–4	4.48+01	1.76−01	1.18+00	−0.152	B+	2,3
				510.087	373 932–569 977	2–2	3.70+01	1.44−01	4.85−01	−0.541	B+	2,3
				506.981	372 731–569 977	4–2	1.89+01	3.64−02	2.43−01	−0.837	B+	2,3
				514.361	373 932–568 348	2–4	8.46+00	6.71−02	2.27−01	−0.872	B+	2,3
47	$2s2p^4$–$2s2p^3(^5\text{S}^\circ)3s$	^{4}P−^{4}S°		*170.80*	*216 469–801 950*	12–4	2.80+02	4.08−02	2.75−01	−0.310	C	2
				170.622	215 860–801 950	6–4	1.41+02	4.09−02	1.38−01	−0.610	C	2
				170.924	216 896–801 950	4–4	9.28+01	4.06−02	9.15−02	−0.789	C	2
				171.083	217 440–801 950	2–4	4.62+01	4.05−02	4.57−02	−1.092	C	2
48	$2s2p^4$–$2s2p^3(^3\text{D}^\circ)3s$	^{4}P−^{4}D°		*151.09*	*216 469–878 320*	12–20	1.66+02	9.49−02	5.66−01	0.056	D	1
				150.953	215 860–878 320	6–8	1.67+02	7.60−02	2.27−01	−0.341	D+	LS
				151.189	216 896–878 320	4–6	1.16+02	5.97−02	1.19−01	−0.622	D+	LS
				151.313	217 440–878 320	2–4	6.90+01	4.74−02	4.72−02	−1.023	D	LS
				150.953	215 860–878 320	6–6	5.01+01	1.71−02	5.10−02	−0.989	D	LS
				151.189	216 896–878 320	4–4	8.84+01	3.03−02	6.03−02	−0.916	D	LS
				151.313	217 440–878 320	2–2	1.38+02	4.74−00	4.72−02	−1.023	D	LS
				150.953	215 860–878 320	6–4	8.34+00	1.90−03	5.67−03	−1.943	E	LS
				151.189	216 896–878 320	4–2	2.77+01	4.74−03	9.44−03	−1.722	E+	LS
49		^{2}D−^{2}D°		*167.51*	*297 894–894 860*	10–10	2.14+02	9.00−02	4.96−01	−0.046	D+	1
				167.510	297 880–894 860	6–6	2.00+02	8.40−02	2.78−01	−0.298	D+	LS
				167.520	297 916–894 860	4–4	1.93+02	8.10−02	1.79−01	−0.489	D+	LS
				167.510	297 880–894 860	6–4	2.14+01	6.00−03	1.99−02	−1.444	E+	LS
				167.520	297 916–894 860	4–6	1.43+01	9.00−03	1.99−02	−1.444	E+	LS
50	$2s2p^4$–$2s2p^3(^5\text{S}^\circ)3d$	^{4}P−^{4}D°		*144.46*	*216 469–908 710*	12–20	5.78+02	3.02−01	1.72+00	0.559	C	1
				144.331	215 860–908 710	6–8	5.79+02	2.41−01	6.87−01	0.160	C	LS
				144.548	216 896–908 710	4–6	4.04+02	1.90−01	3.62−01	−0.119	C	LS
				144.661	217 440–908 710	2–4	2.41+02	1.51−01	1.44−01	−0.520	D+	LS
				144.331	215860–908 710	6–6	1.74+02	5.43−02	1.55−01	−0.487	D+	LS
				144.548	216 896–908 710	4–4	3.08+02	9.64−02	1.83−01	−0.414	D+	LS
				144.661	217 440–908 710	2–2	4.81+02	1.51−01	1.44−01	−0.520	D+	LS
				144.331	215 860–908 710	6–4	2.90+01	6.04−03	1.72−02	−1.441	E+	LS
				144.548	216 896–908 710	4–2	9.64+01	1.51−02	2.87−02	−1.219	E+	LS
51	$2s2p^4$–$2s2p^3(^3\text{P}^\circ)3s$	^{4}P−^{4}P°		*142.33*	*216 469–919 070*	12–12	1.22+02	3.71−02	2.08−01	−0.351	D	1
				142.205	215 860–919 070	6–6	8.58+01	2.60−02	7.30−02	−0.807	D	LS
				142.415	216 896–919 070	4–4	1.62+01	4.94−03	9.26−03	−1.704	E+	LS
				142.525	217 440–919 070	2–2	2.03+01	6.17−03	5.79−03	−1.909	E	LS
				142.205	215 860–919 070	6–4	5.49+01	1.11−02	3.12−02	−1.177	D	LS
				142.415	216 896–919 070	4–2	1.01+02	1.54−02	2.89−02	−1.210	E+	LS
				142.415	216 896–919 070	4–6	3.66+01	1.67−02	3.13−02	−1.175	D	LS
				142.525	217 440–919 070	2–4	5.07+01	3.09−02	2.90−02	−1.209	E+	LS
52	$2s2p^4$–$2s2p^3(^3\text{D}^\circ)3d$	^{4}P−^{4}P°		*126.89*	*216 469–1 004 538*	12–12	1.26+03	3.04−01	1.53+00	0.562	D+	1
				126.817	215 860–1 004 400	6–6	8.83+02	2.13−01	5.34−01	0.107	C	LS
				126.948	216 896–1 004 620	4–4	1.68+02	4.06−02	6.79−02	−0.789	D	LS
				127.008	217 440–1 004 790	2–2	2.10+02	5.07−02	4.24−02	−0.994	D	LS
				126.781	215 860–1 004 620	6–4	5.69+02	9.14−02	2.29−01	−0.261	D+	LS
				126.921	216 896–1 004 790	4–2	1.05+03	1.27−01	2.12−01	−0.294	D+	LS

TABLE 20. Transition probabilities of allowed lines for Na V (references for this table are as follows: 1 = Burke and Lennon,[12] 2 = Tachiev and Froese Fischer,[94] and 3 = Merkelis *et al.*[65])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				126.983	216 896–1 004 400	4–6	3.78+02	1.37−01	2.29−01	−0.261	D+	LS
				127.036	217440–1004 620	2–4	5.23+02	2.53−01	2.12−01	−0.296	D+	LS
53		$^{4}\mathrm{P}-{}^{4}\mathrm{D}^{\circ}$		*126.30*	*216 469–1 008 210*	12–20	5.73+02	2.29−01	1.14+00	0.439	D+	1
				126.207	215 860–1 008 210	6–8	5.75+02	1.83−01	4.56−01	0.041	C	LS
				126.372	216 896–1 008 210	4–6	4.01+02	1.44−01	2.40−01	−0.240	D+	LS
				126.459	217 440–1 008 210	2–4	2.38+02	1.14−01	9.49−02	−0.642	D	LS
				126.207	215 860–1 008 210	6–6	1.73+02	4.12−02	1.03−01	−0.607	D	LS
				126.372	216 896–1 008 210	4–4	3.06+02	7.32−02	1.22−01	−0.533	D+	LS
				126.459	217 440–1 008 210	2–2	4.75+02	1.14−01	9.49−02	−0.642	D	LS
				126.207	215 860–1 008 210	6–4	2.88+01	4.58−03	1.14−02	−1.561	E+	LS
				126.372	216 896–1 008 210	4–2	9.52+01	1.14−02	1.90−02	−1.341	E+	LS
54		$^{4}\mathrm{P}-{}^{4}\mathrm{S}^{\circ}$		*126.19*	*216 469–1 008 940*	12–4	1.08+03	8.60−02	4.29−01	0.014	D+	1
				126.091	215 860–1 008 940	6–4	5.42+02	8.61−02	2.14−01	−0.287	D+	LS
				126.256	216 896–1 008 940	4–4	3.59+02	8.59−02	1.43−01	−0.464	D+	LS
				126.342	217 440–1 008 940	2–4	1.79+02	8.59−02	7.15−02	−0.765	D	LS
55		$^{2}\mathrm{D}-{}^{2}\mathrm{F}^{\circ}$		*140.22*	*297 894–1 011 056*	10–14	7.67+02	3.16−01	1.46+00	0.500	C	1
				140.258	297 880–1 010 850	6–8	7.65+02	3.01−01	8.34−01	0.257	C	LS
				140.171	297 916–1 011 330	4–6	7.17+02	3.17−01	5.85−01	0.103	C	LS
				140.164	297 880–1 011 330	6–6	5.13+01	1.51−02	4.18−02	−1.043	D	LS
56	$2p^5-2s^22p^2(^3\mathrm{P})3s$	$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{P}$		*868.5*	*568 891–684 035*	6–6	2.70−04	3.06−06	5.25−05	−4.736	C+	2
				861.43	568 348–684 434	4–4	2.24−04	2.50−06	2.83−05	−5.000	C+	2
				882.92	569 977–683 238	2–2	1.88−04	2.20−06	1.28−05	−5.357	C+	2
				870.40	568 348–683 238	4–2	9.17−05	5.21−07	5.97−06	−5.681	C	2
				873.69	569 977–684 434	2–4	4.09−05	9.36−07	5.39−06	−5.728	C	2
57	$2p^5-2s^22p^2(^1\mathrm{D})3s$	$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{D}$		*708.5*	*568 891–710 039*	6–10	2.55−04	3.20−06	4.48−05	−4.717	C+	2
				705.76	568 348–710 039	4–6	2.57−04	2.88−06	2.67−05	−4.939	C+	2
				713.97	569 977–710 039	2–4	2.11−04	3.23−06	1.52−05	−5.190	C+	2
				705.76	568 348–710 039	4–4	4.15−05	3.10−07	2.88−06	−5.907	C	2
58	$2p^5-2s^22p^2(^1\mathrm{S})3s$	$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{S}$		*553.98*	*568 891–749 402*	6–2	2.98−03	4.57−06	5.00−05	−4.562	C+	2
				552.321	568 348–749 402	4–2	2.04−03	4.67−06	3.40−05	−4.729	C+	2
				557.336	569 977–749 402	2–2	9.38−04	4.37−06	1.60−05	−5.058	C+	2
59	$2s^22p^2(^3\mathrm{P})3s-$ $2s2p^3(^5\mathrm{S}^{\circ})3s$	$^{4}\mathrm{P}-{}^{4}\mathrm{S}^{\circ}$		*770.5*	*672 165–801 950*	12–4	4.01+00	1.19−02	3.62−01	−0.845	C	2
				774.04	672 757–801 950	6–4	1.97+00	1.18−02	1.81−01	−1.150	C	2
				768.29	671 790–801 950	4–4	1.35+00	1.19−02	1.21−01	−1.322	C	2
				764.44	671 136–801 950	2–4	6.88−01	1.21−02	6.07−02	−1.616	C	2
60	$2s^22p^2(^3\mathrm{P})3s-$ $2s2p^3(^3\mathrm{D}^{\circ})3s$	$^{4}\mathrm{P}-{}^{4}\mathrm{D}^{\circ}$		*485.07*	*672 165–878 320*	12–20	2.45+01	1.44−01	2.76+00	0.238	C	1
				486.469	672 757–878 320	6–8	2.43+01	1.15−01	1.11+00	−0.161	C	LS
				484.191	671 790–878 320	4–6	1.73+01	9.10−02	5.80−01	−0.439	C	LS
				482.663	671 136–878 320	2–4	1.04+01	7.25−02	2.30−01	−0.839	D+	LS
				486.469	672 757–878 320	6–6	7.30+00	2.59−02	2.49−01	−0.809	D+	LS
				484.191	671 790–878 320	4–4	1.31+01	4.62−02	2.95−01	−0.733	C	LS
				482.663	671 136–878 320	2–2	2.08+01	7.25−02	2.30−01	−0.839	D+	LS
				486.469	672 757–878 320	6–4	1.22+00	2.88−03	2.77−02	−1.762	E+	LS
				484.191	671 790–878 320	4–2	4.11+00	7.22−03	4.60−02	−1.539	D	LS

TABLE 20. Transition probabilities of allowed lines for Na V (references for this table are as follows: 1 = Burke and Lennon,[12] 2 = Tachiev and Froese Fischer,[94] and 3 = Merkelis *et al.*[65])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
61		^{2}P–^{2}D$^\circ$		*474.33*	*684 035–894 860*	6–10	8.81+00	4.95−02	4.64−01	−0.527	D+	1
				475.226	684 434–894 860	4–6	8.76+00	4.45−02	2.78−01	−0.750	D+	LS
				472.541	683 238–894 860	2–4	7.42+00	4.97−02	1.55−01	−1.003	D+	LS
				475.226	684 434–894 860	4–4	1.46+00	4.95−03	3.10−02	−1.703	D	LS
62	$2s^22p^2(^3P)3s$–$2s2p^3(^3P^\circ)3s$	^{4}P–^{4}P$^\circ$		*405.01*	*672 165–919 070*	12–12	1.51+01	3.72−02	5.95−01	−0.350	D	1
				405.988	672 757–919 070	6–6	1.05+01	2.60−02	2.09−01	−0.807	D+	LS
				404.400	671 790–919 070	4–4	2.03+00	4.97−03	2.65−02	−1.702	E+	LS
				403.333	671 136–919 070	2–2	2.55+00	6.23−03	1.65−02	−1.904	E+	LS
				405.988	672 757–919 070	6–4	6.74+00	1.11−02	8.90−02	−1.177	D	LS
				404.400	671 790–919 070	4–2	1.26+01	1.55−02	8.25−02	−1.208	D	LS
				404.400	671 790–919 070	4–6	4.57+00	1.68−02	8.95−02	−1.173	D	LS
				403.333	671 136–919 070	2–4	6.40+00	3.12−02	8.29−02	−1.205	D	LS
63	$2s^22p^2(^3P)3s$–$2s2p^3(^3D^\circ)3d$	^{4}P–^{4}S$^\circ$		*296.93*	*672 165–1 008 940*	12–4	1.90+01	8.39−03	9.85−02	−0.997	D	1
				297.457	672 757–1 008 940	6–4	9.48+00	8.38−03	4.92−02	−1.299	D	LS
				296.604	671 790–1 008 940	4–4	6.37+00	8.40−03	3.28−02	−1.474	D	LS
				296.030	671 136–1 008 940	2–4	3.20+00	8.42−03	1.64−02	−1.774	E+	LS
64	$2s^22p^2(^1D)3s$–$2s2p^3(^3D^\circ)3s$	^{2}D–^{2}D$^\circ$		*541.06*	*710 039–894 860*	10–10	2.51+00	1.10−02	1.96−01	−0.959	D	1
				541.064	710 039–894 860	6–6	2.35+00	1.03−02	1.10−01	−1.209	D+	LS
				541.064	710 039–894 860	4–4	2.26+00	9.90−03	7.05−02	−1.402	D	LS
				541.064	710 039–894 860	6–4	2.51−01	7.33−04	7.83−03	−2.357	E+	LS
				541.064	710 039–894 860	4–6	1.67−01	1.10−03	7.84−03	−2.357	E+	LS
65	$2s^22p^2(^3P)3d$–$2s2p^3(^5S^\circ)3s$	^{2}F–^{4}S$^\circ$										
				3891 cm^{-1}	798 059–801 950	6–4	4.15−05	2.74−04	1.39−01	−2.784	C	2
66		^{4}P–^{4}S$^\circ$		*3 513 cm^{-1}*	*798 437*–801 950	12–4	2.22−04	8.99−04	1.01+00	−1.967	C+	2
				3 776 cm^{-1}	798174–801 950	6–4	1.17−04	8.18−04	4.28−01	−2.309	C+	2
				3 330 cm^{-1}	798 620–801 950	4–4	7.23−05	9.77−04	3.86−01	−2.408	C+	2
				3 088 cm^{-1}	798 862–801 950	2–4	2.93−05	9.20−04	1.96−01	−2.735	C	2
67	$2s^22p^2(^3P)3d$–$2s2p^3(^3D^\circ)3s$	^{2}F–^{2}D$^\circ$		*1 040.6*	*798 765–894 860*	14–10	1.95−01	2.26−03	1.09−01	−1.500	D	1
				1 046.41	799 295–894 860	8–6	1.83−01	2.25−03	6.20−02	−1.745	D	LS
				1 033.05	798 059–894 860	6–4	2.00−01	2.13−03	4.35−02	−1.893	D	LS
				1 033.05	798 059–894 860	6–6	9.50−03	1.52−04	3.10−03	−3.040	E	LS
68	$2s^22p^2(^3P)3d$–$2s2p^3(^3P^\circ)3s$	^{4}D–^{4}P$^\circ$				20–12						1
				819.60	797 060–919 070	6–4	1.36+00	9.13−03	1.48−01	−1.261	D+	LS
				819.60	797 060–919 070	4–2	1.08+00	5.43−03	5.86−02	−1.663	D	LS
				819.60	797 060–919 070	6–6	3.88−01	3.91−03	6.33−02	−1.630	D	LS
				819.60	797060–919 070	4–4	6.91−01	6.96−03	7.51−02	−1.555	D	LS
				821.02	797 270–919 070	2–2	1.08+00	1.09−02	5.89−02	−1.662	D	LS
				819.60	797060–919 070	4–6	4.32−02	6.52−04	7.04−03	−2.584	E+	LS
				821.02	797 270–919 070	2–4	1.07−01	2.17−03	1.17−02	−2.363	E+	LS
69		^{4}P–^{4}P$^\circ$		*829.0*	*798 437–919 070*	12–12	1.19+00	1.23−02	4.02−01	−0.831	D	1

TABLE 20. Transition probabilities of allowed lines for Na V (references for this table are as follows: 1 = Burke and Lennon,[12] 2 = Tachiev and Froese Fischer,[94] and 3 = Merkelis *et al.*[65])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				827.16	798174–919 070	6–6	8.39−01	8.61−03	1.41−01	−1.287	D+	LS
				830.22	798 620–919 070	4–4	1.58−01	1.63−03	1.78−02	−2.186	E+	LS
				831.89	798 862–919 070	2–2	1.97−07	2.04−03	1.12−02	−2.389	E+	LS
				827.16	798 174–919 070	6–4	5.40−01	3.69−03	6.03−02	−1.655	D	LS
				830.22	798 620–919 070	4–2	9.89−01	5.11−03	5.59−02	−1.690	D	LS
				830.22	798 620–919 070	4–6	3.55−01	5.51−03	6.02−02	−1.657	D	LS
				831.89	798 862–919 070	2–4	4.92−01	1.02−02	5.59−02	−1.690	D	LS
70	$2s^22p^2(^3P)3d$– $2s2p^3(^3D^\circ)3d$	$^4D-^4D^\circ$				20–20						1
				473.597	797 060–1 008 210	6–6	5.32+00	1.79−02	1.67−01	−0.969	D+	LS
				473.597	797 060–1 008 210	4–4	3.72+00	1.25−02	7.80−02	−1.301	D	LS
				474.068	797 270–1 008 210	2–2	4.63+00	1.56−02	4.87−02	−1.506	D	LS
				473.597	797 060–1 008 210	6–4	3.26+00	7.30−03	6.83−02	−1.359	D	LS
				473.597	797 060–1 008 210	4–2	4.65+00	7.82−03	4.88−02	−1.505	D	LS
				473.597	797 060–1 008 210	6–8	1.32+00	5.94−03	5.56−02	−1.448	D	LS
				473.597	797 060–1 008 210	4–6	2.16+00	1.09−02	6.80−02	−1.361	D	LS
				474.068	797 270–1 008 210	2–4	2.32+00	1.56−02	4.87−02	−1.506	D	LS
71		$^2F-^2F^\circ$		*471.05*	*798 765–1 011 056*	14–14	6.59+00	2.19−02	4.76−01	−0.513	D+	1
				472.690	799 295–1 010 850	8–8	5.76+00	1.93−02	2.40−01	−0.811	D+	LS
				468.887	798 059–1 011 330	6–6	7.13+00	2.35−02	2.18−01	−0.851	D+	LS
				471.620	799 295–1 011 330	8–6	2.86−01	7.16−04	8.89−03	−2.242	E+	LS
				469.945	798 059–1 010 850	6–8	2.17−01	9.58−04	8.89−03	−2.240	E+	LS
72		$^4P-^4P^\circ$		*485.20*	*798 437–1 004 538*	12–12	1.10+01	3.89−02	7.45−01	−0.331	D+	1
				484.905	798 174–1 004 400	6–6	7.72+00	2.72−02	2.61−01	−0.787	D+	LS
				485.437	798 620–1 004 620	4–4	1.47+00	5.18−03	3.31−02	−1.684	D	LS
				485.607	798 862–1 004 790	2–2	1.83+00	6.47−03	2.07−02	−1.888	E+	LS
				484.388	798 174–1 004 620	6–4	4.99+00	1.17−02	1.12−01	−1.154	D+	LS
				485.037	798 620–1 004 790	4–2	9.19+00	1.62−02	1.03−01	−1.188	D	LS
				485.956	798 620–1 004 400	4–6	3.30+00	1.75−02	1.12−01	−1.155	D+	LS
				486.008	798 862–1 004 620	2–4	4.56+00	3.23−02	1.03−01	−1.190	D	LS
73		$^4P-^4D^\circ$		*476.71*	*798 437–1 008 210*	12–20	4.38+00	2.49−02	4.69−01	−0.525	D	1
				476.109	798 174–1 008 210	6–8	4.39+00	1.99−02	1.87−01	−0.923	D+	LS
				477.122	798 620–1 008 210	4–6	3.07+00	1.57−02	9.86−02	−1.202	D	LS
				477.674	798 862–1 008 210	2–4	1.81+00	1.24−02	3.90−02	−1.606	D	LS
				476.109	798 174–1 008 210	6–6	1.32+00	4.49−03	4.22−02	−1.570	D	LS
				477.122	798 620–1 008 210	4–4	2.33+00	7.96−03	5.00−02	−1.497	D	LS
				477.674	798 862–1 008 210	2–2	3.62+00	1.24−02	3.90−02	−1.606	D	LS
				476.109	798 174–1 008 210	6–4	2.20−01	4.98−04	4.68−03	−2.525	E	LS
				477.122	798 620–1 008 210	4–2	7.27−01	1.24−03	7.79−03	−2.305	E+	LS
74		$^4P-^4S^\circ$		*475.05*	*798 437*–1 008 940	12–4	1.59+01	1.79−02	3.36−01	−0.668	D+	1
				474.460	798 174–1 008 940	6–4	7.96+00	1.79−02	1.68−01	−0.969	D+	LS
				475.466	798 620–1 008 940	4–4	5.28+00	1.79−02	1.12−01	−1.145	D+	LS
				476.014	798 862–1 008 940	2–4	2.63+00	1.79−02	5.61−02	−1.446	D	LS
75	$2s2p^3(^5S^\circ)3s$– $2s2p^3(^5S^\circ)3p$	$^4S^\circ-^4P$	*2 193*	*2 194*	801 950–847 539	4–12	2.07+00	4.47−01	1.29+01	0.252	B+	2
			2 192.8	2 193.5	801 950–847 539	4–6	2.07+00	2.24−01	6.46+00	−0.048	B+	2
			2 192.8	2 193.5	801 950–847 539	4–4	2.07+00	1.49−01	4.30+00	−0.225	B+	2
			2 192.8	2 193.5	801 950–847 539	4–2	2.07+00	7.45−02	2.15+00	−0.526	B	2

TABLE 20. Transition probabilities of allowed lines for Na V (references for this table are as follows: 1 = Burke and Lennon,[12] 2 = Tachiev and Froese Fischer,[94] and 3 = Merkelis *et al.*[65])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
76	$2s2p^3(^5S^\circ)3s$–$2s^22p^2(^3P)4s$	$^4S^\circ$–^4P				4–12						1
				1 088.49	801 950–893 820	4–6	5.18−01	1.38−02	1.98−01	−1.258	D+	LS
				1 107.54	801 950–892 240	4–2	4.90−01	4.51−03	6.58−02	−1.744	D	LS
77	$2s2p^3(^5S^\circ)3s$–$2s^22p^2(^3P)4d$	$^4S^\circ$–^4P				4–12						1
				720.62	801 950–940 720	4–6	2.80+00	3.27−02	3.10−01	−0.883	C	LS
				719.53	801 950–940 930	4–4	2.81+00	2.18−02	2.07−01	−1.059	D+	LS
78	$2s^22p^2(^1D)3d$–$2s2p^3(^3D^\circ)3s$	^2F–$^2D^\circ$		*1 526.5*	*829 352–894 860*	14–10	3.35−0.1	8.35−03	5.87−01	−0.932	D+	1
				1 524.60	829 269–894 860	8–6	3.20−01	8.36−03	3.36−01	−1.175	C	LS
				1 529.12	829 463–894 860	6–4	3.33−01	7.78−03	2.35−01	−1.331	D+	LS
				1 529.12	829 463–894 860	6–6	1.59−02	5.56−04	1.68−02	−2.477	E+	LS
79		^2D–$^2D^\circ$		*1 614.8*	*832 931–894 860*	10–10	1.13−01	4.43−03	2.35−01	−1.354	D	1
				1 616.24	832 988–894 860	6–6	1.05−01	4.13−03	1.32−01	−1.606	D+	LS
				1 612.54	832 846–894 860	4–4	1.02−01	3.99−03	8.47−02	−1.797	D	LS
				1 616.24	832 988–894 860	6–4	1.13−02	2.95−04	9.42−03	−2.752	E+	LS
				1 612.54	832 846–894 860	4–6	7.59−03	4.44−04	9.43−03	−2.751	E+	LS
80	$2s2p^3(^5S^\circ)3p$–$2s2p^3(^3D^\circ)3s$	^4P–$^4D^\circ$	*3 248*	*3 249*	*847 539–878 320*	12–20	3.08−03	8.11−04	1.04−01	−2.012	E+	1
			3 247.8	3 248.8	847 539–878 320	6–8	3.08−03	6.49−04	4.16−02	−2.410	D	LS
			3 247.8	3 248.8	847 539–878 320	4–6	2.15−03	5.11−04	2.19−02	−2.690	E+	LS
			3 247.8	3 248.8	847 539–878 320	2–4	1.28−03	4.06−04	8.68−03	−3.090	E+	LS
			3 247.8	3 248.8	847 539–878 320	6–6	9.23−04	1.46−04	9.37−03	−3.057	E+	LS
			3 247.8	3 248.8	847 539–878 320	4–4	1.64−03	2.60−04	1.11−02	−2.983	E+	LS
			3 247.8	3 248.8	847 539–878 320	2–2	2.57−03	4.06−04	8.68−03	−3.090	E+	LS
			3 247.8	3 248.8	847 539–878 320	6–4	1.54−04	1.62−05	1.04−03	−4.012	E	LS
			3 247.8	3 248.8	847 539–878 320	4–2	5.13−04	4.06−05	1.74−03	−3.789	E	LS
81	$2s2p^3(^5S^\circ)3p$–$2s2p^3(^5S^\circ)3d$	^4P–$^4D^\circ$		*1 634.8*	*847 539–908 710*	12–20	7.01+00	4.68−01	3.02+01	0.749	B	1
				1 634.76	847 539–908 710	6–8	7.00+00	3.74−01	1.21+01	0.351	C+	LS
				1 634.76	847 539–908 710	4–6	4.91+00	2.95−01	6.35+00	0.072	B	LS
				1 634.76	847 539–908 710	2–4	2.92+00	2.34−01	2.52+00	−0.330	C+	LS
				1 634.76	847 539–908 710	6–6	2.10+00	8.42−02	2.72+00	−0.297	C+	LS
				1 634.76	847 539–908 710	4–4	3.74+00	1.50−01	3.23+00	−0.222	B	LS
				1 634.76	847 539–908 710	2–2	5.84+00	2.34−01	2.52+00	−0.330	C+	LS
				1 634.76	847 539–908 710	6–4	3.50−01	9.36−03	3.02−01	−1.251	C	LS
				1 634.76	847 539–908 710	4–2	1.17+00	2.34−02	5.04−01	−1.029	C	LS
82	$2s2p^3(^5S^\circ)3p$–$2s2p^3(^3D^\circ)3d$	^4P–$^4P^\circ$		*636.9*	*847 539–1 004 538*	12–12	1.68+00	1.03−02	2.58−01	−0.908	D	1
				637.51	847 539–1 004 400	6–6	1.18+00	7.17−03	9.03−02	−1.366	D	LS
				636.61	847 539–1 004 620	4–4	2.25−01	1.37−03	1.15−02	−2.261	E+	LS
				635.93	847 539–1 004 790	2–2	2.82−01	1.71−03	7.16−03	−2.466	E+	LS
				636.61	847 539–1 004 620	6–4	7.60−01	3.08−03	3.87−02	−1.733	D	LS
				635.93	847 539–1 004 790	4–2	1.41+00	4.28−03	3.58−02	−1.766	D	LS
				637.51	847 539–1 004 400	4–6	5.04−01	4.61−03	3.87−02	−1.734	D	LS
				636.61	847 539–1 004 620	2–4	7.04−01	8.55−03	3.58−02	−1.767	D	LS

TABLE 20. Transition probabilities of allowed lines for Na V (references for this table are as follows: 1 = Burke and Lennon,[12] 2 = Tachiev and Froese Fischer,[94] and 3 = Merkelis *et al.*[65])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
83	$2s^22p^2(^1S)3d$–$2s2p^3(^3D^\circ)3d$	$^2D-^2F^\circ$		*696.7*	*867 530–1 011 056*	10–14	2.59−01	2.64−03	6.06−02	−1.578	E+	1
				[697.7]	867 530–1 010 850	6–8	2.58−01	2.51−03	3.46−02	−1.822	D	LS
				[695.4]	867 530–1 011 330	4–6	2.44−01	2.65−03	2.43−02	−1.975	E+	LS
				[695.4]	867 530–1 011 330	6–6	1.74−02	1.26−04	1.73−03	−3.121	E	LS
84	$2s2p^3(^3D^\circ)3s$–$2s^22p^2(^3P)4s$	$^4D^\circ-^4P$				20–12						1
			6 450	6 452	878 320–893 820	8–6	1.95−02	9.11−03	1.55+00	−1.137	C+	LS
			7 182	7 184	878 320–892 240	4–2	8.81−03	3.41−03	3.23−01	−1.865	C	LS
			6 450	6 452	878 320–893 820	6–6	4.37−03	2.73−03	3.48−01	−1.786	C	LS
			7 182	7 184	878 320–892 240	2–2	8.81−03	6.82−03	3.23−01	−1.865	C	LS
			6 450	6 452	878 320–893 820	4–6	4.87−04	4.56−04	3.87−02	−2.739	D	LS
85		$^2D^\circ-^2P$		*2 652 cm^{-1}*	*894 860–897 512*	10–6	3.04−05	3.89−04	4.84−01	−2.410	D+	1
				[3 050]	894 860–897 910	6–4	4.17−05	4.48−04	2.90−01	−2.571	D+	LS
				[1 855]	894 860–896 715	4–2	1.04−05	2.27−04	1.61−01	−3.042	D+	LS
				[3 050]	894 860–897 910	4–4	4.64−06	7.47−05	3.23−02	−3.525	D	LS
86	$2s2p^3(^3D^\circ)3s$–$2s^22p^2(^1D)4s$	$^2D^\circ-^2D$	*2 943*	*2 944*	*894 860–928 830*	10–10	1.50−01	1.95−02	1.89+00	−0.710	C	1
			[2 943]	[2 944]	894 860–928 830	6–6	1.40−01	1.82−02	1.06+00	−0.962	C	LS
			[2 943]	[2 944]	894 860–928 830	4–4	1.35−01	1.75−02	6.78−01	−1.155	C	LS
			[2 943]	[2 944]	894 860–928 830	6–4	1.50−02	1.30−03	7.56−02	−2.108	D	LS
			[2 943]	[2 944]	894 860–928 830	4–6	1.00−02	1.95−03	7.56−02	−2.108	D	LS
87	$2s2p^3(^3D^\circ)3s$–$2s^22p^2(^3P)4d$	$^4D^\circ-^4D$				20–20						1
				1 646.36	878 320–939 060	6–6	2.90−02	1.18−03	3.84−02	−2.150	D	LS
				1 646.36	878 320–939 060	4–4	2.02−02	8.21−04	1.78−02	−2.484	E+	LS
				1 624.96	878 320–939 860	2–2	2.63−02	1.04−03	1.11−02	−2.682	E+	LS
				1 646.36	878 320–939 060	8–6	9.61−03	2.93−04	1.27−02	−2.630	E+	LS
				1 646.36	878 320–939 060	6–4	1.77−02	4.79−04	1.56−02	−2.542	E+	LS
				1 624.96	878 320–939 860	4–2	2.63−02	5.20−04	1.11−02	−2.682	E+	LS
				1 646.36	878 320–939 060	4–6	1.18−02	7.19−04	1.56−02	−2.541	E+	LS
				1 646.36	878 320–939 060	2–4	1.27−02	1.03−03	1.12−02	−2.686	E+	LS
88		$^2D^\circ-^2P$				10–6						1
			[2 295]	[2 295]	894 860–938 430	6–4	3.42−01	1.80−02	8.16−01	−0.967	C	LS
			[2 295]	[2 295]	894 860–938 430	4–4	3.80−02	3.00−03	9.07−02	−1.921	D	LS
89		$^2D^\circ-^2F$				10–14						1
			[2 114]	[2 115]	894 860–942 150	6–8	1.44−00	1.29−01	5.39+00	−0.111	B	LS
90	$2s2p^3(^3D^\circ)3s$–$2s2p^3(^3D^\circ)3p$	$^2D^\circ-^2F$		*1 799*	*894 860–950 451*	10–14	1.77−00	1.20−01	7.12+00	0.079	B	1
				1 806.4	894 860–950 220	6–8	1.75+00	1.14−01	4.07+00	−0.165	B	LS
				[1 789]	894 860–950 760	4–6	1.68+00	1.21−01	2.85+00	−0.315	C+	LS
				[1 789]	894 860–950 760	6–6	1.20+01	5.78−03	2.04−01	−1.460	D+	LS
91	$2s2p^3(^3D^\circ)3s$–$2s^22p^2(^1D)4d$	$^2D^\circ-^2F$		*1 261.8*	*894 860–974 110*	10–14	1.16+00	3.89−02	1.62+00	−0.410	C	1
				[1 261.8]	894 860–974 110	6–8	1.17+00	3.71−02	9.25−01	−0.652	C	LS
				[1 261.8]	894 860–974 110	4–6	1.09+00	3.89−02	6.46−01	−0.808	C	LS

TABLE 20. Transition probabilities of allowed lines for Na V (references for this table are as follows: 1 = Burke and Lennon,[12] 2 = Tachiev and Froese Fischer,[94] and 3 = Merkelis *et al.*[65])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				[1 261.8]	894 860–974 110	6–6	7.75−02	1.85−03	4.61−02	−1.955	D	LS
92	$2s2p^3(^3D^\circ)3s$– $2s^22p^2(^1D)4d$?	$^2D^\circ-^2D$?		*[1 251]*	894 860–974 800	10–10	1.52+00	3.58−02	1.47+00	−0.446	C	1
				1 250.94	894 860–974 800	6–6	1.42+00	3.34−02	8.25−01	−0.698	C	LS
				1 250.94	894 860–974 800	4–4	1.37+00	3.22−02	5.30−01	−0.890	C	LS
				1 250.94	894 860–974 800	6–4	1.52+01	2.38−03	5.88−02	−1.845	D	LS
				1 250.94	894 860–974 800	4–6	1.01−01	3.57−03	5.88−02	−1.845	D	LS
93	$2s2p^3(^3D^\circ)3s$– $2s^22p^2(^1D)5d$	$^2D^\circ-^2D$		*690.8*	*894 860–1 039 610*	10–10	4.09−01	2.93−03	6.66−02	−1.533	E+	1
				[690.9]	894 860–1 039 610	6–6	3.82−01	2.73−03	3.73−02	−1.786	D	LS
				[690.9]	894 860–1 039 610	4–4	3.69−01	2.64−03	2.40−02	−1.976	E+	LS
				[690.9]	894 860–1 039 610	6–4	4.09−02	1.95−04	2.66−03	−2.932	E	LS
				[690.9]	894 860–1 039 610	4–6	2.73−02	2.93−04	2.67−03	−2.931	E	LS
94	$2s^22p^2(^3P)4s$– $2s2p^3(^3P^\circ)3s$	$^4P-^4P^\circ$				12–12						1
			3 959.3	3 960.4	893 820–919 070	6–6	2.75−01	6.47−02	5.06+00	−0.411	B	LS
			3 726.1	3 727.2	892 240–919 070	2–2	7.87−02	1.64−02	4.02−01	−1.484	C	LS
			3 959.3	3 960.4	893 820–919 070	6–4	1.77−01	2.77−02	2.17+00	−0.779	C+	LS
			3 726.1	3 727.2	892 240–919 070	2–4	1.96−01	8.18−02	2.01+00	−0.786	C+	LS
95	$2s^22p^2(^3P)4s$– $2s2p^3(^3D^\circ)3d$	$^4P-^4D^\circ$				12–20						1
				874.20	893 820–1 008 210	6–8	2.11−01	3.22−03	5.56−02	−1.714	D	LS
				862.29	892 240–1 008 210	2–4	9.15−02	2.04−03	1.16−02	−2.389	E+	LS
				874.20	893 820–1 008 210	6–6	6.32−02	7.24−04	1.25−02	−2.362	E+	LS
				862.29	892 240–1 008 210	2–2	1.83−01	2.04−03	1.16−02	−2.389	E+	LS
				874.20	893 820–1 008 210	6–4	1.05−02	8.05−05	1.39−03	−3.316	E	LS
96	$2s2p^3(^3P^\circ)3s$– $2s^22p^2(^3P)4d$	$^4P^\circ-^4D$				12–20						1
			5 001.1	5 002.5	919 070–939 060	4–6	1.46−01	8.24−02	5.43+00	−0.482	B	LS
			5 001.1	5 002.5	919 070–939 060	2–4	8.72−02	6.54−02	2.15+00	−0.883	C+	LS
			5 001.1	5 002.5	919 070–939 060	6–6	6.26−02	2.35−02	2.32+00	−0.851	C+	LS
			5 001.1	5 002.5	919 070–939 060	4–4	1.11−01	4.18−02	2.75+00	−0.777	C+	LS
			4 808.7	4 810.0	919 070–939 860	2–2	1.96−01	6.80−02	2.15+00	−0.866	C+	LS
			5 001.1	5 002.5	919 070–939 060	6–4	1.05−02	2.62−03	2.59−01	−1.804	D+	LS
			4 808.7	4 810.0	919 070–939 860	4–2	3.92−02	6.80−03	4.31−01	−1.565	C	LS
97		$^4P^\circ-^4P$				12–12						1
			4 617.6	4 618.9	919 070–940 720	6–6	1.23−01	3.95−02	3.60+00	−0.625	B	LS
			4 573.3	4 574.6	919 070–940 930	4–4	2.42−02	7.59−03	4.57−01	−1.518	C	LS
			4 573.3	4 574.6	919 070–940 930	6–4	8.18−02	1.71−02	1.55+00	−0.989	C+	LS
			4 617.6	4 618.9	919 070–940 720	4–6	5.29−02	2.54−02	1.54+00	−0.993	C+	LS
			4 573.3	4 574.6	919 070–940 930	2–4	7.55−02	4.74−02	1.43+00	−1.023	C+	LS
98	$2s^22p^2(^1D)4s$– $2s2p^3(^3D^\circ)3d$	$^2D-^2F^\circ$		*1 216.2*	*928 830–1 011 056*	10–14	6.76−02	2.10−03	8.40−02	−1.678	D	1
				[1 219.2]	928 830–1 010 850	6–8	6.70−02	1.99−03	4.79−02	−1.923	D	LS
				[1 212.1]	928 830–1 011 330	4–6	6.39−02	2.11−03	3.37−02	−2.074	D	LS
				[1 212.1]	928 830–1 011 330	6–6	4.54−03	1.00−04	2.39−03	−3.222	E	LS

TABLE 20. Transition probabilities of allowed lines for Na V (references for this table are as follows: 1 = Burke and Lennon,[12] 2 = Tachiev and Froese Fischer,[94] and 3 = Merkelis *et al.*[65])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})$^{\mathrm{a}}$	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
99	$2s^22p^2(^3\mathrm{P})4d$– $2s2p^3(^3\mathrm{D}^\circ)3d$	$^4\mathrm{P}-{}^4\mathrm{P}^\circ$				12–12						1
				1 570.35	940 720–1 004 400	6–6	8.01−02	2.96−03	9.18−02	−1.751	D	LS
				1 570.11	940 930–1 004 620	4–4	1.53−02	5.64−04	1.17−02	−2.647	E+	LS
				1 564.95	940 720–1 004 620	6–4	5.19−02	1.27−03	3.93−02	−2.118	D	LS
				1 565.93	940 930–1 004 790	4–2	9.63−02	1.77−03	3.65−02	−2.150	D	LS
				1 575.55	940 930–1 004 400	4–6	3.40−02	1.90−03	3.94−02	−2.119	D	LS
100		$^4\mathrm{P}-{}^4\mathrm{D}^\circ$				12–20						1
				1 481.70	940 720–1 008 210	6–8	3.42−01	1.50−02	4.39−01	−1.046	C	LS
				1 486.33	940 930–1 008 210	4–6	2.38−01	1.18−02	2.31−01	−1.326	D+	LS
				1 481.70	940 720–1 008 210	6–6	1.03−01	3.38−03	9.89−02	−1.693	D	LS
				1 486.33	940 930–1 008 210	4–4	1.81−01	5.99−03	1.17−01	−1.621	D+	LS
				1 481.70	940 720–1 008 210	6–4	1.71−02	3.76−04	1.10−02	−2.647	E+	LS
				1 486.33	940 930–1 008 210	4–2	5.65−02	9.36−04	1.83−02	−2.427	E+	LS
101		$^2\mathrm{F}-{}^2\mathrm{F}^\circ$				14–14						1
				[1 455.6]	942 150–1 010 850	8–8	2.27−00	7.22−02	2.77+00	−0.238	C+	LS
				[1 445.5]	942 150–1 011 330	8–6	1.14−01	2.69−03	1.02−01	−1.667	D	LS
102		$^2\mathrm{D}-{}^2\mathrm{F}^\circ$		*1 513.3*	*944 976–1 011 056*	10–14	3.43−01	1.65−02	8.21−01	−0.783	C	1
				1 520.91	945 100–1 010 850	6–8	3.37−01	1.56−02	4.69−01	−1.029	C	LS
				1 502.86	944 790–1 011 330	4–6	3.27−01	1.66−02	3.29−01	−1.178	C	LS
				1 509.89	945 100–1 011 330	6–6	2.31−02	7.88−04	2.35−02	−2.325	E+	LS
103	$2s2p^3(^3\mathrm{D}^\circ)3p$– $2s2p^3(^3\mathrm{D}^\circ)3d$	$^2\mathrm{F}-{}^2\mathrm{F}^\circ$		*1 650.0*	*950 451–1 011 056*	14–14	1.58−00	6.46−02	4.91+00	−0.044	C+	1
				1 649.35	950 220–1 010 850	8–8	1.40−00	5.71−02	2.48+00	−0.340	C+	LS
				[1 651.0]	950 760–1 011 330	6–6	1.69−00	6.90−02	2.25+00	−0.383	E+	LS
				1 636.39	950 220–1 011 330	8–6	7.07−02	2.13−03	9.18−02	−1.769	D	LS
				[1 664.2]	950 760–1 010 850	6–8	5.04−02	2.79−03	9.17−02	−1.776	D	LS
104	$2s^22p^2(^1\mathrm{D})4d$– $2s2p^3(^3\mathrm{D}^\circ)3d$	$^2\mathrm{F}-{}^2\mathrm{F}^\circ$	*2 706*	*2 707*	*974 110–1 011 056*	14–14	6.80−03	7.47−04	9.32−02	−1.981	D	1
			[2 721]	[2 722]	974 110–1 010 850	8–8	5.91−03	6.56−04	4.70−02	−2.280	D	LS
			[2 686]	[2 687]	974 110–1 011 330	6–6	7.44−03	8.05−04	4.27−02	−2.316	D	LS
			[2 686]	[2 687]	974 110–1 011 330	8–6	3.03−04	2.46−05	1.74−03	−3.706	E	LS
			[2 721]	[2 722]	974 110–1 010 850	6–8	2.19−04	3.24−05	1.74−03	−3.711	E	LS
105	$2s^22p^2(^1\mathrm{D})4d$?– $2s2p^3(^3\mathrm{D}^\circ)3d$	$^2\mathrm{D}?-{}^2\mathrm{F}^\circ$	*2 757*	*2 758*	*974 800–1 011 056*	10–14	2.07−02	3.30−03	3.00−01	−1.481	D+	1
			2 773.1	2 773.9	974 800–1 010 850	6–8	2.03−02	3.13−03	1.72−01	−1.726	D+	LS
			2 736.7	2 737.5	974 800–1 011 330	4–6	1.98−02	3.33−03	1.20−01	−1.875	B+	LS
			2 736.7	2 737.5	974 800–1 011 330	6–6	1.41−03	1.58−04	8.54−03	−3.023	E+	LS
106	$2s2p^3(^3\mathrm{D}^\circ)3d$– $2s^22p^2(^1\mathrm{D})5d$	$^2\mathrm{F}^\circ-{}^2\mathrm{F}$	*3 581*	*3 582*	*1 011 056–1 038 970*	14–14	3.20−03	6.16−04	1.02−01	−2.064	D	1
			[3 555]	[3 556]	1 010 850–1 038 970	8–8	2.89−03	5.48−04	5.13−02	−2.358	D	LS
			[3 617]	[3 618]	1 011 330–1 038 970	6–6	3.32−03	6.52−04	4.66−02	−2.408	D	LS
			[3 555]	[3 556]	1 010 850–1 038 970	8–6	1.43−04	2.03−05	1.90−03	−3.789	E	LS
			[3 617]	[3 618]	1 011 330–1 038 970	6–8	1.02−04	2.66−05	1.90−03	−3.797	E	LS
107		$^2\mathrm{F}^\circ-{}^2\mathrm{D}$	*3 501*	*3 502*	*1 011 056–1 039 610*	14–10	2.62−03	3.44−04	5.56−02	−2.317	E+	1
			[3 476]	[3 477]	1 010 850–1 039 610	8–6	2.55−03	3.47−04	3.18−02	−2.557	D	LS

TABLE 20. Transition probabilities of allowed lines for Na V (references for this table are as follows: 1 = Burke and Lennon,[12] 2 = Tachiev and Froese Fischer,[94] and 3 = Merkelis *et al.*[65])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	$E_i - E_k$ (cm^{-1})	$g_i - g_k$	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
			[3 535]	[3 536]	1 011 330–1 039 610	6–4	2.54−03	3.18−04	2.22−02	−2.719	E+	LS
			[3 535]	[3 536]	1 011 330–1 039 610	6–6	1.21−04	2.27−05	1.59−03	−3.866	E	LS

[a] Wavelengths (Å) are always given unless cm^{-1} is indicated.

10.5.3. Forbidden Transitions for Na V

The MCHF results of Tachiev and Froese Fischer[94] and the second-order MBPT results of Merkelis *et al.*[63] are compiled.

To estimate accuracies, we pooled the relative standard deviation of the mean (RSDM) for each of the lines with transition rates published in both references,[63,94] as described in the general introduction. In this spectrum, the forbidden transitions between different configurations generally are stronger for E2 than for M1 lines. We note that these types of transitions have only been computed by a single source,[63,94] and that their estimated accuracies are therefore comparatively uncertain. The same also holds for the M2 transitions.

10.5.4. References for Forbidden Transitions for Na V

[89] G. Tachiev and C. Froese Fischer, Astron. Astrophys. **385**, 716 (2002).

[94] G. Tachiev and C. Froese Fischer, http://www.vuse.vanderbilt.edu/~cff/mchf_collection/ (MCHF, *ab initio*, downloaded on May 6, 2002). See Tachiev and Froese Fischer (Ref. 89).

[63] G. Merkelis, I. Martinson, R. Kisielius, and M. J. Vilkas, Phys. Scr. **59**, 122 (1999).

TABLE 21. Wavelength finding list for forbidden lines for Na V

Wavelength (vac) (Å)	Mult. No.	Wavelength (vac) (Å)	Mult. No.	Wavelength (vac) (Å)	Mult. No.	Wavelength (vac) (Å)	Mult. No.
146.106	18	167.064	21	322.059	34	597.04	9
146.362	18	167.075	21	323.304	34	636.80	29
147.897	25	167.257	21	330.669	11	637.47	29
148.642	17	218.868	33	330.709	11	639.01	29
148.856	17	219.332	33	332.583	16	641.70	29
149.001	17	219.365	33	333.875	16	643.95	29
151.124	23	219.627	33	333.917	16	693.55	13
151.132	23	219.647	33	335.665	6	696.00	13
157.030	24	219.831	33	335.706	6	696.18	13
157.039	24	220.095	33	360.371	15	701.06	13
157.207	20	220.148	33	400.663	10	701.24	13
157.216	20	220.412	33	400.721	10	747.10	28
157.503	20	221.473	36	400.779	10	750.15	28
157.512	20	221.491	36	445.042	14	1 218.68	27
160.147	19	242.625	35	445.113	14	1 219.21	27
160.156	19	242.646	35	445.115	14	1 234.26	27
160.395	19	267.428	8	445.186	14	1 234.81	27
160.404	19	268.290	8	459.897	5	1 242.61	27
160.564	19	285.106	7	461.050	5	1 315.51	30
160.573	19	307.123	12	463.263	5	1 335.99	30
163.608	22	307.157	12	591.33	9	1 336.63	30
163.618	22	308.260	12	591.46	9	1 365.09	2
163.939	22	308.295	12	593.24	9	1 365.78	2
166.795	21	320.818	34	593.37	9		
166.805	21	322.054	34	596.91	9		

Wavelength (air) (Å)	Mult. No.	Wavelength (air) (Å)	Mult. No.	Wavelength (air) (Å)	Mult. No.	Wavelength (air) (Å)	Mult. No.
2 066.9	1	4 010.9	3	4 016.9	3	4 311.9	31
2 068.4	1	4 016.7	3	4 022.7	3	4 547.5	31

Wavenumber (cm^{-1})	Mult. No.	Wavenumber (cm^{-1})	Mult. No.	Wavenumber (cm^{-1})	Mult. No.	Wavenumber (cm^{-1})	Mult. No.
1 201	32	1 036	26	654	37	37	4
1 196	38	967	37	544	26		

TABLE 22. Transition probabilities of forbidden lines for Na V (references for this table are as follows: 1=Tachiev and Froese Fischer[94] and 2=Merkelis *et al.*[63])

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	$E_i - E_k$ (cm^{-1})	$g_i - g_k$	Type	A_{ki} (s^{-1})	S (a.u.)	Acc.	Source
1	$2p^3-2p^3$	$^4S^\circ-^2D^\circ$									
			2 068.4	2 069.1	0–48 330	4–6	M1	7.43−04	1.46−06	D+	1,2
			2 068.4	2 069.1	0–48 330	4–6	E2	9.82−04	2.00−04	C	2
			2 066.9	2 067.6	0–48 366	4–4	M1	2.46−02	3.22−05	C	1,2
			2 066.9	2 067.6	0–48 366	4–4	E2	6.34−04	8.56−05	C	2
2		$^4S^\circ-^2P^\circ$									
				1 365.09	0–73 255	4–4	M1	4.16+00	1.57−03	B	1,2
				1 365.09	0–73 255	4–4	E2	1.60−05	2.71−07	D	2
				1 365.78	0–73 218	4–2	M1	1.68+00	3.18−04	C+	1,2
				1 365.78	0–73 218	4–2	E2	1.12−04	9.51−07	D	2
3		$^2D^\circ-^2P^\circ$									
			4 016.9	4 018.0	48 330–73 218	6–2	E2	1.29−01	2.41−01	B+	2
			4 010.9	4 012.0	48 330–73 255	6–4	M1	6.56−01	6.29−03	B	1,2
			4 010.9	4 012.0	48 330–73 255	6–4	E2	2.26−01	8.39−01	B+	2
			4 022.7	4 023.8	48 366–73 218	4–2	M1	7.22−01	3.49−03	B	1,2
			4 022.7	4 023.8	48 366–73 218	4–2	E2	1.92−01	3.62−01	B+	2
			4 016.7	4 017.8	48 366–73 255	4–4	M1	1.16+00	1.12−02	B	1,2
			4 016.7	4 017.8	48 366–73 255	4–4	E2	9.47−02	3.54−01	B+	2
4		$^2P^\circ-^2P^\circ$									
				37 cm^{-1}	73 218–73 255	2–4	E2	1.70−20	8.76−06	D+	2
5	$2s^22p^3-2s2p^4$	$^4S^\circ-^4P$									
				463.263	0–215 860	4–6	M2	1.02+00	8.78+00	B+	1
				461.050	0–216 896	4–4	M2	7.59−01	4.24+00	B+	1
				459.897	0–217 440	4–2	M2	2.35−01	6.49−01	B	1
6		$^4S^\circ-^2D$									
				335.706	0–297 880	4–6	M2	6.15−05	1.06−04	D	1
				335.665	0–297 916	4–4	M2	1.84−03	2.10−03	D+	1
7		$^4S^\circ-^2S$									
				285.106	0–350 747	4–2	M2	4.70−02	1.19−02	C	1
8		$^4S^\circ-^2P$									
				268.290	0–372 731	4–4	M2	1.23+01	4.58+00	B+	1
				267.428	0–373 932	4–2	M2	2.42+01	4.44+00	B+	1
9		$^2D^\circ-^4P$									
				591.33	48 330–217 440	6–2	M2	6.53−02	6.34−01	B	1
				593.24	48 330–216 896	6–4	M2	1.78−01	3.51+00	B+	1
				591.46	48 366–217 440	4–2	M2	5.08−01	4.93+00	B+	1
				596.91	48 330–215 860	6–6	M2	1.69−01	5.15+00	B+	1
				593.37	48 366–216 896	4–4	M2	2.66−01	5.25+00	B+	1
				597.04	48 366–215 860	4–6	M2	5.84−02	1.78+00	B	1
10		$^2D^\circ-^2D$									
				400.721	48 330–297 880	6–6	M2	3.20+00	1.33+01	B+	1
				400.721	48 366–297 916	4–4	M2	3.57−01	9.90−01	B	1
				400.663	48 330–297 916	6–4	M2	2.18+00	6.03+00	B+	1
				400.779	48 366–297 880	4–6	M2	1.57+00	6.55+00	B+	1
11		$^2D^\circ-^2S$									
				330.669	48 330–350 747	6–2	M2	3.73−02	1.98−02	C	1
				330.709	48 366–350 747	4–2	M2	1.92−03	1.02−03	D+	1
12		$^2D^\circ-^2P$									
				307.123	48 330–373 932	6–2	M2	3.03+00	1.11+00	B	1

TABLE 22. Transition probabilities of forbidden lines for Na V (references for this table are as follows: 1=Tachiev and Froese Fischer[94] and 2=Merkelis *et al.*[63])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	Type	A_{ki} (s^{-1})	S (a.u.)	Acc.	Source
				308.260	48 330–372 731	6–4	M2	7.90−01	5.90−01	B	1
				307.157	48 366–373 932	4–2	M2	1.90−01	6.96−02	C+	1
				308.295	48 366–372 731	4–4	M2	2.91−01	2.18−01	B	1
13		^{2}P$^\circ-^4$P									
				696.18	73 255–216 896	4–4	M2	5.61−03	2.46−01	B	1
				693.55	73 255–217 440	4–2	M2	4.78−02	1.03+00	B	1
				701.24	73 255–215 860	4–6	M2	1.44−01	9.85+00	B+	1
				696.00	73 218–216 896	2–4	M2	1.20−01	5.26+00	B+	1
				701.06	73 218–215 860	2–6	M2	4.24−02	2.89+00	B+	1
14		^{2}P$^\circ-^2$D									
				445.113	73 218–297 880	2–6	M2	9.41−01	6.61+00	B+	1
				445.186	73 255–297 880	4–6	M2	6.80−01	4.79+00	B+	1
				445.042	73 218–297 916	2–4	M2	6.57−02	3.08−01	B	1
				445.115	73 255–297 916	4–4	M2	2.19−01	1.03+00	B	1
15		^{2}P$^\circ-^2$S									
				360.371	73 255–350 747	4–2	M2	6.23+00	5.08+00	B+	1
16		^{2}P$^\circ-^2$P									
				333.917	73 255–372 731	4–4	M2	1.01+00	1.13+00	B	1
				332.583	73 255–373 932	4–2	M2	1.48+00	8.07−01	B	1
				333.875	73 218–372 731	2–4	M2	5.23−01	5.82−01	B	1
17	$2p^3-2p^2(^3\mathrm{P})3s$	^{4}S$^\circ-^4$P									
				148.642	0–672 757	4–6	M2	3.59+01	1.05+00	C	1
				148.856	0–671 790	4–4	M2	2.95+01	5.78−01	C	1
				149.001	0–671 136	4–2	M2	9.95+00	9.80−02	D	1
18		^{4}S$^\circ-^2$P									
				146.106	0–684 434	4–4	M2	2.56+01	4.57−01	C	1
				146.362	0–683 238	4–2	M2	5.39+01	4.86−01	C	1
19		^{2}D$^\circ-^4$P									
				160.564	48 330–671 136	6–2	M2	5.93+00	8.49−02	D	1
				160.395	48 330–671 790	6–4	M2	1.79+01	5.11−01	C	1
				160.573	48 366–671 136	4–2	M2	5.41+01	7.75−01	C	1
				160.147	48 330–672 757	6–6	M2	1.94+01	8.23−01	C	1
				160.404	48 366–671 790	4–4	M2	2.58+01	7.34−01	C	1
				160.156	48 366–672 757	4–6	M2	3.28+00	1.39−01	D	1
20		^{2}D$^\circ-^2$P									
				157.503	48 330–683 238	6–2	M2	1.21+01	1.57−01	D	1
				157.207	48 330–684 434	6–4	M2	3.87+00	9.96−02	D	1
				157.512	48 366–683 238	4–2	M2	6.87−01	8.94−03	E	1
				157.216	48 366–684 434	4–4	M2	1.32+00	3.40−02	E+	1
21		^{2}P$^\circ-^4$P									
				167.075	73 255–671 790	4–4	M2	8.89−01	3.11−02	E+	1
				167.257	73 255–671 136	4–2	M2	2.62+00	4.60−02	E+	1
				166.805	73 255–672 757	4–6	M2	1.52+01	7.90−01	C	1
				167.064	73 218–671 790	2–4	M2	1.11+01	3.87−01	D+	1
				166.795	73 218–672 757	2–6	M2	4.39+00	2.28−01	D+	1
22		^{2}P$^\circ-^2$P									
				163.618	73 255–684 434	4–4	M2	2.38+00	7.49−02	D	1
				163.939	73 255–683 238	4–2	M2	4.11−01	6.53−03	E	1
				163.608	73 218–684 434	2–4	M2	1.33−01	4.19−03	E	1

TABLE 22. Transition probabilities of forbidden lines for Na V (references for this table are as follows: 1=Tachiev and Froese Fischer[94] and 2=Merkelis *et al.*[63])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	Type	A_{ki} (s^{-1})	S (a.u.)	Acc.	Source
23	$2p^3-2p^2(^1D)3s$	$^2D^\circ-^2D$									
				151.124	48 330–710 039	6–6	M2	5.17+01	1.64+00	C+	1
				151.132	48 366–710 039	4–4	M2	4.86+00	1.03−01	D	1
				151.124	48 330–710 039	6–4	M2	3.41+01	7.22−01	C	1
				151.132	48 366–710 039	4–6	M2	2.23+01	7.08−01	C	1
24		$^2P^\circ-^2D$									
				157.030	73 218–710 039	2–6	M2	7.40+00	2.84−01	D+	1
				157.039	73 255–710 039	4–6	M2	1.22+01	4.69−01	C	1
				157.030	73 218–710 039	2–4	M2	1.77−01	4.54−03	E	1
				157.039	73 255–710 039	4–4	M2	1.85+00	4.75−02	E+	1
25	$2p^3-2p^2(^1S)3s$	$^2P^\circ-^2S$									
				147.897	73 255–749 402	4–2	M2	1.10+02	1.04+00	C	1
26	$2s2p^4-2s2p^4$	$^4P-^4P$									
				1 036 cm^{-1}	215 860–216 896	6–4	M1	2.70−02	3.60+00	A	1
				544 cm^{-1}	216 896–217 440	4–2	M1	7.24−03	3.33+00	A	1
27		$^4P-^2D$									
				1 234.81	216 896–297 880	4–6	M1	3.08−01	1.29−04	C	1
				1 242.61	217 440–297 916	2–4	M1	2.02−01	5.76−05	C	1
				1 219.21	215 860–297 880	6–6	M1	1.83+00	7.37−04	C	1
				1 234.26	216 896–297 916	4–4	M1	8.07−01	2.25−04	C	1
				1 218.68	215 860–297 916	6–4	M1	1.62−01	4.36−05	C	1
28		$^4P-^2S$									
				747.10	216 896–350 747	4–2	M1	1.02+01	3.14−04	C	1
				750.15	217 440–350 747	2–2	M1	1.93+00	6.04−05	C	1
29		$^4P-^2P$									
				641.70	216 896–372 731	4–4	M1	4.34−01	1.70−05	D+	1
				639.01	217 440–373 932	2–2	M1	9.11−01	1.76−05	D+	1
				637.47	215 860–372 731	6–4	M1	7.28−01	2.80−05	D+	1
				636.80	216 896–373 932	4–2	M1	8.57−03	1.64−07	D	1
				643.95	217 440–372 731	2–4	M1	2.46−01	9.74−06	D+	1
30		$^2D-^2P$									
				1 335.99	297 880–372 731	6–4	M1	6.00−01	2.12−04	C	1
				1 315.51	297 916–373 932	4–2	M1	7.03−01	1.19−04	C	1
				1 336.63	297 916–372 731	4–4	M1	1.07+00	3.81−04	C	1
31		$^2S-^2P$									
			4 547.5	4 548.8	350 747–372 731	2–4	M1	1.41−01	1.97−03	C+	1
			4 311.9	4 313.1	350 747–373 932	2–2	M1	6.61−01	3.94−03	C+	1
32		$^2P-^2P$									
				1 201 cm^{-1}	372 731–373 932	4–2	M1	3.11−02	1.33+00	B+	1
33	$2s2p^4-2s^22p^2(^3P)3s$	$^4P-^4P$									
				218.868	215 860–672 757	6–6	M1	8.68−01	2.02−06	E	1
				218.868	215 860–672 757	6–6	E2	2.65+03	7.13−03	E+	1
				219.831	216 896–671 790	4–4	M1	4.68−01	7.37−07	E	1
				219.831	216 896–671 790	4–4	E2	2.96+03	5.43−03	E+	1
				220.412	217 440–671 136	2–2	M1	2.31−01	1.83−07	E	1
				219.647	215 860–671 136	6–2	E2	8.37+03	7.64−03	D	1
				219.332	215 860–671 790	6–4	M1	2.74−02	4.29−08	E	1
				219.332	215 860–671 790	6–4	E2	5.90+03	1.07−02	D	1
				220.148	216 896–671 136	4–2	M1	5.40−02	4.28−08	E	1
				220.148	216 896–671 136	4–2	E2	9.21+02	8.50−04	E	1

TABLE 22. Transition probabilities of forbidden lines for Na V (references for this table are as follows: 1=Tachiev and Froese Fischer[94] and 2=Merkelis *et al.*[63])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	Type	A_{ki} (s^{-1})	S (a.u.)	Acc.	Source
				219.365	216 896–672 757	4–6	M1	3.14−02	7.38−08	E	1
				219.365	216 896–672 757	4–6	E2	3.93+03	1.07−02	D	1
				220.095	217 440–671 790	2–4	M1	4.44−02	7.01−08	E	1
				220.095	217 440–671 790	2–4	E2	4.61+02	8.50−04	E	1
				219.627	217 440–672 757	2–6	E2	2.79+03	7.65−03	D	1
34		^{2}P−^{2}P									
				320.818	372 731–684 434	4–4	M1	3.87+00	1.90−05	E	1
				320.818	372 731–684 434	4–4	E2	9.55+02	1.16−02	D	1
				323.304	373 932–683 238	2–2	M1	1.96−01	4.91−07	E	1
				322.054	372 731–683 238	4–2	M1	5.17−01	1.28−06	E	1
				322.054	372 731–683 238	4–2	E2	1.88+03	1.16−02	D	1
				322.059	373 932–684 434	2–4	M1	1.44−01	7.14−07	E	1
				322.059	373 932–684 434	2–4	E2	9.32+02	1.15−02	D	1
35	$2s2p^4-2s^22p^2(^1\mathrm{D})3s$	^{2}D−^{2}D									
				242.625	297 880–710 039	6–6	M1	1.57+00	4.99−06	E	1
				242.625	297 880–710 039	6–6	E2	6.29+03	2.83−02	D+	1
				242.646	297 916–710 039	4–4	M1	3.06−01	6.49−07	E	1
				242.646	297 916–710 039	4–4	E2	5.52+03	1.66−02	D	1
				242.625	297 880–710 039	6–4	M1	6.98−02	1.48−07	E	1
				242.625	297 880–710 039	6–4	E2	2.35+03	7.05−03	E+	1
				242.646	297 916–710 039	4–6	M1	5.20−02	1.65−07	E	1
				242.646	297 916–710 039	4–6	E2	1.56+03	7.05−03	E+	1
36	$2s2p^4-2s^22p^2(^1\mathrm{S})3s$	^{2}D−^{2}S									
				221.473	297 880–749 402	6–2	E2	7.85+03	7.47−03	D	1
				221.491	297 916–749 402	4–2	M1	6.50−06	5.23−12	E	1
				221.491	297 916–749 402	4–2	E2	5.20+03	4.95−03	E+	1
37	$2p^2(^3\mathrm{P})3s-2p^2(^3\mathrm{P})3s$	^{4}P−^{4}P									
				967 cm^{-1}	671 790–672 757	4–6	M1	1.46−02	3.60+00	B+	1
				654 cm^{-1}	671 136–671 790	2–4	M1	6.28−03	3.33+00	B+	1
38		^{2}P−^{2}P		1 196 cm^{-1}	683 238–684 434	2–4	M1	1.54−02	1.33+00	B	1

[a] Wavelengths (Å) are always given unless cm^{-1} is indicated.

10.6. Na VI

Carbon isoelectronic sequence
Ground state: $1s^22s^22p^2\ ^3P_0$
Ionization energy: 172.183 eV=1 388 750 cm^{-1}

10.6.1. Allowed Transitions for Na VI

Only OP (Ref. 56) results were available for transitions from energy levels above the $3d$. Tachiev and Froese Fischer[94] use extensive MCHF calculations with Breit-Pauli corrections to order α^2. Aggarwal *et al.*[4] apply the CIV3 code. Tachiev and Froese Fischer[94] and Aggarwal *et al.*[4] are in excellent agreement for transitions with upper levels of energy less than 600 000 cm^{-1}, but this deteriorates rapidly for lines with from higher-lying levels with line strengths less than 10^{-3}. We found the calculations of Mendoza *et al.*[62] to agree extremely well with those of Tachiev and Froese Fischer,[94] though only a few intercombination lines were available.

To estimate accuracies, we pooled the relative standard deviation of the mean (RSDM) for each of the lines with transition rates published in two or more references,[4,21,56,62,94] as described in the general introduction. For this purpose the spin-allowed (non-OP) and intercombination data weretreated separately and each of these was in turn divided into two upper-level energy groups below and above 600 000 cm^{-1}. Estimated accuracies were substantially better for the lower energy groups. OP[56] lines constituted a fifth group and have been used only when more accurate sources were not available, because spin-orbit effects are often significant for this spectrum.

10.6.2. References for Allowed Transitions for Na VI

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TABLE 23. Wavelengths finding list for allowed lines for Na VI

Wavelength (vac) (Å)	Mult. No.
80.645	81
81.543	33
83.639	34
87.141	77
87.211	77
88.223	31
88.248	31
88.270	31
88.277	31
88.338	31
88.368	31
88.460	80
88.467	80
88.470	80
90.468	32
95.182	78
95.255	78
95.263	78
95.307	78
95.316	78
95.319	78
95.933	30
96.475	29
98.302	79
99.496	28
99.501	28
99.565	28
99.616	28
99.680	28
100.471	27
100.515	27
100.588	27
103.004	26
103.078	26
103.201	26
106.040	60
106.077	60
106.125	60
107.014	20
107.062	20
107.094	20
107.156	20
107.227	20
107.289	20
107.532	69
107.542	69
107.547	69
107.553	19
107.608	19
107.634	19
107.683	19
107.742	19
107.768	19
107.933	68
107.944	68

TABLE 23. Wavelengths finding list for allowed lines for Na VI—Continued

Wavelength (vac) (Å)	Mult. No.
107.948	68
108.555	67
108.566	67
108.571	67
109.766	24
109.896	23
110.749	72
112.014	71
112.449	70
112.949	22
113.124	21
114.664	25
115.724	63
115.736	63
115.762	63
115.775	63
115.780	63
115.803	63
115.808	63
117.491	62
117.596	62
117.609	62
117.682	62
117.695	62
117.700	62
118.501	61
118.506	61
118.585	61
118.598	61
118.603	61
119.194	74
119.682	73
120.931	65
120.973	65
121.004	65
121.773	52
121.913	52
122.018	52
123.132	56
123.146	56
123.151	56
123.747	16
123.867	16
123.925	16
123.953	64
123.974	16
124.059	64
124.153	16
124.850	76
125.385	75
127.838	17
129.044	57
133.823	53
133.839	53
133.846	53
134.022	53
134.029	53
134.135	53
134.530	18
137.455	66
137.585	66
138.688	58
140.835	54
141.038	54
141.155	54
146.404	59
149.442	50
149.462	50
149.470	50
149.621	50
149.629	50
158.241	51
158.419	51
158.529	55
158.785	55
158.934	55
266.500	35
266.729	38
267.440	35
281.754	96
285.454	6
286.024	6
286.977	6
295.356	132
295.994	132
296.005	41
311.926	5
312.606	5
313.745	5
317.641	11
320.907	4
322.107	4
331.146	37
331.245	37
331.287	37
338.639	151
339.282	129
339.714	150
350.765	10
361.249	9
362.444	15
363.774	36
364.466	36
364.517	36
366.106	36
366.228	36
366.279	36
370.961	130
371.968	130
377.682	40

TABLE 23. Wavelengths finding list for allowed lines for Na VI—Continued

Wavelength (vac) (Å)	Mult. No.
379.075	95
380.098	95
380.807	127
381.869	127
382.468	94
382.717	94
383.274	94
383.759	94
383.862	131
384.320	94
384.808	131
386.722	46
387.582	126
387.687	126
388.561	126
388.787	126
389.666	126
394.415	128
395.413	128
406.215	14
410.931	123
414.351	3
415.553	3
417.568	3
420.493	39
421.486	39
423.844	39
433.971	102
436.960	49
440.509	101
457.896	149
458.337	124
459.834	93
459.876	124
463.779	86
466.135	148
467.880	148
469.153	148
475.376	106
476.599	106
477.236	106
478.194	125
478.583	85
479.662	125
481.997	85
485.684	170
485.807	8
485.814	100
488.400	108
489.438	104
489.570	2
489.980	104
491.207	104
491.248	2
491.340	2
494.066	2
494.159	2
494.381	2
494.976	172
495.909	172
496.697	107
497.277	171
498.082	172
498.219	171
500.413	171
502.159	173
508.363	105
509.762	105
510.491	105
511.389	103
511.980	103
513.321	103
515.999	43
537.606	114
539.011	45
540.570	114
544.336	113
544.959	113
545.375	113
546.090	113
548.005	113
549.149	113
574.81	147
592.55	7
592.68	7
593.00	7
595.77	156
596.52	92
599.05	92
599.06	13
601.39	42
606.20	42
630.64	44
632.88	44
638.21	44
641.87	48
694.11	84
699.06	84
701.31	84
701.95	84
706.36	84
724.22	122
728.07	122
742.83	121
746.88	121
751.15	91
754.77	91
755.17	91
758.84	91
770.14	12

TABLE 23. Wavelengths finding list for allowed lines for Na VI—Continued

Wavelength (vac) (Å)	Mult. No.
776.17	47
779.56	47
787.66	47
810.04	90
810.18	90
814.86	90
889.52	137
930.23	139
974.05	1
985.19	1
1 017.71	89
1 022.39	138
1 024.80	162
1 025.12	89
1 065.30	143
1 105.71	112
1 106.07	142
1 112.97	112
1 125.75	112
1 137.53	99
1 175.09	141
1 201.20	163
1 239.16	168
1 245.02	168
1 258.81	168
1 285.18	169
1 294.33	116
1 305.99	116
1 318.91	144
1 342.46	136
1 362.58	146
1 384.08	118
1 389.66	118
1 393.73	118
1 398.21	118
1 403.90	118
1 429.18	145
1 515.84	82
1 532.33	82
1 550.63	82
1 567.89	82
1 589.83	120
1 595.15	120
1 598.72	120
1 606.17	120
1 608.75	88
1 611.60	120
1 616.03	88
1 630.26	88
1 634.79	88
1 649.35	88
1 708.82	117
1 709.69	117
1 728.01	117
1 731.30	117
1 741.55	87
1 747.64	87
1 748.44	87
1 750.09	117
1 763.36	87
1 770.41	87
1 800.2	83
1 807.0	111
1 808.6	111
1 823.5	83
1 828.2	111
1 840.9	111
1 862.9	111
1 868.5	155
Wavelength (air) (Å)	**Mult. No.**
2 190.4	110
2 204.4	110
2 240.5	110
2 245.0	135
2 307.2	154
2 323.2	119
2 358.3	119
2 361.1	119
2 397.4	119
2 507.4	153
2 584.5	134
3 288.5	176
3 766.8	175
3 883.9	175
3 973.4	175
4 174.2	133
4 346.6	152
4 386.7	152
4 443.2	152
4 624.9	97
4 673.8	97
4 747.0	109
4 787.9	97
4 854.0	97
4 883.8	109
4 907.8	97
4 934.5	115
4 971.3	165
4 997.1	97
5 118.9	115
5 140.0	109
5 723	98
5 905	98
6 077	98
6 284	98
6 396	98
6 526	98
6 647	140

TABLE 23. Wavelengths finding list for allowed lines for Na VI—Continued

Wavelength (vac) (Å)	Mult. No.
7 001	140
7 131	174
7 319	140
10 602	158
11 693	158
12 237	158
12 655	166
14 282	167
17 387	160
18 513	164
Wavenumber (cm^{-1})	**Mult. No.**
4 120	159
3 370	157
3 240	159
2 860	159
2 290	161

TABLE 24. Transition probabilities of allowed lines for Na VI (references for this table are as follows: 1=Luo and Pradhan,[56] 2=Tachiev and Froese Fischer,[94] 3=Aggarwal *et al.*,[4] 4=Fawcett,[21] and 5=Mendoza *et al.*[62])

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s−1)	f_{ik}	S (a.u.)	log gf	Acc.	Source
1	$2s^22p^2$–$2s2p^3$	^3P–$^5S^\circ$										
				[985.2]	1 859–103 362	5–5	1.48−04	2.15−06	3.49−05	−4.969	C+	2,3,5
				[974.0]	698–103 362	3–5	5.95−05	1.41−06	1.36−05	−5.374	C+	2,3,5
2		^3P–$^3D^\circ$		*492.80*	*1 265–204 188*	9–15	1.40−01	8.47−02	1.24+00	−0.118	A	2,3
				494.381	1 859–204 132	5–7	1.38+01	7.08−02	5.76−01	−0.451	A	2,3
				491.340	698–204 223	3–5	1.10+01	6.64−02	3.22−01	−0.701	A	2,3
				489.570	0–204 261	1–3	8.27+08	8.91−02	1.44−01	−1.050	A	2,3
				494.159	1 859–204 223	5–5	3.03+00	1.11−02	9.04−02	−1.256	A	2,3
				491.248	698–204 261	3–3	5.63+00	2.04−02	9.88−02	−1.213	A	2,3
				494.066	1 859–204 261	5–3	3.12−07	6.84−04	5.56−03	−2.466	B+	2,3
3		^3P–$^3P^\circ$		*416.54*	*1 265–241 341*	9–9	3.79+01	9.85−02	1.22+00	−0.052	A	2,3
				417.568	1 859–241 341	5–5	2.89+01	7.56−02	5.19−01	−0.423	A	2,3
				415.553	698–241 341	3–3	1.03+01	2.66−02	1.09−01	−1.098	A	2,3
				417.568	1 859–241 341	5–3	1.52+01	2.39−02	1.64−01	−0.923	A	2,3
				415.553	698–241 341	3–1	3.81+01	3.29−02	1.35−01	−1.006	A	2,3
				415.553	698–241 341	3–5	8.79+00	3.79−02	1.56−01	−0.944	A	2,3
				414.351	0–241 341	1–3	1.25+01	9.63−02	1.31−01	−1.016	A	2,3
4		^3P–$^1D^\circ$										
				320.907	698–312 315	3–5	3.07−03	7.89−06	2.50−05	−4.626	D	2,4
				322.107	1 859–312 315	5–5	5.89−02	9.16−05	4.86−04	−3.339	C	2,4
5		^3P–$^3S^\circ$		*313.16*	*1 265–320 589*	9–3	2.52+02	1.24−01	1.15+00	0.048	A	2,3
				313.745	1 859–320 589	5–3	1.40+02	1.24−01	6.42−01	−0.208	A	2,3
				312.606	698–320 589	3–3	8.37+07	1.23−01	3.79−01	−0.433	A	2,3
				311.926	0–320 589	1–3	2.79+01	1.22−01	1.25−01	−0.914	A	2,3
6		^3P–$^1P^\circ$										

TABLE 24. Transition probabilities of allowed lines for Na VI (references for this table are as follows: 1=Luo and Pradhan,[56] 2=Tachiev and Froese Fischer,[94] 3=Aggarwal *et al.*,[4] 4=Fawcett,[21] and 5=Mendoza *et al.*[62])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})$^{\mathrm{a}}$	$E_i - E_k$ (cm^{-1})	$g_i - g_k$	A_{ki} (10^8 s−1)	f_{ik}	S (a.u.)	log gf	Acc.	Source
				286.024	698–350 319	3–3	9.05−02	1.11−04	3.14−04	−3.478	C	2,3
				286.977	1 859–350 319	5–3	6.23−03	4.62−06	2.18−05	−4.636	D	2,3
				285.454	0–350 319	1–3	9.64−04	3.53−06	3.32−06	−5.452	E+	2,3
7		$^{1}\mathrm{D}-{}^{3}\mathrm{D}^{\circ}$										
				592.68	35 498–204 223	5–5	1.04−03	5.47−06	5.34−05	−4.563	D+	2,3
				592.55	35 498–204 261	5–3	6.45−04	2.04−06	1.99−05	−4.991	D	2,3
				593.00	35 498–204 132	5–7	5.12−03	3.78−05	3.69−04	−3.724	C	2,3
8		$^{1}\mathrm{D}-{}^{3}\mathrm{P}^{\circ}$										
				485.807	35 498–241 341	5–3	6.37−03	1.35−05	1.08−04	−4.171	D+	2,4
				485.807	35 498–241 341	5–5	8.52−04	3.01−06	2.41−05	−4.822	D	2,4
9		$^{1}\mathrm{D}-{}^{1}\mathrm{D}^{\circ}$		361.249	35 498–312 315	5–5	1.15+02	2.24−01	1.33+00	0.049	A	2,3
10		$^{1}\mathrm{D}-{}^{3}\mathrm{S}^{\circ}$										
				350.765	35 498–320 589	5–3	9.33−03	1.03−05	5.96−05	−4.288	D+	2,4
11		$^{1}\mathrm{D}-{}^{1}\mathrm{P}^{\circ}$		317.641	35 498–350 319	5–3	1.57+02	1.43−01	7.46−01	−0.146	A	2,3
12		$^{1}\mathrm{S}-{}^{3}\mathrm{D}^{\circ}$										
				770.14	74 414–204 261	1–3	3.83−04	1.02−05	2.59−05	−4.991	D	2,3
13		$^{1}\mathrm{S}-{}^{3}\mathrm{P}^{\circ}$										
				599.06	74 414–241 341	1–3	2.12−03	3.43−05	6.76−05	−4.465	D+	2,3
14		$^{1}\mathrm{S}-{}^{3}\mathrm{S}^{\circ}$										
				406.215	74 414–320 589	1–3	6.79−03	5.04−05	6.73−05	−4.298	D+	2,3
15		$^{1}\mathrm{S}-{}^{1}\mathrm{P}^{\circ}$		362.444	74 414–350 319	1–3	3.69+01	2.18−01	2.60−01	−0.662	A	2,3
16	$2p^2-2p3s$	$^{3}\mathrm{P}-{}^{3}\mathrm{P}^{\circ}$				9–9						
				123.925	1 859–808 800	5–5	2.38+02	5.47−02	1.12−01	−0.563	C+	2,3
				123.974	698–807 320	3–3	7.83+01	1.80−02	2.21−02	−1.268	C+	2,3
				124.153	1 859–807 320	5–3	1.32+02	1.82−02	3.73−02	−1.041	C+	2,3
				123.747	698–808 800	3–5	7.94+01	3.04−02	3.71−02	−1.040	C+	2,3
				123.867	0–807 320	1–3	1.05+02	7.24−02	2.95−02	−1.140	C+	2,3
17		$^{1}\mathrm{D}-{}^{1}\mathrm{P}^{\circ}$		127.838	35 498–817 740	5–3	3.68+02	5.41−02	1.14−01	−0.568	C+	2,3
18		$^{1}\mathrm{S}-{}^{1}\mathrm{P}^{\circ}$		134.530	74 414–817 740	1–3	1.12+02	9.14−02	4.05−02	−1.039	C	2,3
19	$2p^2-2p3d$	$^{3}\mathrm{P}-{}^{3}\mathrm{D}^{\circ}$		*107.65*	*1 265–930 193*	9–15	2.55+03	7.39−01	2.36+00	0.823	B	2,3
				107.683	1 859–930 510	5–7	2.57+03	6.26−01	1.11+00	0.496	B+	2,3
				107.608	698–930 000	3–5	2.21+03	6.38−01	6.78−01	0.282	B+	2,3
				107.553	0–929 774	1–3	1.65+03	8.57−01	3.03−01	−0.067	B	2,3
				107.742	1 859–930 000	5–5	3.18+02	5.53−02	9.81−02	−0.558	C+	2,3
				107.634	698–929 774	3–3	8.90+02	1.55−01	1.64−01	−0.333	B	2,3
				107.768	1 859–929 774	5–3	2.47+01	2.58−03	4.59−03	−1.889	D+	2,3
20		$^{3}\mathrm{P}-{}^{3}\mathrm{P}^{\circ}$		*107.19*	*1 265–934 191*	9–9	1.50+03	2.59−01	8.23−01	0.368	C+	2,3
				107.289	1 859–933 920	5–5	1.43+03	2.46−01	4.35−01	0.090	B	2,3
				107.094	698–934 460	3–3	5.58+02	9.60−02	1.02−01	−0.541	C+	2,3
				107.227	1 859–934 460	5–3	6.60+02	6.83−02	1.21−01	−0.467	C+	2,3
				[107.06]	698–934 740	3–1	1.48+03	8.46−02	8.95−02	−0.596	C+	2,3
				107.156	698–933 920	3–5	8.64+01	2.48−02	2.62−02	−1.128	C	2,3
				107.014	0–934 460	1–3	2.78+02	1.43−01	5.04−02	−0.845	C+	2,3
21		$^{1}\mathrm{D}-{}^{3}\mathrm{F}^{\circ}$										
				113.124	35 498–919 480	5–5	4.16+02	7.98−02	1.49−01	−0.399	C	2,3

TABLE 24. Transition probabilities of allowed lines for Na VI (references for this table are as follows: 1 = Luo and Pradhan,[56] 2 = Tachiev and Froese Fischer,[94] 3 = Aggarwal *et al.*,[4] 4 = Fawcett,[21] and 5 = Mendoza *et al.*[62])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^{a}	$E_i - E_k$ (cm^{-1})	$g_i - g_k$	A_{ki} (10^8 s−1)	f_{ik}	S (a.u.)	log gf	Acc.	Source
22		$^{1}\mathrm{D}-{}^{1}\mathrm{D}^{\circ}$		112.949	35 498–920 850	5–5	5.76+02	1.10−01	2.05−01	−0.260	B+	2,3
23		$^{1}\mathrm{D}-{}^{1}\mathrm{F}^{\circ}$		109.896	35 498–945 450	5–7	2.95+02	7.48−01	1.35+00	0.573	B+	2,3
24		$^{1}\mathrm{D}-{}^{1}\mathrm{P}^{\circ}$		109.766	35 498–946 530	5–3	6.71+01	7.27−03	1.31−02	−1.439	D	2
25		$^{1}\mathrm{S}-{}^{1}\mathrm{P}^{\circ}$		114.664	74 414–946 530	1–3	1.68+03	9.92−01	3.74−01	−0.003	C+	2
26	$2s^22p^2$–$2s2p^2(^4\mathrm{P})3p$	$^{3}\mathrm{P}-{}^{3}\mathrm{S}^{\circ}$		*103.14*	*1 265*–970 840	9–3	8.17+02	4.34−02	1.33−01	−0.408	C	4
				103.201	1 859–970 840	5–3	4.40+02	4.22−02	7.17−02	−0.676	C	4
				103.078	698–970 840	3–3	2.80+02	4.47−02	4.55−02	−0.873	C	4
				103.004	0–970 840	1–3	9.64+01	4.60−02	1.56−02	−1.337	D	4
27		$^{3}\mathrm{P}-{}^{3}\mathrm{D}^{\circ}$				9–15						
				100.515	1 859–996 740	5–7	5.51+02	1.17−01	1.93−01	−0.233	C+	4
				100.471	698–996 010	3–5	4.32+02	1.09−01	1.08−01	−0.485	C	4
				100.588	1 859–996 010	5–5	1.17+02	1.78−02	2.95−02	−1.051	D+	4
28		$^{3}\mathrm{P}-{}^{3}\mathrm{P}^{\circ}$				9–9						4
				99.616	1 859–1 005 710	5–5	4.45+02	6.62−02	1.09−01	−0.480	C	4
				[99.56]	698–1 005 070	3–3	1.41+02	2.10−02	2.07−02	−1.201	D+	4
				[99.68]	1 859–1 005 070	5–3	2.53+02	2.26−02	3.71−02	−0.947	D+	4
				99.501	698–1 005 710	3–5	1.25+02	3.10−02	3.05−02	−1.032	D+	4
				[99.50]	0–1 005 070	1–3	1.68+02	7.50−02	2.46−02	−1.125	D+	4
29	$2s^22p^2$–$2s2p^2(^2\mathrm{D})3p$	$^{1}\mathrm{D}-{}^{1}\mathrm{F}^{\circ}$		96.475	35 498–1 072 040	5–7	7.30+02	1.43−01	2.26−01	−0.146	C+	4
30		$^{1}\mathrm{D}-{}^{1}\mathrm{D}^{\circ}$		95.933	35 498–1 077 890	5–5	6.64+02	9.16−02	1.45−01	−0.339	C	4
31	$2p^2$–$2p4d$	$^{3}\mathrm{P}-{}^{3}\mathrm{D}^{\circ}$		*88.27*	*1 265–1 134 205*	9–15	1.02+03	1.98−01	5.17−01	0.251	D	1
				88.270	1 859–1 134 750	5–7	1.02+03	1.66−01	2.41−01	−0.081	D+	LS
				88.248	698–1 133 870	3–5	7.61+02	1.48−01	1.29−01	−0.353	D	LS
				88.223	0–1 133 490	1–3	5.66+02	1.98−01	5.75−02	−0.703	E+	LS
				88.338	1 859–1 133 870	5–5	2.54+02	2.97−02	4.32−02	−0.828	E+	LS
				88.277	698–1 133 490	3–3	4.24+02	4.95−02	4.32−02	−0.828	E+	LS
				88.368	1 859–1 133 490	5–3	2.82+01	1.98−03	2.88−03	−2.004	E	LS
32		$^{1}\mathrm{D}-{}^{1}\mathrm{F}^{\circ}$		90.468	35 498–1 140 860	5–7	1.04+03	1.79−01	2.67−01	−0.048	D+	1
33	$2p^2$–$2p5d$	$^{3}\mathrm{P}-{}^{3}\mathrm{D}^{\circ}$				9–15						1
				[81.54]	1 859–1 228 210	5–7	3.91+02	5.45−02	7.32−02	−0.565	D	LS
34		$^{1}\mathrm{D}-{}^{1}\mathrm{F}^{\circ}$		83.639	35 498–1 231 110	5–7	5.11+02	7.50−02	1.03−01	−0.426	D	1
35	$2s2p^3$–$2p^4$	$^{5}\mathrm{S}^{\circ}-{}^{3}\mathrm{P}$										
				[267.44]	103 362–477 277	5–5	5.76−03	6.18−06	2.72−05	−4.510	D	2,3
				[266.50]	103 362–478 597	5–3	2.52−03	1.61−06	7.05−06	−5.094	D	2,3
36		$^{3}\mathrm{D}^{\circ}-{}^{3}\mathrm{P}$		*365.31*	*204 188–477 926*	15–9	9.61+01	1.15−01	2.08+00	0.237	A	2,3
				366.106	204 132–477 277	7–5	8.02+01	1.15−01	9.71−01	−0.094	A	2,3
				364.466	204 223–478 597	5–3	7.07+01	8.45−02	5.07−01	−0.374	A	2,3
				363.774	204 261–479 157	3–1	9.49+01	6.28−02	2.26−01	−0.725	A	2,3
				366.228	204 223–477 277	5–5	1.54+01	3.10−02	1.87−01	−0.810	A	2,3
				364.517	204 261–478 597	3–3	2.48+01	4.94−02	1.78−01	−0.829	A	2,3
				366.279	204 261–477 277	3–5	1.09+00	3.65−03	1.32−02	−1.961	B+	2,3
37		$^{3}\mathrm{D}^{\circ}-{}^{1}\mathrm{D}$										
				331.245	204 223–506 114	5–5	1.68−02	2.76−05	1.50−04	−3.860	D+	2,3

TABLE 24. Transition probabilities of allowed lines for Na VI (references for this table are as follows: 1=Luo and Pradhan,[56] 2=Tachiev and Froese Fischer,[94] 3=Aggarwal *et al.*,[4] 4=Fawcett,[21] and 5=Mendoza *et al.*[62])—Continued

No.	Transition array	Mult.	$\lambda_{\rm air}$ (Å)	$\lambda_{\rm vac}$ (Å) or σ (cm^{-1})$^{\rm a}$	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s−1)	f_{ik}	S (a.u.)	log gf	Acc.	Source
				331.146	204 132–506 114	7–5	8.63−02	1.01−04	7.74−04	−3.151	C	2,3
				331.287	204 261–506 114	3–5	3.29−04	9.03−07	2.96−06	−5.567	E+	2,3
38		^{3}D°−^{1}S										
				266.729	204 261–579 173	3–1	3.76−03	1.34−06	3.52−06	−5.396	D	2,4
39		^{3}P°−^{3}P		*422.68*	*241 341–477 926*	9–9	2.20+01	5.90−02	7.39−01	−0.275	A	2,3
				423.844	241 341–477 277	5–5	1.57+01	4.22−02	2.95−01	−0.676	A	2,3
				421.486	241 341–478 597	3–3	4.89+00	1.30−02	5.42−02	−1.409	A	2,3
				421.486	241 341–478 597	5–3	1.05+01	1.67−02	1.16−01	−1.078	A	2,3
				420.493	241 341–479 157	3–1	2.34+01	2.07−02	8.58−02	−1.207	A	2,3
				423.844	241 341–477 277	3–5	5.67+00	2.54−02	1.06−01	−1.118	A	2,3
				421.486	241 341–478 597	1–3	7.41+00	5.92−02	8.21−02	−1.228	A	2,3
40		^{3}P°−^{1}D		377.682	241 341–506 114	3–5	6.65−03	2.37−05	8.84−05	−4.148	D+	2,3
				377.682	241 341–506 114	5–5	3.08−04	6.58−07	4.09−06	−5.483	D	2,3
41		^{3}P°−^{1}S										
				296.005	241 341–579 173	3–1	1.96−02	8.59−06	2.51−05	−4.589	D	2,3
42		^{1}D°−^{3}P										
				601.39	312 315–478 597	5–3	5.55−04	1.81−06	1.79−05	−5.043	D	2,3
				606.20	312 315–477 277	5–5	1.89−02	1.04−04	1.04−03	−3.284	C	2,3
43		^{1}D°−^{1}D		515.999	312 315–506 114	5–5	5.60+01	2.24−01	1.90+00	0.049	A	2,3
44		^{3}S°−^{3}P		*635.6*	320 589–*477 926*	3–9	1.30+01	2.36−01	1.48+00	−0.150	A	2,3
				638.21	320 589–477 277	3–5	1.27+01	1.30−01	8.18−01	−0.409	A	2,3
				632.88	320 589–478 597	3–3	1.32+01	7.95−02	4.97−01	−0.623	A	2,3
				630.64	320 589–479 157	3–1	1.35+01	2.68−02	1.67−01	−1.095	A	2,3
45		^{3}S°−^{1}D										
				539.011	320 589–506 114	3–5	6.38−04	4.63−06	2.47−05	−4.857	D	2,3
46		^{3}S°−^{1}S										
				386.722	320 589–579 173	3–1	1.20−01	8.96−05	3.42−04	−3.571	C	2,3
47		^{1}P°−^{3}P										
				779.56	350 319–478 597	3–3	5.52−03	5.03−05	3.87−04	−3.821	C	2,3
				776.17	350 319–479 157	3–1	6.70−04	2.02−06	1.55−05	−5.218	D	2,3
				87.66	350 319–477 277	3–5	1.44−03	2.23−05	1.74−04	−4.175	D+	2,3
48		^{1}P°−^{1}D		641.87	350 319–506 114	3–5	5.86+00	6.03−02	3.82−01	−0.743	A	2,3
49		^{1}P°−^{1}S		436.960	350 319–579 173	3–1	1.47+02	1.40−01	6.05−01	−0.377	A	2,3
50	$2s2p^3$−$2s^22p3p$	^{3}D°−^{3}P				15–9						2,3
				149.442	204 132–873 290	7–5	2.98+01	7.13−03	2.46−02	−1.302	A	2,3
				149.621	204 223–872 580	5–3	2.65+01	5.33−03	1.31−02	−1.574	A	2,3
				149.462	204 223–873 290	5–5	5.41+00	1.81−03	4.46−03	−2.043	B+	2,3
				149.629	204 261–872 580	3–3	8.93+00	3.00−03	4.43−03	−2.046	B+	2,3
				149.470	204 261–873 290	3–5	3.62−01	2.02−04	2.98−04	−3.218	B	2,3
51		^{3}P°−^{3}P				9–9						
				158.241	241 341–873 290	5–5	2.15+00	8.09−04	2.11−03	−2.393	C	2,3
				158.419	241 341–872 580	3–3	1.47+00	5.53−04	8.64−04	−2.780	D	2,3
				158.419	241 341–872 580	5–3	2.30−01	5.18−05	1.35−04	−3.587	E+	2,3
				158.241	241 341–873 290	3–5	8.56−01	5.35−04	8.37−04	−2.795	D+	2,3
				158.419	241 341–872 580	1–3	1.49+00	1.68−03	8.74−04	−2.775	D+	2,3

TABLE 24. Transition probabilities of allowed lines for Na VI (references for this table are as follows: 1=Luo and Pradhan,[56] 2=Tachiev and Froese Fischer,[94] 3=Aggarwal *et al.*,[4] 4=Fawcett,[21] and 5=Mendoza *et al.*[62])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s−1)	f_{ik}	S (a.u.)	log gf	Acc.	Source
52	$2s2p^3-2s2p^2(^4P)3s$	$^5S^\circ-^5P$		*121.87*	*103 362–923 917*	5–15	2.22+02	1.48−01	2.97−01	−0.131	C	4
				121.773	103 362–924 560	5–7	2.23+02	6.94−02	1.39−01	−0.460	C	4
				121.913	103 362–923 620	5–5	2.21+02	4.92−02	9.87−02	−0.609	C	4
				122.018	103 362–922 910	5–3	2.20+02	2.94−02	5.90−02	−0.833	C	4
53		$^3D^\circ-^3P$		*133.93*	*204 188–950 871*	15–9	2.10+02	3.39−02	2.24−01	−0.294	C	4
				133.823	204 132–951 390	7–5	1.78+02	3.41−02	1.05−01	−0.622	C	4
				134.022	204 223–950 370	5–3	1.65+02	2.66−02	5.87−02	−0.876	C	4
				134.135	204 261–949 780	3–1	2.15+02	1.93−02	2.56−02	−1.237	D+	4
				133.839	204 223–951 390	5–5	2.68+01	7.20−03	1.59−02	−1.444	D	4
				134.029	204 261–950 370	3–3	4.95+01	1.33−02	1.76−02	−1.399	D+	4
				133.846	204 261–951 390	3–5	1.49+00	6.67−04	8.81−04	−2.699	E	4
54		$^3P^\circ-^3P$				9–9						
				140.835	241 341–951 390	5–5	1.32+02	3.92−02	9.09−02	−0.708	C	4
				141.038	241 341–950 370	3–3	4.06+01	1.21−02	1.69−02	−1.440	E+	LS
				141.038	241 341–950 370	5–3	6.76+01	1.21−02	2.81−02	−1.218	E+	LS
				141.155	241 341–949 780	3–1	1.63+02	1.62−02	2.26−02	−1.313	E+	LS
				140.835	241 341–951 390	3–5	4.37+01	2.17−02	3.01−02	−1.186	D+	4
				141.038	241 341–950 370	1–3	5.42+01	4.85−02	2.25−02	−1.314	E+	LS
55		$^3S^\circ-^3P$		*158.66*	*320 589–950 871*	3–9	5.00+00	5.67−03	8.88−03	−1.769	E+	4
				158.529	320 589–951 390	3–5	5.31+00	3.33−03	5.22−03	−2.000	D	4
				158.785	320 589–950 370	3–3	4.41+00	1.67−03	2.61−03	−2.300	E+	4
				158.934	320 589–949 780	3–1	5.28+00	6.67−04	1.05−03	−2.699	E	4
56	$2s2p^3-2s2p^2(^2D)3s$	$^3D^\circ-^3D$		*123.14*	*204 188–1 016 270*	15–15	3.40+02	7.74−02	4.71−01	0.065	C	4
				123.132	204 132–1 016 270	7–7	3.02+02	6.87−02	1.95−01	−0.318	C+	4
				123.146	204 223–1 016 270	5–5	2.31+02	5.26−02	1.07−01	−0.580	C	4
				123.151	204 261–1 016 270	3–3	2.51+02	5.70−02	6.93−02	−0.767	C	4
				123.132	204 132–1 016 270	7–5	5.10+01	8.29−03	2.35−02	−1.236	D+	4
				123.146	204 223–1 016 270	5–3	8.21+01	1.12−02	2.27−02	−1.252	D+	4
				123.146	204 223–1 016 270	5–7	4.34+01	1.38−02	2.80−02	−1.161	D+	4
				123.151	204 261–1 016 270	3–5	5.54+01	2.10−02	2.55−02	−1.201	D+	4
57		$^3P^\circ-^3D$		*129.04*	*241 341–1 016 270*	9–15	1.24+02	5.16−02	1.97−01	−0.333	C	4
				129.044	241 341–1 016 270	5–7	1.21+02	4.22−02	8.96−02	−0.676	C	4
				129.044	241 341–1 016 270	3–5	8.97+01	3.73−02	4.76−02	−0.951	C	4
				129.044	241 341–1 016 270	1–3	6.81+01	5.10−02	2.17−02	−1.292	D+	4
				129.044	241 341–1 016 270	5–5	3.61+01	9.00−03	1.91−02	−1.347	D+	4
				129.044	241 341–1 016 270	3–3	5.61+01	1.40−02	1.78−02	−1.377	D+	4
				129.044	241 341–1 016 270	5–3	4.01+00	6.00−04	1.27−03	−2.523	E+	4
58		$^1D^\circ-^1D$		138.688	312315–1 033 360	5–5	2.25+10	6.48−02	1.48−01	−0.489	C	4
59		$^1P^\circ-^1D$		146.404	350 319–1 033 360	3–5	7.97+01	4.27−02	6.17−02	−0.892	C	4
60	$2s2p^3-2s2p^2(^4P)3d$	$^5S^\circ-^5P$		*106.09*	*103 362–1 045 940*	5–15	2.85+03	1.44+00	2.52+00	0.857	B	4
				106.125	103 362–1 045 650	5–7	2.84+03	6.72−01	1.17+00	0.526	B	4
				106.077	103 362–1 046 070	5–5	2.85+03	4.82−01	8.41−01	0.382	B	4
				106.040	103 362–1 046 400	5–3	2.87+03	2.91−01	5.07−01	0.163	B	4
61		$^3D^\circ-^3P$				15–9						
				118.585	204 132–1 047 410	7–5	1.11+02	1.67−02	4.57−02	−0.932	C	4

TABLE 24. Transition probabilities of allowed lines for Na VI (references for this table are as follows: 1=Luo and Pradhan,[56] 2=Tachiev and Froese Fischer,[94] 3=Aggarwal *et al.*,[4] 4=Fawcett,[21] and 5=Mendoza *et al.*[62])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s−1)	f_{ik}	S (a.u.)	log gf	Acc.	Source
				118.501	204 223–1 048 100	5–3	8.55+01	1.08−02	2.11−02	−1.268	D+	4
				118.598	204 223–1 047 410	5–5	3.51+01	7.40−03	1.44−02	−1.432	D	4
				118.506	204 261–1 048 100	3–3	4.43+01	9.33−03	1.09−02	−1.553	D	4
				118.603	204 261–1 047 410	3–5	3.79+00	1.33−03	1.56−03	−2.399	E+	4
62		$^3D^\circ-^3F$		*117.58*	*204 188–1 054 678*	15–21	1.32+03	3.83−01	2.22+00	0.759	B	4
				117.491	204 132–1 055 260	7–9	1.32+03	3.52−01	9.54−01	0.392	B	4
				117.609	204 223–1 054 500	5–7	1.18+03	3.43−01	6.65−01	0.234	B	4
				117.700	204 261–1 053 880	3–5	1.11+03	3.85−01	4.47−01	0.063	B	4
				117.596	204 132–1 054 500	7–7	1.34+02	2.77−02	7.51−02	−0.712	C	4
				117.695	204 223–1 053 880	5–5	1.94+02	4.02−02	7.79−02	−0.697	C	4
				117.682	204 132–1 053 880	7–5	4.82+00	7.14−04	1.94−03	−2.301	E+	4
63		$^3D^\circ-^3D$		*115.76*	*204 188–1 068 063*	15–15	5.11+02	1.03−01	5.87−01	0.189	C	4
				115.724	204 132–1 068 260	7–7	4.71+01	9.46−02	2.52−01	−0.179	C+	4
				115.775	204 223–1 067 970	5–5	3.34+02	6.72−02	1.28−01	−0.474	C	4
				115.808	204 261–1 067 760	3–3	3.50+02	7.03−02	8.04−02	−0.676	C	4
				115.762	204 132–1 067 970	7–5	8.76+01	1.26−02	3.35−02	−1.055	D+	4
				15.803	204 223–1 067 760	5–3	1.28+02	1.54−02	2.94−02	−1.114	D+	4
				115.736	204 223–1 068 260	5–7	6.33+01	1.78−02	3.39−02	−1.051	D+	4
				115.780	204 261–1 067 970	3–5	7.66+01	2.57−02	2.93−02	−1.113	D+	4
64		$^3P^\circ-^3P$				9–9						
				124.059	241341–1 047 410	5–5	5.63+02	1.30−01	2.65−01	−0.187	C+	4
				123.953	241 341–1 048 100	3–3	1.82+02	4.20−02	5.14−02	−0.900	C	4
				123.953	241 341–1 048 100	5–3	3.36+02	4.64−02	9.47−02	−0.635	C	4
				124.059	241 341–1 047 410	3–5	2.22+02	8.53−02	1.05−01	−0.592	C	4
				123.953	241 341–1 048 100	1–3	2.84+02	1.96−01	8.00−02	−0.708	C	4
65		$^3P^\circ-^3D$		*120.96*	*241 341–1 068 063*	9–15	1.13+03	4.11−01	1.47+00	0.568	C+	4
				120.931	241 341–1 068 260	5–7	1.11+03	3.42−01	6.80−01	0.233	B	4
				120.973	241 341–1 067 970	3–5	8.08+02	2.95−01	3.53−01	−0.053	C+	4
				121.004	241 341–1 067 760	1–3	6.04+02	3.98−01	1.59−01	−0.400	C	4
				120.973	241 341–1 067 970	5–5	3.25+02	7.12−02	1.42−01	−0.449	C	4
				121.004	241 341–1 067 760	3–3	5.00+02	1.10−01	1.31−01	−0.481	C	4
				121.004	241 341–1 067 760	5–3	3.95+01	5.20−03	1.04−02	−1.585	D	4
66		$^3S^\circ-^3P$				3–9						
				137.585	320 589–1 047 410	3–5	1.95+02	9.20−02	1.25−01	−0.559	C	4
				137.455	320 589–1 048 100	3–3	2.01+02	5.70−02	7.74−02	−0.767	C	4
67	$2s2p^3-2s2p^2(^2D)3d$	$^3D^\circ-^3F$		*108.56*	*204 188–1 125 320*	15–21	2.44+03	6.04−01	3.24+00	0.957	B	4
				108.555	204 132–1 125 320	7–9	2.45+03	5.55−01	1.39+00	0.589	B+	4
				108.566	204 223–1 125 320	5–7	2.15+03	5.32−01	9.50−01	0.425	B	4
				108.571	204 261–1 125 320	3–5	2.03+03	5.98−01	6.41−01	0.254	B	4
				108.555	204 132–1 125 320	7–7	2.92+02	5.16−02	1.29−01	−0.442	C	4
				108.566	204 223–1 125 320	5–5	3.97+02	7.02−02	1.25−01	−0.455	C	4
				108.555	204 132–1 125 320	7–5	1.25+01	1.57−03	3.93−03	−1.959	E+	4
68		$^3D^\circ-^3P$		*107.94*	*204 188–1 130 630*	15–9	7.53+02	7.89−02	4.21−01	0.073	C	4
				107.933	204 132–1 130 630	7–5	6.28+02	7.83−02	1.95−01	−0.261	C+	4
				107.944	204 223–1 130 630	5–3	6.03+02	6.32−02	1.12−01	−0.500	C	4
				107.948	204 261–1 130 630	3–1	8.13+02	4.73−02	5.05−02	−0.848	C	4
				107.944	204 223–1 130 630	5–5	9.16+01	1.60−02	2.84−02	−1.097	D+	4

TABLE 24. Transition probabilities of allowed lines for Na VI (references for this table are as follows: 1=Luo and Pradhan,[56] 2=Tachiev and Froese Fischer,[94] 3=Aggarwal *et al.*,[4] 4=Fawcett,[21] and 5=Mendoza *et al.*[62])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s−1)	f_{ik}	S (a.u.)	log gf	Acc.	Source
				107.948	204 261–1 130 630	3–3	1.77+02	3.10−02	3.31−02	−1.032	D+	4
				107.948	204 261–1 130 630	3–5	5.72+00	1.67−03	1.78−03	−2.300	E+	4
69		^{3}D$^\circ$−^{3}D		*107.54*	*204 188–1 134 090*	15–15	1.34+03	2.32−01	1.23+00	0.542	C+	4
				107.532	204 132–1 134 090	7–7	1.17+03	2.03−01	5.02−01	0.153	B	4
				107.542	204 223–1 134 090	5–5	9.41+02	1.63−01	2.89−01	−0.089	C+	4
				107.547	204 261–1 134 090	3–3	1.03+03	1.79−01	1.90−01	−0.270	C+	4
				107.532	204 132–1 134 090	7–5	2.10+02	2.60−02	6.44−02	−0.740	C	4
				107.542	204 223–1 134 090	5–3	3.44+02	3.58−02	6.34−02	−0.747	C	4
				107.542	204 223–1 134 090	5–7	1.43+02	3.46−02	6.12−02	−0.762	C	4
				107.547	204 261–1 134 090	3–5	2.00+02	5.77−02	6.13−02	−0.762	C	4
70		^{3}P$^\circ$−^{3}P		*112.45*	*241 341–1 130 630*	9–9	1.30+03	2.47−01	8.22−01	0.347	C	4
				112.449	241 341–1 130 630	5–5	9.95+02	1.89−01	3.49−01	−0.025	C+	4
				112.449	241 341–1 130 630	3–3	3.50+02	6.63−02	7.37−02	−0.701	C	4
				112.449	241 341–1 130 630	5–3	4.91+02	5.58−02	1.03−01	−0.554	C	4
				112.449	241 341–1 130 630	3–1	1.26+03	7.97−02	8.85−02	−0.621	C	4
				112.449	241 341–1 130 630	3–5	3.26+02	1.03−01	1.14−01	−0.510	C	4
				112.449	241 341–1 130 630	1–3	4.43+02	2.52−01	9.33−02	−0.599	C	4
71		^{3}P$^\circ$−^{3}D		*112.01*	*241 341–1 134 090*	9–15	8.23+02	2.58−01	8.57−01	0.366	C+	4
				112.014	241 341–1 134 090	5–7	8.47+02	2.23−01	4.11−01	0.047	C+	4
				112.014	241 341–1 134 090	3–5	6.32+02	1.98−01	2.19−01	−0.226	C+	4
				112.014	241 341–1 134 090	1–3	4.55+02	2.57−01	9.48−02	−0.590	C	4
				112.014	241 341–1 134 090	5–5	1.80+02	3.38−02	6.23−02	−0.772	C	4
				112.014	241 341–1 134 090	3–3	3.15+02	5.93−02	6.56−02	−0.750	C	4
				112.014	241 341–1 134 090	5–3	1.77+01	2.00−03	3.69−03	−2.000	E+	4
72		^{3}P$^\circ$−^{3}S		*110.75*	*241 341–1 144 280*	9–3	1.22+03	7.49−02	2.46−01	−0.171	C	4
				110.749	241 341–1 144 280	5–3	7.05+02	7.78−02	1.42−01	−0.410	C	4
				110.749	241 341–1 144 280	3–3	3.92+02	7.20−02	7.88−02	−0.666	C	4
				110.749	241 341–1 144 280	1–3	1.25+02	6.90−02	2.52−02	−1.161	D+	4
73		^{1}D$^\circ$−^{1}D		119.682	312 315–1 147 860	5–5	1.73+03	3.72−01	7.32−01	0.270	B	4
74		^{1}D$^\circ$−^{1}P		119.194	312 315–1 151 280	5–3	3.43+02	4.38−02	8.59−02	−0.660	C	4
75		^{1}P$^\circ$−^{1}D		125.385	350 319–1 147 860	3–5	7.26+02	2.85−01	3.53−01	−0.068	C+	4
76		^{1}P$^\circ$−^{1}P		124.850	350 319–1 151 280	3–3	3.00+02	7.01−02	8.64−02	−0.677	D	1
77	$2s2p^3-2s2p^2(^4\mathrm{P})4d$	^{5}S$^\circ$−^{5}P				5–15						1
				87.211	103 362–1 250 010	5–7	8.21+02	1.31−01	1.88−01	−0.184	D	LS
				87.141	103 362–1 250 930	5–5	8.20+02	9.34−02	1.34−01	−0.331	D	LS
78		^{3}D$^\circ$−^{3}F		*95.24*	*204 188–1 254 155*	15–21	7.33+02	1.40−01	6.57−01	0.322	D	1
				95.182	204 132–1 254 750	7–9	7.33+02	1.28−01	2.81−01	−0.048	D+	LS
				95.263	204 223–1 253 950	5–7	6.51+02	1.24−01	1.94−01	−0.208	D	LS
				95.319	204 261–1 253 370	3–5	6.17+02	1.40−01	1.32−01	−0.377	D	LS
				95.255	204 132–1 253 950	7–7	8.16+01	1.11−02	2.44−02	−1.110	E+	LS
				95.316	204 223–1 253 370	5–5	1.15+02	1.56−02	2.45−02	−1.108	E+	LS
				95.307	204 132–1 253 370	7–5	3.22+00	3.13−04	6.87−04	−2.659	E	LS
79		^{3}P$^\circ$−^{3}D		*98.30*	*241 341–1 258 610*	9–15	6.10+02	1.47−01	4.29−01	0.122	D	1
				98.302	241 341–1 258 610	5–7	6.11+02	1.24−01	2.01−01	−0.208	D	LS
				98.302	241 341–1 258 610	3–5	4.56+02	1.10−01	1.07−01	−0.481	D	LS

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No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s−1)	f_{ik}	S (a.u.)	log gf	Acc.	Source
				98.302	241 341–1 258 610	1–3	3.38+02	1.47−01	4.76−02	−0.833	E+	LS
				98.302	241 341–1 258 610	5–5	1.53+02	2.21−02	3.58−02	−0.957	E+	LS
				98.302	241 341–1 258 610	3–3	2.54+02	3.68−02	3.57−02	−0.957	E+	LS
				98.302	241 341–1 258 610	5–3	1.69+01	1.47−03	2.38−03	−2.134	E	LS
80	$2s2p^3-2s2p^2(^2\mathrm{D})4d$	$^3\mathrm{D}^\circ-^3\mathrm{F}$		*88.46*	*204 188–1 334 585*	15–21	2.61+02	4.28−02	1.87−01	−0.192	E+	1
				88.460	204 132–1 334 585	7–9	2.61+02	3.93−02	8.01−02	−0.561	D	LS
				88.467	204 223–1 334 585	5–7	2.31+02	3.80−02	5.53−02	−0.721	E+	LS
				88.470	204 261–1 334 585	3–5	2.19+02	4.28−02	3.74−02	−0.891	E+	LS
				88.460	204 132–1 334 585	7–7	2.91+01	3.41−03	6.95−03	−1.622	E	LS
				88.467	204 223–1 334 585	5–5	4.07+01	4.77−03	6.95−03	−1.623	E	LS
				88.460	204 132–1 334 585	7–5	1.15+00	9.61−05	1.96−04	−3.172	E	LS
81	$2s2p^3-2s2p^2(^5\mathrm{P})5d$	$^5\mathrm{S}^\circ-^5\mathrm{P}$				5–15						1
				80.645	103 362–1 343 360	5–7	4.81+02	6.57−02	8.72−02	−0.483	D	LS
82	$2p3s-2p3p$	$^3\mathrm{P}^\circ-^3\mathrm{P}$				9–9						
				1 550.63	808 800–873 290	5–5	3.74+00	1.35−01	3.44+00	−0.171	A	2,3
				1 532.33	807 320–872 580	3–3	9.96−01	3.51−02	5.31−01	−0.978	B	2,3
				1 567.89	808 800–872 580	5–3	2.44+00	5.40−02	1.39+00	−0.569	B+	2,3
				1 515.84	807 320–873 290	3–5	1.14+00	6.54−02	9.79−01	−0.707	B+	2,3
83		$^1\mathrm{P}^\circ-^3\mathrm{P}$										
				1 823.5	817 740–872 580	3–3	8.45−03	4.21−04	7.59−03	−2.899	D	2,3
				1 800.2	817 740–873 290	3–5	3.20−05	2.59−06	4.60−05	−5.110	E	2,3
84	$2s^22p3s-2s2p^2(^3\mathrm{P})3s$	$^3\mathrm{P}^\circ-^3\mathrm{P}$				9–9						1
				701.31	808 800–951 390	5–5	2.47+00	1.82−02	2.10−01	−1.041	D	LS
				699.06	807 320–950 370	3–3	8.30−01	6.08−03	4.20−02	−1.739	E+	LS
				706.36	808 800–950 370	5–3	1.34+00	6.01−03	6.99−02	−1.522	D	LS
				701.95	807 320–949 780	3–1	3.28+00	8.07−03	5.59−02	−1.616	E+	LS
				694.11	807 320–951 390	3–5	8.47−01	1.02−02	6.99−02	−1.514	D	LS
85	$2s^22p3s-2s2p^2(^2\mathrm{D})3s$	$^3\mathrm{P}^\circ-^3\mathrm{D}$				9–15						1
				481.997	808 800–1 016 270	5–7	2.11+01	1.03−01	8.17−01	−0.288	C	LS
				478.583	807 320–1 016 270	3–5	1.62+01	9.28−02	4.39−01	−0.555	D+	LS
				481.997	808 800–1 016 270	5–5	5.28+00	1.84−02	1.46−01	−1.036	D	LS
				478.583	807 320–1 0162 70	3–3	9.00+00	3.09−02	1.46−01	−1.033	D	LS
				481.997	808 800–1 016 270	5–3	5.89−01	1.23−03	9.76−03	−2.211	E	LS
86		$^1\mathrm{P}^\circ-^1\mathrm{D}$		463.779	817 740–1 033 360	3–5	7.09+00	3.81−02	1.75−01	−0.942	D	1
87	$2p3p-2p3d$	$^3\mathrm{P}-^3\mathrm{D}^\circ$				9–15						
				1 747.64	873 290–930 510	5–7	2.36+00	1.51−01	4.35+00	−0.122	A	2,3
				1 741.55	872 580–930 000	3–5	1.88+00	1.43−01	2.45+00	−0.368	B+	2,3
				1 763.36	873 290–930 000	5–5	3.41−01	1.59−02	4.61−01	−1.100	B	2,3
				1 748.44	872 580–929 774	3–3	8.17−01	3.74−02	6.47−01	−0.950	B+	2,3
				1 770.41	873 290–929 774	5–3	2.94−02	8.27−04	2.41−02	−2.384	C	2,3
88		$^3\mathrm{P}-^3\mathrm{P}^\circ$				9–9						
				1 649.35	873 290–933 920	5–5	1.31+00	5.33−02	1.45+00	−0.574	B+	2,3
				1 616.03	872 580–934 460	3–3	8.41−01	3.29−02	5.25−01	−1.006	B	2,3
				1 634.79	873 290–934 460	5–3	6.38−01	1.53−02	4.13−01	−1.116	B	2,3
				[1 608.8]	872 580–934 740	3–1	1.91+00	2.47−02	3.92−01	−1.130	B	2,3

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No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	$E_i - E_k$ (cm^{-1})	$g_i - g_k$	A_{ki} (10^8 s−1)	f_{ik}	S (a.u.)	log gf	Acc.	Source
				1 630.26	872 580–933 920	3–5	5.42−03	3.60−04	5.79−03	−2.967	D	2,3
89	$2s^22p3p-2s2p^2(^4\mathrm{P})3p$	$^3\mathrm{P}-{}^3\mathrm{S}^\circ$				9–3						1
				1 025.12	873 290–970 840	5–3	6.46−01	6.11−03	1.03−01	−1.515	D	LS
				1 017.71	872 580–970 840	3–3	3.97−01	6.16−03	6.19−02	−1.733	E+	LS
90		$^3\mathrm{P}-{}^3\mathrm{D}^\circ$				9–15						1
				810.04	873 290–996 740	5–7	3.99+00	5.49−02	7.32−01	−0.561	C	LS
				810.18	872 580–996 010	3–5	2.99+00	4.90−02	3.92−01	−0.833	D+	LS
				814.86	873 290–996 010	5–5	9.79−01	9.75−03	1.31−01	−1.312	D	LS
91		$^3\mathrm{P}-{}^3\mathrm{P}^\circ$				9–9						1
				755.17	873 290–1 005 710	5–5	2.70+00	2.31−02	2.87−01	−0.937	D+	LS
				[754.8]	872 580–1 005 070	3–3	9.03−01	7.71−03	5.75−02	−1.636	E+	LS
				[758.8]	873 290–1 005 070	5–3	1.48+00	7.67−03	9.58−02	−1.416	D	LS
				751.15	872 580–10 05 710	3–5	9.15−01	1.29−02	9.57−02	−1.412	D	LS
92	$2s^22p3p-2s2p^2(^2\mathrm{D})3p$	$^3\mathrm{P}-{}^3\mathrm{D}^\circ$				9–15						1
				599.05	873 290–1 040 220	5–7	2.16+00	1.63−02	1.61−01	−1.089	D	LS
				596.52	872 580–1 040 220	3–5	1.64+00	1.46−02	8.60−02	−1.359	D	LS
				599.05	873 290–1 040 220	5–5	5.39−01	2.90−03	2.86−02	−1.839	E+	LS
				596.52	872 580–1 040 220	3–3	9.11−01	4.86−03	2.86−02	−1.836	E+	LS
				599.05	873 290–1 040 220	5–3	6.01−01	1.94−04	1.91−03	−3.013	E	LS
93	$2p3p-2p4s$	$^3\mathrm{P}-{}^3\mathrm{P}^\circ$				9–9						1
				459.834	873 290–1 090 760	5–5	5.24+00	1.66−02	1.26−01	−1.081	D	LS
				458.337	872 580–1 090 760	3–5	1.76+00	9.26−03	4.19−02	−1.556	E+	LS
94	$2p3p-2p4d$	$^3\mathrm{P}-{}^3\mathrm{D}^\circ$				9–15						1
				382.468	873 290–1 134 750	5–7	6.74+01	2.07−01	1.30+00	0.015	C	LS
				382.717	872 580–1 133 870	3–5	5.05+01	1.85−01	6.99−01	−0.256	C	LS
				383.759	873 290–1 133 870	5–5	1.67+01	3.68−02	2.32−01	−0.735	D+	LS
				383.274	872 580–1 133 490	3–3	2.79+01	6.15−02	2.33−01	−0.734	D+	LS
				384.320	873 290–1 133 490	5–3	1.84+00	2.45−03	1.55−02	−1.912	E+	LS
95		$^3\mathrm{P}-{}^3\mathrm{P}^\circ$				9–9						1
				380.098	873 290–1 136 380	5–5	3.40+01	7.36−02	4.60−01	−0.434	D+	LS
				379.075	872 580–1 136 380	3–5	1.14+01	4.10−02	1.53−01	−0.910	D	LS
96	$2p3p-2p5d$	$^3\mathrm{P}-{}^3\mathrm{D}^\circ$				9–15						1
				[281.75]	873 290–1 228 210	5–7	3.32+01	5.53−02	2.56−01	−0.558	D+	LS
97	$2s^22p3d-2s2p^2(^4\mathrm{P})3s$	$^3\mathrm{D}^\circ-{}^3\mathrm{P}$	*4 835*	*4 836*	*930 193–950 871*	15–9	2.03−02	4.24−03	1.01+00	−1.197	D+	1
			4 787.9	4 789.3	930 510–951 390	7–5	1.73−02	4.26−03	4.70−01	−1.525	D+	LS
			4 907.8	4 909.2	930 000–950 370	5–3	1.43−02	3.11−03	2.51−01	−1.808	D+	LS
			4 997.1	4 998.5	929 774–949 780	3–1	1.82−02	2.27−03	1.12−01	−2.167	D	LS
			4 673.8	4 675.1	930 000–951 390	5–5	3.33−03	1.09−03	8.39−02	−2.264	D	LS
			4 854.0	4 855.3	929 774–950 370	3–3	4.95−03	1.75−03	8.39−02	−2.280	D	LS
			4 624.9	4 626.2	929 774–951 390	3–5	2.28−04	1.22−04	5.57−03	−3.437	E	LS
98		$^3P^\circ-{}^3\mathrm{P}$	*5 990*	*5 995*	*934 191–95 0 871*	9–9	3.21−03	1.73−03	3.07−01	−1.808	E+	1
			5 723	5 724	933 920–951 390	5–5	2.77−03	1.36−03	1.28−01	−2.167	D	LS
			6 284	6 285	934 460–950 370	3–3	6.97−04	4.13−04	2.56−02	−2.907	E+	LS

TABLE 24. Transition probabilities of allowed lines for Na VI (references for this table are as follows: 1=Luo and Pradhan,[56] 2=Tachiev and Froese Fischer,[94] 3=Aggarwal *et al.*,[4] 4=Fawcett,[21] and 5=Mendoza *et al.*[62])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s−1)	f_{ik}	S (a.u.)	log gf	Acc.	Source
			6 077	6 079	933 920–950 370	5–3	1.28−03	4.27−04	4.27−02	−2.671	E+	LS
			6 526	6 527	934 460–949 780	3–1	2.49−03	5.30−04	3.42−02	−2.799	E+	LS
			5 905	5 907	934 460–951 390	3–5	8.40−04	7.32−04	4.27−02	−2.658	E+	LS
			[6 396]	[6 398]	934 740–950 370	1–3	8.80−04	1.62−03	3.41−02	−2.790	E+	LS
99	$2s^22p3d-2s2p^2(^2\mathrm{D})3s$	$^1\mathrm{F}^\circ-^1\mathrm{D}$		1 137.53	945 450–1 033 360	7–5	4.80−01	6.65−03	1.74−01	−1.332	D	1
100	$2s^22p3d-2s2p^2(^2\mathrm{D})3d$	$^3\mathrm{F}^\circ-^3\mathrm{F}$				21–21						1
				485.814	919 480–1 125 320	5–5	1.20+01	4.24−02	3.39−01	−0.674	D+	LS
				485.814	919 480–1 125 320	5–7	1.07+00	5.29−03	4.23−02	−1.578	E+	LS
101		$^1\mathrm{D}^\circ-^1\mathrm{D}$		440.509	920 850–1 147 860	5–5	1.58+01	4.59−02	3.33−01	−0.639	D+	1
102		$^1\mathrm{D}^\circ-^1\mathrm{P}$		433.971	920 850–1 151 280	5–3	8.85+00	1.50−02	1.07−01	−1.125	D	1
103		$^3\mathrm{D}^\circ-^3\mathrm{F}$		*512.49*	*930 193–1 125 320*	15–21	1.91+00	1.05−02	2.66−01	−0.803	D	1
				513.321	930 510–1 125 320	7–9	1.90+00	9.63−03	1.14−01	−1.171	D	LS
				511.980	930 000–1 125 320	5–7	1.70+00	9.34−03	7.87−02	−1.331	D	LS
				511.389	929 774–1 125 320	3–5	1.61+00	1.05−02	5.30−02	−1.502	E+	LS
				513.321	930 510–1 125 320	7–7	2.11−01	8.34−04	9.87−03	−2.234	E	LS
				511.980	930 000–1 125 320	5–5	2.98−01	1.17−03	9.86−03	−2.233	E	LS
				513.321	930 510–1 125 320	7–5	8.33−03	2.35−05	2.78−04	−3.784	E	LS
104		$^3\mathrm{D}^\circ-^3\mathrm{D}$		*490.44*	*930 193–1 134 090*	15–15	1.69+01	6.10−02	1.48+00	−0.039	D+	1
				491.207	930 510–1 134 090	7–7	1.50+01	5.41−02	6.12−01	−0.422	C	LS
				489.980	930 000–1 134 090	5–5	1.18+01	4.25−02	3.43−01	−0.673	D+	LS
				489.438	929 774–1 134 090	3–3	1.28+01	4.58−02	2.21−01	−0.862	D+	LS
				491.207	930 510–1 134 090	7–5	2.62+00	6.78−03	7.67−02	−1.324	D	LS
				489.980	930 000–1 134 090	5–3	4.24+00	9.15−03	7.38−02	−1.340	D	LS
				489.980	930 000–1 134 090	5–7	1.89+00	9.52−03	7.68−02	−1.322	D	LS
				489.438	929 774–1 134 090	3–5	2.56+00	1.53−02	7.40−02	−1.338	D	LS
105		$^3\mathrm{P}^\circ-^3\mathrm{P}$		*509.06*	*934 191–1 130 630*	9–9	1.00+01	3.89−02	5.87−01	−0.456	D	1
				508.363	933 920–1 130 630	5–5	7.54+00	2.92−02	2.44−01	−0.836	D+	LS
				509.762	934 460–1 130 630	3–3	2.49+00	9.71−03	4.89−02	−1.536	E+	LS
				508.363	933 920–1 130 630	5–3	4.19+00	9.74−03	8.15−02	−1.312	D	LS
				509.762	934 460–1 130 630	3–1	1.00+01	1.30−02	6.54−02	−1.409	D	LS
				509.762	934 460–1 130 630	3–5	2.50+00	1.62−02	8.16−02	−1.313	D	LS
				[510.49]	934 740–1 130 630	1–3	3.31+00	3.88−02	6.52−02	−1.411	D	LS
106		$^3\mathrm{P}^\circ-^3\mathrm{S}$		*475.99*	*934 191–1 144 280*	9–3	1.02+01	1.16−02	1.63−01	−0.981	D	1
				475.376	933 920–1 144 280	5–3	5.71+00	1.16−02	9.08−02	−1.237	D	LS
				476.599	934 460–1 144 280	3–3	3.38+00	1.15−02	5.41−02	−1.462	E+	LS
				[477.24]	934 740–1 144 280	1–3	1.12+00	1.15−02	1.81−02	−1.939	E+	LS
107		$^1\mathrm{P}^\circ-^1\mathrm{D}$		496.697	946 530–1 147 860	3–5	6.34+00	3.91−02	1.92−01	−0.931	D	1
108		$^1\mathrm{P}^\circ-^1\mathrm{P}$		488.400	946 530–1 151 280	3–3	4.98+00	1.78−02	8.59−02	−1.272	D	1
109	$2s2p^2(^4\mathrm{P})3s-2s2p^2(^4\mathrm{P})3p$	$^3\mathrm{P}-^3\mathrm{S}^\circ$	*5 006*	*5 008*	*950 871–970 840*	9–3	1.34−01	1.68−02	2.50+00	−0.820	C	1
			5 140.0	5 141.4	951 390–970 840	5–3	6.90−02	1.64−02	1.39+00	−1.086	C	LS
			4 883.8	4 885.2	950 370–970 840	3–3	4.84−02	1.73−02	8.35−01	−1.285	C	LS
			4 747.0	4 748.3	949 780–970 840	1–3	1.75−02	1.77−02	2.77−01	−1.752	D+	LS
110		$^3\mathrm{P}-^3\mathrm{D}^\circ$				9–15						1

TABLE 24. Transition probabilities of allowed lines for Na VI (references for this table are as follows: 1=Luo and Pradhan,[56] 2=Tachiev and Froese Fischer,[94] 3=Aggarwal *et al.*,[4] 4=Fawcett,[21] and 5=Mendoza *et al.*[62])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s−1)	f_{ik}	S (a.u.)	log gf	Acc.	Source
			2 204.4	2 205.1	951 390–996 740	5–7	1.63+00	1.66−01	6.03+00	−0.081	B	LS
			2 190.4	2 191.1	950 370–996 010	3–5	1.24+00	1.49−01	3.22+00	−0.350	C+	LS
			2 240.5	2 241.1	951 390–996 010	5–5	3.86−01	2.91−02	1.07+00	−0.837	C	LS
111		^{3}P–^{3}P$^\circ$				9–9						1
				1 840.9	951 390–1 005 710	5–5	2.20+00	1.12−01	3.39+00	−0.252	C+	LS
				[1 828]	950 370–1 005 070	3–3	7.50−01	3.76−02	6.79−01	−0.948	C	LS
				[1 863]	951 390–1 005 070	5–3	1.18+00	3.69−02	1.13+00	−0.734	C	LS
				1 807.0	950 370–1 005 710	3–5	7.77−01	6.34−02	1.13+00	−0.721	C	LS
				[1 809]	949 780–1 005 070	1–3	1.03+00	1.52−01	9.05−01	−0.818	C	LS
112	2s2p^2(^{4}P)3s–2s2p^2(^{2}D)3p	^{3}P–^{3}D$^\circ$		*1 119.2*	*950 871–1 040 220*	9–15	1.02+00	3.20−02	1.06+00	−0.541	D+	1
				1 125.75	951 390–1 040 220	5–7	1.00+00	2.67−02	4.95−01	−0.875	D+	LS
				1 112.97	950 370–1 040 220	3–5	7.79−01	2.41−02	2.65−01	−1.141	D+	LS
				1 105.71	949 780–1 040 220	1–3	5.87−01	3.23−02	1.18−01	−1.491	D	LS
				1 125.75	951 390–1 040 220	5–5	2.51−01	4.76−03	8.82−02	−1.623	D	LS
				1 112.97	950 370–1 040 220	3–3	4.32−01	8.03−03	8.83−02	−1.618	D	LS
				1 125.75	951 390–1 040 220	5–3	2.78−02	3.17−04	5.87−03	−2.800	E	LS
113	2s2p^2(^{4}P)3s–2$s^2$2p4d	^{3}P–^{3}D$^\circ$		*545.45*	*950 871–1 134 205*	9–15	7.06+00	5.25−02	8.48−01	−0.326	D	1
				545.375	951 390–1 134 750	5–7	7.06+00	4.41−02	3.96−01	−0.657	D+	LS
				544.959	950 370–1 133 870	3–5	5.31+00	3.94−02	2.12−01	−0.927	D	LS
				544.336	949 780–1 133 490	1–3	3.95+00	5.26−02	9.43−02	−1.279	D	LS
				548.005	951 390–1 133 870	5–5	1.74+00	7.83−03	7.06−02	−1.407	D	LS
				546.090	950 370–1 133 490	3–3	2.93+00	1.31−02	7.07−02	−1.406	D	LS
				549.149	951 390–1 133 490	5–3	1.92−01	5.21−04	4.71−03	−2.584	E	LS
114		^{3}P–^{3}P$^\circ$				9–9						1
				540.570	951 390–1 136 380	5–5	3.97+00	1.74−02	1.55−01	−1.060	D	LS
				537.606	950 370–1 136 380	3–5	1.35+00	9.73−03	5.17−02	−1.535	E+	LS
115	2s2p^2(^{4}P)3p–2s2p^2(^{2}D)3s	^{3}D$^\circ$–^{3}D				15–15						1
			5 118.9	5 120.3	996 740–1 016 270	7–7	3.03−03	1.19−03	1.40−01	−2.079	D	LS
			4 934.5	4 935.8	996 010–1 016 270	5–5	2.64−03	9.64−04	7.83−02	−2.317	D	LS
			5 118.9	5 120.3	996 740–1 016 270	7–5	5.31−04	1.49−04	1.76−02	−2.982	E+	LS
			4 934.5	4 935.8	996 010–1 016 270	5–3	9.49−04	2.08−04	1.69−02	−2.983	E+	LS
			4 934.5	4 935.8	996 010–1 016 270	5–7	4.22−04	2.16−04	1.75−02	−2.967	E+	LS
116	2s2p^2(^{4}P)3p–2s2p^2(^{4}P)3d	^{3}S$^\circ$–^{3}P				3–9						1
				1 305.99	970 840–1 047 410	3–5	4.55+00	1.94−01	2.50+00	−0.235	C+	LS
				1 294.33	970 840–1 048 100	3–3	4.66+00	1.17−01	1.50+00	−0.455	C	LS
117		^{3}D$^\circ$–^{3}F				15–21						1
				1 708.82	996 740–1 055 260	7–9	4.18+00	2.35−01	9.25+00	0.216	B	LS
				1 709.69	996 010–1 054 500	5–7	3.72+00	2.28−01	6.42+00	0.057	B	LS
				1 731.30	996 740–1 054 500	7–7	4.47−01	2.01−02	8.02−01	−0.852	C	LS
				1 728.01	996 010–1 053 880	5–5	6.30−01	2.82−02	8.02−01	−0.851	C	LS
				1 750.09	996 740–1 053 880	7–5	1.71−02	5.62−04	2.27−02	−2.405	E+	LS
118		^{3}D$^\circ$–^{3}D				15–15						1
				1 398.21	996 740–1 068 260	7–7	1.86+00	5.46−02	1.76+00	−0.418	C	LS

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No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})$^{\mathrm{a}}$	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s−1)	f_{ik}	S (a.u.)	log gf	Acc.	Source
				1 389.66	996 010–1 067 970	5–5	1.49+00	4.30−02	9.84−01	−0.668	C	LS
				1 403.90	996 740–1 067 970	7–5	3.23−01	6.82−03	2.21−01	−1.321	D+	LS
				1 393.73	996 010–1 067 760	5–3	5.29−01	9.25−03	2.12−01	−1.335	D	LS
				1 384.08	996 010–1 068 260	5–7	2.41−01	9.69−03	2.21−01	−1.315	D+	LS
119		^{3}P$^\circ$–^{3}P				9–9						1
			2 397.4	2 398.1	1 005 710–1 047 410	5–5	5.24−01	4.52−02	1.78+00	−0.646	C	LS
			[2 323]	[2 324]	1 005 070–1 048 100	3–3	1.91−01	1.55−02	3.56−01	−1.333	D+	LS
			2 358.3	2 359.0	1 005 710–1 048 100	5–3	3.06−01	1.53−02	5.94−01	−1.116	C	LS
			[2 361]	[2 362]	1 005 070–1 047 410	3–5	1.83−01	2.55−02	5.95−01	−1.116	C	LS
120		^{3}P$^\circ$–^{3}D				9–15						1
				1 598.72	1 005 710–1 068 260	5–7	4.21+00	2.26−01	5.95+00	0.053	B	LS
				[1 589.8]	1 005 070–1 067 970	3–5	3.21+00	2.03−01	3.19+00	−0.215	C+	LS
				1 606.17	1 005 710–1067 970	5–5	1.04+00	4.01−02	1.06+00	−0.698	C	LS
				[1 595.2]	1 005 070–1 067 760	3–3	1.76+00	6.73−02	1.06+00	−0.695	C	LS
				1 611.60	1 005 710–1 067 760	5–3	1.14−01	2.66−03	7.06−02	−1.876	D	LS
121	$2s2p^2(^4\mathrm{P})3p$–$2s2p^2(^2\mathrm{D})3d$	^{3}D$^\circ$–^{3}P				15–9						1
				746.88	996 740–1 130 630	7–5	7.99−01	4.77−03	8.21−02	−1.476	D	LS
				742.83	996 010–1 130 630	5–3	7.25−01	3.60−03	4.40−02	−1.745	E+	LS
				742.83	996 010–1 130 630	5–5	1.45−01	1.20−03	1.47−02	−2.222	E+	LS
122		^{3}D$^\circ$–^{3}D				15–15						1
				728.07	996 740–1 134 090	7–7	9.80−01	7.79−03	1.31−01	−1.263	D	LS
				724.22	996 010–1 134 090	5–5	7.80−01	6.13−03	7.31−02	−1.514	D	LS
				728.07	996 740–1 134 090	7–5	1.72−01	9.76−04	1.64−02	−2.165	E+	LS
				724.22	996 010–1 134 090	5–3	2.80−01	1.32−03	1.57−02	−2.180	E+	LS
				724.22	996 010–1 134 090	5–7	1.24−01	1.37−03	1.63−02	−2.164	E+	LS
123	$2s2p^2(^4\mathrm{P})3p$–$2s2p^2(^4\mathrm{P})4s$	^{3}S$^\circ$–^{3}P				3–9						1
				[410.93]	970 840–1 214 190	3–5	9.36+00	3.95−02	1.60−01	−0.926	D	LS
124		^{3}D$^\circ$–^{3}P				15–9						1
				[459.88]	996 740–1 214 190	7–5	4.05+01	9.17−02	9.72−01	−0.193	C	LS
				[458.34]	996 010–1 214 190	5–5	7.30+00	2.30−02	1.74−01	−0.939	D	LS
125		^{3}P$^\circ$–^{3}P				9–9						1
				[479.66]	1 005 710–1 214 190	5–5	1.26+01	4.36−02	3.44−01	−0.662	D+	LS
				[478.19]	1 005 070–1 214 190	3–5	4.25+00	2.43−02	1.15−01	−1.137	D	LS
126	$2s2p^2(^4\mathrm{P})3p$–$2s2p^2(^4\mathrm{P})4d$	^{3}D$^\circ$–^{3}F				15–21						1
				387.582	996 740–1 254 750	7–9	7.18+01	2.08−01	1.86+00	0.163	C	LS
				387.687	996 010–1 253 950	5–7	6.37+01	2.01−01	1.28+00	0.002	C	LS
				388.787	996 740–1 253 950	7–7	7.94+00	1.80−02	1.61−01	−0.900	D	LS
				388.561	996 010–1 253 370	5–5	1.11+01	2.52−02	1.61−01	−0.900	D	LS
				389.666	996 740–1 253 370	7–5	3.11−01	5.06−04	4.54−03	−2.451	E	LS
127		^{3}D$^\circ$–^{3}D				15–15						1
				381.869	996 740–1 258 610	7–7	1.11+01	2.42−02	2.13−01	−0.771	D	LS
				380.807	996 010–1 258 610	5–5	8.74+00	1.90−02	1.19−01	−1.022	D	LS
				381.869	996 740–1 258 610	7–5	1.94+00	3.03−03	2.67−02	−1.673	E+	LS

TABLE 24. Transition probabilities of allowed lines for Na VI (references for this table are as follows: 1=Luo and Pradhan,[56] 2=Tachiev and Froese Fischer,[94] 3=Aggarwal *et al.*,[4] 4=Fawcett,[21] and 5=Mendoza *et al.*[62])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s−1)	f_{ik}	S (a.u.)	log gf	Acc.	Source
				380.807	996 010–1 258 610	5–3	3.14+00	4.09−03	2.56−02	−1.689	E+	LS
				380.807	996 010–1 258 610	5–7	1.40+00	4.25−03	2.66−02	−1.673	E+	LS
128		$^3P^\circ-^3D$				9–15						1
				395.413	1 005 710–1 258 610	5–7	4.48+01	1.47−01	9.57−01	−0.134	C	LS
				[394.42]	1 005 070–1 258 610	3–5	3.40+01	1.32−01	5.14−01	−0.402	D+	LS
				395.413	1 005 710–1 258 610	5–5	1.12+01	2.63−02	1.71−01	−0.881	D	LS
				[394.42]	1 005 070–1 258 610	3–3	1.88+01	4.39−02	1.71−01	−0.880	D	LS
				395.413	1 005 710–1 258 610	5–3	1.24+00	1.75−03	1.14−02	−2.058	E	LS
129	$2s2p^2(^4P)3p$–$2p^3(^4S^\circ)3p$	$^3S^\circ-^3P$		*339.28*	*970 840–1 265 580*	3–9	4.21+01	2.18−01	7.31−01	−0.184	D+	1
				339.282	970 840–1 265 580	3–5	4.21+01	1.21−01	4.05−01	−0.440	D+	LS
				339.282	970 840–1 265 580	3–3	4.22+01	7.29−02	2.44−01	−0.660	D+	LS
				339.282	970 840–1 265 580	3–1	4.22+01	2.43−02	8.14−02	−1.137	D	LS
130		$^3D^\circ-^3P$				15–9						1
				371.968	996 740–1 265 580	7–5	2.70+01	4.00−02	3.43−01	−0.553	D+	LS
				370.961	996 010–1 265 580	5–3	2.42+01	3.00−02	1.83−01	−0.824	D	LS
				370.961	996 010–1 265 580	5–5	4.85+00	1.00−02	6.11−02	−1.301	E+	LS
131		$^3P^\circ-^3P$				9–9						1
				384.808	1 005 710–1 265 580	5–5	5.90+01	1.31−01	8.30−01	−0.184	C	LS
				[383.86]	1 005 070–1 265 580	3–3	1.98+01	4.38−02	1.66−01	−0.881	D	LS
				384.808	1 005 710–1 265 580	5–3	3.28+01	4.37−02	2.77−01	−0.661	D+	LS
				[383.86]	1 005 070–1 265 580	3–1	7.93+01	5.84−02	2.21−01	−0.756	D+	LS
				[383.86]	1 005 070–1 265 580	3–5	1.98+01	7.30−02	2.77−01	−0.660	D+	LS
132	$2s2p^2(^4P)3p$–$2s2p^2(^4D)4d$	$^3D^\circ-^3F$				15–21						1
				295.994	996 740–1 334 585	7–9	1.53+01	2.58−02	1.76−01	−0.743	D	LS
				295.356	996 010–1 334 585	5–7	1.37+01	2.50−02	1.22−01	−0.903	D	LS
				295.994	996 740–1 334 585	7–7	1.70+00	2.23−03	1.52−02	−1.807	E+	LS
				295.356	996 010–1 334 585	5–5	2.40+00	3.14−03	1.53−02	−1.804	E+	LS
				295.994	996 740–1 334 585	7–5	6.71−02	6.30−05	4.30−04	−3.356	E	LS
133	$2s2p^2(^2D)3s$–$2s2p^2(^2D)3p$	$^3D-^3D^\circ$	*4 174*	*4 175*	*1 016 270–1 040 220*	15–15	2.60−01	6.80−02	1.40+01	0.009	C+	1
			4 174.2	4 175.4	1 016 270–1 040 220	7–7	2.31−01	6.04−02	5.81+00	−0.374	B	LS
			4 174.2	4 175.4	1 016 270–1 040 220	5–5	1.81−01	4.73−02	3.25+00	−0.626	C+	LS
			4 174.2	4 175.4	1 016 270–1 040 220	3–3	1.95−01	5.10−02	2.10+00	−0.815	C	LS
			4 174.2	4 175.4	1 016 270–1 040 220	7–5	4.06−02	7.58−03	7.29−01	−1.275	C	LS
			4 174.2	4 175.4	1 016 270–1 040 220	5–3	6.50−02	1.02−02	7.01−01	−1.292	C	LS
			4 174.2	4 175.4	1 016 270–1 040 220	5–7	2.90−02	1.06−02	7.29−01	−1.276	C	LS
			4 174.2	4 175.4	1 016 270–1 040 220	3–5	3.90−02	1.70−02	7.01−01	−1.292	C	LS
134		$^1D-^1F^\circ$	2 584.5	2 585.3	1 033 360–1 072 040	5–7	1.03+00	1.44−01	6.13+00	−0.143	B	1
135		$^1D-^1D^\circ$	2 245.0	2 245.7	1 033 360–1077 890	5–5	1.47+00	1.11−01	4.10+00	−0.256	C+	1
136	$2s2p^2(^2D)3s$–$2s^22p4s$	$^3D-^3P^\circ$				15–9						1
				1 342.46	1 016 270–1 090 760	7–5	2.43+00	4.69−02	1.45+00	−0.484	C	LS
				1 342.46	1 016 270–1 090 760	5–5	4.33−01	1.17−02	2.59−01	−1.233	D+	LS
				1 342.46	1 016 270–1090 760	3–5	2.89−02	1.30−03	1.72−02	−2.409	E+	LS
137	$2s2p^2(^2D)3s$–$2s^22p4d$	$^3D-^3F^\circ$				15–21						1

TABLE 24. Transition probabilities of allowed lines for Na VI (references for this table are as follows: 1=Luo and Pradhan,[56] 2=Tachiev and Froese Fischer,[94] 3=Aggarwal *et al.*,[4] 4=Fawcett,[21] and 5=Mendoza *et al.*[62])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})$^{\text{a}}$	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s-1)	f_{ik}	S (a.u.)	log gf	Acc.	Source
				889.52	1 016 270–1 128 690	3–5	4.88−01	9.65−03	8.48−02	−1.538	D	LS
				889.52	1 016 270–1 128 690	5–5	9.10−02	1.08−03	1.58−02	−2.268	E+	LS
				889.52	1 016 270–1 128 690	7–5	2.56−03	2.17−05	4.45−04	−3.818	E	LS
138		^{1}D−^{1}D$^\circ$		1 022.39	1 033 360–1 131 170	5–5	3.12−01	4.89−03	8.23−02	−1.612	D	1
139		^{1}D−^{1}F$^\circ$		930.23	1 033 360–1 140 860	5–7	1.21+00	2.19−02	3.35−01	−0.961	D+	1
140	$2s2p^2(^2\text{D})3p$– $2s2p^2(^4\text{P})3d$	^{3}D$^\circ$−^{3}F	*6 910*	*6 917*	*1 040 220–1 054 678*	15–21	4.74−04	4.76−04	1.63−01	−2.146	E+	1
			6 647	6 649	1 040 220–1 055 260	7–9	5.34−04	4.55−04	6.97−02	−2.497	D	LS
			7 001	7 003	1 040 220–1 054 500	5–7	4.06−04	4.18−04	4.82−02	−2.680	E+	LS
			7 319	7 321	1 040 220–1 053 880	3–5	3.36−04	4.50−04	3.25−02	−2.870	E+	LS
			7 001	7 003	1 040 220–1 054 500	7–7	5.10−05	3.75−05	6.05−03	−3.581	E	LS
			7 319	7 321	1 040 220–1 053 880	5–5	6.25−05	5.02−05	6.05−03	−3.600	E	LS
			7 319	7 321	1 040 220–1 053 880	7–5	1.76−06	1.01−06	1.70−04	−5.151	E	LS
141	$2s2p^2(^2\text{D})3p$– $2s2p^2(^2\text{D})3d$	^{3}D$^\circ$−^{3}F		*1 175.1*	*1 040 220–1 125 320*	15–21	7.45+00	2.16−01	1.25+01	0.511	C+	1
				1 175.09	1 040 220–1 125 320	7–9	7.44+00	1.98−01	5.36+00	0.142	C+	LS
				1 175.09	1 040 220–1 125 320	5–7	6.62+00	1.92−01	3.71+00	−0.018	C+	LS
				1 175.09	1 040 220–1 125 320	3–5	6.26+00	2.16−01	2.51+00	−0.188	C+	LS
				1 175.09	1 040 220–1 125 320	7–7	8.31−01	1.72−02	4.66−01	−0.919	D+	LS
				1 175.09	1 040 220–1 125 320	5–5	1.16+00	2.40−02	4.64−01	−0.921	D+	LS
				1 175.09	1 040 220–1 125 320	7–5	3.27−02	4.84−04	1.31−02	−2.470	E	LS
142		^{3}D$^\circ$−^{3}P		*1 106.1*	*1 040 220–1 130 630*	15–9	3.70+00	4.07−02	2.23+00	−0.214	D+	1
				1 106.07	1 040 220–1 130 630	7–5	3.11+00	4.07−02	1.04+00	−0.545	C	LS
				1 106.07	1 040 220–1 130 630	5–3	2.78+00	3.06−02	5.57−01	−0.815	D+	LS
				1 106.07	1 040 220–1 130 630	3–1	3.70+00	2.26−02	2.47−01	−1.169	D+	LS
				1 106.07	1 040 220–1 130 630	5–5	5.56−01	1.02−02	1.86−01	−1.292	D	LS
				1 106.07	1 040 220–1 130 630	3–3	9.27−01	1.70−02	1.86−01	−1.292	D	LS
				1 106.07	1 040 220–1 130 630	3–5	3.70−02	1.13−03	1.23−02	−2.470	E	LS
143		^{3}D$^\circ$−^{3}D		*1 065.3*	*1 040 220–1 134 090*	15–15	6.37+00	1.08−01	5.70+00	0.210	C	1
				1 065.30	1 040 220–1 134 090	7–7	5.65+00	9.62−02	2.36+00	−0.172	C+	LS
				1 065.30	1 040 220–1 134 090	5–5	4.43+00	7.54−02	1.32+00	−0.424	C	LS
				1 065.30	1 040 220–1 134 090	3–3	4.77+00	8.12−02	8.54−01	−0.613	C	LS
				1 065.30	1 040 220–1 134 090	7–5	9.96−01	1.21−02	2.97−01	−1.072	D+	LS
				1 065.30	1 040 220–1 134 090	5–3	1.59+00	1.62−02	2.84−01	−1.092	D+	LS
				1 065.30	1 040 220–1 134 090	5–7	7.10−01	1.69−02	2.96−01	−1.073	D+	LS
				1 065.30	1 040 220–1 134 090	3–5	9.56−01	2.71−02	2.85−01	−1.090	D+	LS
144		^{1}F$^\circ$−^{1}D		1 318.91	1 072 040–1 147 860	7–5	9.99−01	1.86−02	5.65−01	−0.885	D+	1
145		^{1}D$^\circ$−^{1}D		1 429.18	1 077 890–1 147 860	5–5	3.16+00	9.69−02	2.28+00	−0.315	C+	1
146		^{1}D$^\circ$−^{1}P		1 362.58	1 077 890–1 151 280	5–3	1.95+00	3.26−02	7.31−01	−0.788	C	1
147	$2s2p^2(^2\text{D})3p$– $2s2p^2(^4\text{P})4s$	^{3}D$^\circ$−^{3}P				15–9						1
				[574.8]	1 040220–1 214 190	7–5	4.72+00	1.67−02	2.21−01	−0.932	D+	LS
				[574.8]	1 040 220–1 214 190	5–5	8.44−01	4.18−03	3.96−02	−1.680	E+	LS
				[574.8]	1 040 220–1 214 190	3–5	5.62−02	4.64−04	2.63−03	−2.856	E	LS
148	$2s2p^2(^2\text{D})3p$– $2s2p^2(^4\text{P})4d$	^{3}D$^\circ$−^{3}F		*467.43*	*1 040 220–1 254 155*	15–21	2.75+00	1.26−02	2.91−01	−0.724	D	1

TABLE 24. Transition probabilities of allowed lines for Na VI (references for this table are as follows: 1=Luo and Pradhan,[56] 2=Tachiev and Froese Fischer,[94] 3=Aggarwal *et al.*,[4] 4=Fawcett,[21] and 5=Mendoza *et al.*[62])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s−1)	f_{ik}	S (a.u.)	log gf	Acc.	Source
				466.135	1 040 220–1 254 750	7–9	2.77+00	1.16−02	1.25−01	−1.090	D	LS
				467.880	1 040 220–1 253 950	5–7	2.44+00	1.12−02	8.63−02	−1.252	D	LS
				469.153	1 040 220–1 253 370	3–5	2.29+00	1.26−02	5.84−02	−1.423	E+	LS
				467.880	1 040 220–1 253 950	7–7	3.05−01	1.00−03	1.08−02	−2.155	E	LS
				469.153	1 040 220–1 253 370	5–5	4.24−01	1.40−03	1.08−02	−2.155	E	LS
				469.153	1 040 220–1 253 370	7–5	1.20−02	2.83−05	3.06−04	−3.703	E	LS
149		^{3}D$^\circ$−^{3}D		*457.90*	*1 040 220–1 258 610*	15–15	3.49+00	1.10−02	2.48−01	−0.783	E+	1
				457.896	1 040 220–1 258 610	7–7	3.10+00	9.76−03	1.03−01	−1.165	D	LS
				457.896	1 040 220–1 258 610	5–5	2.43+00	7.64−03	5.76−02	−1.418	E+	LS
				457.896	1 040 220–1 258 610	3–3	2.62+00	8.23−03	3.72−02	−1.607	E+	LS
				457.896	1 040 220–1 258 610	7–5	5.43−01	1.22−03	1.29−02	−2.069	E	LS
				457.896	1 040 220–1 258 610	5–3	8.75−01	1.65−03	1.24−02	−2.084	E	LS
				457.896	1 040 220–1 258 610	5–7	3.89−01	1.71−03	1.29−02	−2.068	E	LS
				457.896	1 040 220–1 258 610	3–5	5.23−01	2.74−03	1.24−02	−2.085	E	LS
150	$2s2p^2(^2\mathrm{D})3p$–$2s2p^2(^2\mathrm{D})4d$	^{3}D$^\circ$−^{3}F		*339.71*	*1 040 220–1 334 585*	15–21	6.75+01	1.63−01	2.74+00	0.388	C	1
				339.714	1 040 220–1 334 585	7–9	6.74+01	1.50−01	1.17+00	0.021	C	LS
				339.714	1 040 220–1 334 585	5–7	5.99+01	1.45−01	8.11−01	−0.140	C	LS
				339.714	1 040 220–1 334 585	3–5	5.69+01	1.64−01	5.50−01	−0.308	D+	LS
				339.714	1 040 220–1 334 585	7–7	7.51+00	1.30−02	1.02−01	−1.041	D	LS
				339.714	1 040 220–1 334 585	5–5	1.05+01	1.82−02	1.02−01	−1.041	D	LS
				339.714	1 040 220–1 334 585	7–5	2.97−01	3.67−04	2.87−03	−2.590	E	LS
151		^{3}D$^\circ$−^{3}P		*338.64*	*1 040 220–1 335 520*	15–9	1.15+01	1.18−02	1.98−01	−0.752	E+	1
				338.639	1 040 220–1 335 520	7–5	9.61+00	1.18−02	9.21−02	−1.083	D	LS
				338.639	1 040 220–1 335 520	5–3	8.60+00	8.87−03	4.94−02	−1.353	E+	LS
				338.639	1 040 220–1 335 520	3–1	1.15+01	6.57−03	2.20−02	−1.705	E+	LS
				338.639	1 040 220–1 335 520	5–5	1.72+00	2.96−03	1.65−02	−1.830	E+	LS
				338.639	1 040 220–1 335 520	3–3	2.87+00	4.93−03	1.65−02	−1.830	E+	LS
				338.639	1 040 220–1 335 520	3–5	1.15−01	3.29−04	1.10−03	−3.006	E	LS
152	$2s2p^2(^4\mathrm{P})3d$–$2s^22p4s$	^{3}D−^{3}P$^\circ$				15–9						1
			4 443.2	4 444.4	1 068 260–1 090 760	7–5	4.38−03	9.26−04	9.48−02	−2.188	D	LS
			4 386.7	4 387.9	1 067 970–1 090 760	5–5	8.11−04	2.34−04	1.69−02	−2.932	E+	LS
			4 346.6	4 347.8	1 067 760–1 090 760	3–5	5.57−05	2.63−05	1.13−03	−4.103	E	LS
153	$2s^22p4s$–$2s2p^2(^2\mathrm{D})3d$	^{3}P$^\circ$−^{3}P				9–9						1
			2 507.4	2 508.2	1 090 760–1 130 630	5–5	6.45−01	6.08−02	2.51+00	−0.517	C+	LS
			2 507.4	2 508.2	1 090 760–1 130 630	5–3	3.59−01	2.03−02	8.38−01	−0.994	C	LS
154		^{3}P$^\circ$−^{3}D				9–15						1
			2 307.2	2 307.9	1 0907 60–1 134 090	5–7	5.08−01	5.68−02	2.16+00	−0.547	C	LS
			2 307.2	2 307.9	1 090 760–1 134 090	5–5	1.26−01	1.01−02	3.84−01	−1.297	D+	LS
			2 307.2	2 307.9	1 090 760–1 134 090	5–3	1.41−02	6.76−04	2.57−02	−2.471	E+	LS
155		^{3}P$^\circ$−^{3}S				9–3						1
				1868.5	1 090 760–1 144 280	5–3	1.28+00	4.01−02	1.23+00	−0.698	C	LS
156	$2s^22p4s$–$2s2p^2(^4\mathrm{P})4d$	^{3}P$^\circ$−^{3}D				9–15						1
				595.77	1 090 760–1 258 610	5–7	2.21+00	1.65−02	1.62−01	−1.084	D	LS
				595.77	1 090 760–1 258 610	5–5	5.52−01	2.94−03	2.88−02	−1.833	E+	LS
				595.77	1 090 760–1 258 610	5–3	6.14−02	1.96−04	1.92−03	−3.009	E	LS

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No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})$^{\mathrm{a}}$	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s−1)	f_{ik}	S (a.u.)	log gf	Acc.	Source
157	$2s2p^2(^2\mathrm{D})3d-2s^22p4d$	$^3\mathrm{F}-{}^3\mathrm{F}^\circ$				21–21						1
				3 370 cm^{-1}	1 125 320–1 128 690	5–5	2.04−05	2.69−04	1.31−01	−2.871	D	LS
				3 370 cm^{-1}	1 125 320–1 128 690	7–5	2.55−06	2.40−05	1.64−02	−3.775	E+	LS
158		$^3\mathrm{F}-{}^3\mathrm{D}^\circ$	*11 250*	*11 255*	*1 125 320–1 134 205*	21–15	3.50−03	4.75−03	3.70+00	−1.001	C	1
			10 602	10 604	1 125 320–1 134 750	9–7	3.84−03	5.04−03	1.58+00	−1.343	C	LS
			11 693	11 696	1 125 320–1 133 870	7–5	2.77−03	4.06−03	1.09+00	−1.546	C	LS
			12 237	12 240	1 125 320–1 133 490	5–3	2.72−03	3.67−03	7.39−01	−1.736	C	LS
			10 602	10 604	1 125 320–1 134 750	7–7	3.33−04	5.62−04	1.37−01	−2.405	D	LS
			11 693	11 696	1 125 320–1 133 870	5–5	3.48−04	7.13−04	1.37−01	−2.448	D	LS
			10 602	10 604	1 125 320–1 134 750	5–7	9.41−06	2.22−05	3.88−03	−3.955	E	LS
159		$^3\mathrm{P}-{}^3\mathrm{D}^\circ$		*3 575* cm^{-1}	*1 130 630–1 134 205*	9–15	5.03−05	9.86−04	8.18−01	−2.052	D	1
				4 120 cm^{-1}	1 130 630–1 134 750	5–7	7.73−05	9.56−04	3.82−01	−2.321	D+	LS
				3 240 cm^{-1}	1 130 630–1 133 870	3–5	2.82−05	6.71−04	2.05−01	−2.696	D	LS
				2 860 cm^{-1}	1 130 630–1 133 490	1–3	1.44−05	7.90−04	9.09−02	−3.102	D	LS
				3 240 cm^{-1}	1 130 630–1 133 870	5–5	9.38−06	1.34−04	6.81−02	−3.174	D	LS
				2 860 cm^{-1}	1 130 630–1 133 490	3–3	1.07−05	1.97−04	6.80−02	−3.228	D	LS
				2 860 cm^{-1}	1 130 630–1 133 490	5–3	7.18−07	7.90−06	4.55−03	−4.403	E	LS
160		$^3\mathrm{P}-{}^3\mathrm{P}^\circ$				9–9						1
			17 387	17 391	1 130 630–1 136 380	5–5	6.02−05	2.73−04	7.82−02	−2.865	D	LS
			17 387	17 391	1 130 630–1 136 380	3–5	2.01−05	1.52−04	2.61−02	−3.341	E+	LS
161		$^3\mathrm{D}-{}^3\mathrm{P}^\circ$				9–15						1
				2 290 cm^{-1}	1 134 090–1 136 380	7–5	4.68−05	9.56−04	9.62−01	−2.174	C	LS
				2 290 cm^{-1}	1 134 090–1 136 380	5–5	8.36−06	2.39−04	1.72−01	−2.923	D	LS
				2 290 cm^{-1}	1 134 090–1 136 380	3–5	5.58−07	2.66−05	1.15−02	−4.098	E	LS
162	$2s2p^2(^2\mathrm{D})3d-2s^22p5d$	$^3\mathrm{P}-{}^3\mathrm{D}^\circ$				9–15						1
				[1 024.8]	1 130 630–1 228 210	5–7	4.94−01	1.09−02	1.84−01	−1.264	D	LS
163		$^1\mathrm{D}-{}^1\mathrm{F}^\circ$		1 201.20	1 147 860–1 231 110	5–7	1.35−01	4.09−03	8.09−02	−1.689	D	1
164	$2s^22p4d-2s2p^2(^2\mathrm{D})3d$	$^3\mathrm{F}^\circ-{}^3\mathrm{D}$				21–15						1
			18 513	18 519	1 128 690–1 134 090	5–3	2.49−04	7.69−04	2.34−01	−2.415	D+	LS
			18 513	18 519	1 128 690–1 134 090	5–5	2.78−05	1.43−04	4.36−02	−3.146	E+	LS
			18 513	18 519	1 128 690–1 134 090	5–7	5.60−07	4.03−06	1.23−03	−4.696	E	LS
165		$^1\mathrm{D}^\circ-{}^1\mathrm{P}$	4 971.3	4 972.7	1 131 170–1 151 280	5–3	1.49−02	3.31−03	2.71−01	−1.781	D+	1
166		$^3\mathrm{P}^\circ-{}^3\mathrm{S}$				9–3						1
			12 655	12 658	1 136 380–1 144 280	5–3	3.55−04	5.12−04	1.07−01	−2.592	D	LS
167		$^1\mathrm{F}^\circ-{}^1\mathrm{D}$	14 282	14 286	1 140 860–1 147 860	7–5	3.28−04	7.17−04	2.36−01	−2.299	D+	1
168	$2s^22p4d-2s2p^2(^4\mathrm{P})4s$	$^3\mathrm{D}^\circ-{}^3\mathrm{P}$				15–9						1
				[1 258.8]	1 134 750–1 214 190	7–5	1.53+00	2.59−02	7.51−01	−0.742	C	LS
				[1 245.0]	1 133 870–1 214 190	5–5	2.81−01	6.54−03	1.34−01	−1.485	D	LS
				[1 239.2]	1 133 490–1 214 190	3–5	1.90−02	7.30−04	8.93−03	−2.660	E	LS
169		$^3\mathrm{P}^\circ-{}^3\mathrm{P}$				9–9						1
				[1 285.2]	1 1363 80–1 214 190	5–5	4.64−01	1.15−02	2.43−01	−1.240	D+	LS

TABLE 24. Transition probabilities of allowed lines for Na VI (references for this table are as follows: 1=Luo and Pradhan,[56] 2=Tachiev and Froese Fischer,[94] 3=Aggarwal *et al.*,[4] 4=Fawcett,[21] and 5=Mendoza *et al.*[62])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s−1)	f_{ik}	S (a.u.)	log gf	Acc.	Source
170	$2s^22p4d$–$2s2p^2(^2\mathrm{D})4d$	$^3\mathrm{F}^\circ-{}^3\mathrm{F}$				21–21						1
				485.684	1 128 690–1 334 585	5–5	4.30+00	1.52−02	1.22−01	−1.119	D	LS
				485.684	1 128 690–1 334 585	5–7	3.82−01	1.89−03	1.51−02	−2.025	E+	LS
171		$^3\mathrm{D}^\circ-{}^3\mathrm{F}$		*499.05*	*1 134 205–1 334 585*	15–21	7.31+00	3.82−02	9.41−01	−0.242	D+	1
				500.413	1 134 750–1 334 585	7–9	7.25+00	3.50−02	4.04−01	−0.611	D+	LS
				498.219	1 133 870–1 334 585	5–7	6.53+00	3.40−02	2.79−01	−0.770	D+	LS
				497.277	1 133 490–1 334 585	3–5	6.20+00	3.83−02	1.88−01	−0.940	D	LS
				500.413	1 134 750–1 334 585	7–7	8.07−01	3.03−03	3.49−02	−1.673	E+	LS
				498.219	1 133 870–1 334 585	5–5	1.14+00	4.26−03	3.49−02	−1.672	E+	LS
				500.413	1 134 750–1 334 585	7–5	3.19−02	8.55−05	9.86−04	−3.223	E	LS
172		$^3\mathrm{D}^\circ-{}^3\mathrm{P}$		*496.73*	*1 134 205–1 335 520*	15–9	2.62+00	5.81−03	1.43−01	−1.060	E+	1
				498.082	1 134 750–1 335 520	7–5	2.18+00	5.79−03	6.65−02	−1.392	D	LS
				495.909	1 133 870–1 335 520	5–3	1.98+00	4.37−03	3.57−02	−1.661	E+	LS
				494.976	1 133 490–1 335 520	3–1	2.65+00	3.24−03	1.58−02	−2.012	E+	LS
				495.909	1 1 33870–1 335 520	5–5	3.96−01	1.46−03	1.19−02	−2.137	E	LS
				494.976	1 133 490–1 335 520	3–3	6.62−01	2.43−03	1.19−02	−2.137	E	LS
				494.976	1 133 490–1 335 520	3–5	2.65−02	1.62−04	7.92−04	−3.313	E	LS
173		$^3\mathrm{P}^\circ-{}^3\mathrm{P}$				9–9						1
				502.159	1 136 380–1 335 520	5–5	2.02+00	7.63−03	6.31−02	−1.419	D	LS
				502.159	1 136 380–1 335 520	5–3	1.12+00	2.54−03	2.10−02	−1.896	E+	LS
174	$2s2p^2(^4\mathrm{P})4s$–$2s^22p5d$	$^3\mathrm{P}-{}^3\mathrm{D}^\circ$				9–15						1
			[7 131]	[7 133]	1 214 190–1 228 210	5–7	5.88−02	6.28−02	7.37+00	−0.503	B	LS
175	$2s^22p5d$–$2s2p^2(^4\mathrm{P})4d$	$^3\mathrm{D}^\circ-{}^3\mathrm{F}$				15–21						1
			[3 767]	[3 768]	1 228 210–1 254 750	7–9	3.95−02	1.08−02	9.38−01	−1.121	C	LS
			[3 884]	[3 885]	1 228 210–1 253 950	7–7	4.00−03	9.06−04	8.11−02	−2.198	D	LS
			[3 973]	[3 975]	1 228 210–1 253 370	7–5	1.48−04	2.50−05	2.29−03	−3.757	E	LS
176		$^3\mathrm{D}^\circ-{}^3\mathrm{D}$				15–15						1
			[3 289]	[3 289]	1 228 210–1 258 610	7–7	7.58−03	1.23−03	9.32−02	−2.065	D	LS
			[3 289]	[3 289]	1 228 210–1 258 610	7–5	1.34−03	1.55−04	1.17−02	−2.965	E	LS

[a] Wavelengths (Å) are always given unless cm^{-1} is indicated.

10.6.3. Forbidden Transitions for Na VI

The MCHF results of Tachiev and Froese Fischer[94] and the second-order MBPT results of Vilkas *et al.*[118] were used for all the compiled transitions, together with those of Galavis *et al.*[40] where available. As part of the Iron Project, Galavis *et al.*[40] used the SUPERSTRUCTURE code with CI, relativistic effects, and semiempirical energy corrections.

To estimate accuracies, we pooled the relative standard deviation of the mean (RSDM) for each of the lines with transition rates published in two or more references,[40,71,94,118] as described in the general introduction.

10.6.4. References for Forbidden Transitions for Na VI

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[118] M. J. Vilkas, I. Martinson, G. Merkelis, G. Gaigalas, and R. Kisielius, Phys. Scr. **54**, 281 (1996).

TABLE 25. Wavelength finding list for forbidden lines for Na VI

Wavelength (vac) (Å)	Mult. No.
172.868	23
173.216	23
183.933	25
197.584	22
197.857	22
209.004	21
209.513	21
209.522	21
209.759	21
209.829	21
225.398	24
225.683	24
247.413	26
248.223	26
286.024	10
286.977	10
312.606	9
313.745	9
317.641	16
320.190	8
320.907	8
322.107	8
350.765	15
361.249	14
414.351	7
415.553	7
417.568	7
420.343	20
460.348	30
478.577	29
485.807	13
489.661	6
491.248	6
491.340	6
491.560	6
494.066	6
494.159	6
494.381	6
592.55	12
592.68	12
593.00	12
599.06	19
684.06	35
684.48	35
684.66	35
724.75	28
770.36	18
858.69	34
859.36	34
859.64	34
917.62	38
924.36	33
925.14	33
925.46	33
967.47	5
974.05	5
985.19	5
991.09	27
991.46	27
992.36	27
1 261.86	37
1 356.56	3
1 378.26	3
1 408.97	36
1 473.54	11

Wavelength (air) (Å)	Mult. No.
2 568.9	4
2 686.7	32
2 693.3	32
2 696.1	32
2 816.2	2
2 872.7	2
2 971.9	2
3 362.6	40
3 453.5	17
12 083	39

Wavenumber (cm^{-1})	Mult. No.
1 859	1
1 161	1
698	1
129	31
91	31
38	31

TABLE 26. Transition probabilities of forbidden lines for Na VI (references for this table are as follows: 1=Tachiev and Froese Fischer,[94] 2=Vilkas *et al.*,[118] 3=Galavis *et al.*[40])

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^{a}	E_i–E_k (cm^{-1})	g_i–g_k	Type	A_{ki} (s^{-1})	S (a.u.)	Acc.	Source
1	$2p^2$–$2p^2$	^{3}P–^{3}P									
				1 161 cm^{-1}	698–1 859	3–5	M1	2.07−02	2.45+00	B+	1,2,3
				1 161 cm^{-1}	698–1 859	3–5	E2	7.68−09	1.62−01	B	1,2
				698 cm^{-1}	0–698	1–3	M1	5.98−03	1.95+00	B+	1,2,3
				1 859 cm^{-1}	0–1 859	1–5	E2	3.65−08	7.34−02	B	1,2,3
2		^{3}P–^{1}D									

TABLE 26. Transition probabilities of forbidden lines for Na VI (references for this table are as follows: 1 = Tachiev and Froese Fischer,[94] 2 = Vilkas *et al.*,[118] 3 = Galavis *et al.*[40])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	Type	A_{ki} (s^{-1})	S (a.u.)	Acc.	Source
			2 816.2	2 817.1	0–35 498	1–5	E2	5.38−05	4.26−05	B	1,2,3
			2 872.7	2 873.6	698–35 498	3–5	M1	4.17−01	1.83−03	B+	1,2,3
			2 872.7	2 873.6	698–35 498	3–5	E2	1.41−04	1.23−04	B	1,2
			2 971.9	2 972.7	1 859–35 498	5–5	M1	1.13+00	5.49−03	B+	1,2,3
			2 971.9	2 972.7	1 859–35 498	5–5	E2	8.71−04	9.03−04	B+	1,2
3		$^3\mathrm{P}-{}^1\mathrm{S}$									
				1 378.26	1 859–74 414	5–1	E2	1.71−02	7.59−05	B	1,2,3
				1 356.56	698–74 414	3–1	M1	1.30+01	1.20−03	B+	1,2,3
4		$^1\mathrm{D}-{}^1\mathrm{S}$									
			2 568.9	2 569.6	35 498–74 414	5–1	E2	3.38+00	3.38−01	A	1,2,3
5	$2s^22p^2-2s2p^3$	$^3\mathrm{P}-{}^5\mathrm{S}^\circ$									
				[985.2]	1 859–103 362	5–5	M2	1.97−02	6.13+00	B+	1
				[974.0]	698–103 362	3–5	M2	2.72−02	7.99+00	B+	1
				[967.5]	0–103 362	1–5	M2	1.26−02	3.58+00	B+	1
6		$^3\mathrm{P}-{}^3\mathrm{D}^\circ$									
				491.560	698–204 132	3–7	M2	2.99−01	4.03+00	B+	1
				489.661	0–204 223	1–5	M2	3.12−01	2.95+00	B+	1
				494.381	1 859–204 132	5–7	M2	6.95−01	9.64+00	B+	1
				491.340	698–204 223	3–5	M2	3.27−01	3.14+00	B+	1
				494.159	1 859–204 223	5–5	M2	7.20−04	7.11−03	C+	1
				491.248	698–204 261	3–3	M2	1.30−01	7.50−01	B+	1
				494.066	1 859–204 261	5–3	M2	8.20−02	4.86−01	B+	1
7		$^3\mathrm{P}-{}^3\mathrm{P}^\circ$									
				417.568	1 859–241 341	5–5	M2	1.08+00	4.59+00	B+	1
				415.553	698–241 341	3–3	M2	6.52−01	1.63+00	B+	1
				417.568	1 859–241 341	5–1	M2	6.47−01	5.51−01	B+	1
				417.568	1 859–241 341	5–3	M2	8.84−03	2.26−02	B	1
				415.553	698–241 341	3–5	M2	2.89−03	1.20−02	C+	1
				414.351	0–241 341	1–5	M2	1.32−01	5.41−01	B+	1
8		$^3\mathrm{P}-{}^1\mathrm{D}^\circ$									
				320.190	0–312 315	1–5	M2	1.62+00	1.83+00	B+	1
				320.907	698–312 315	3–5	M2	3.67+00	4.19+00	B+	1
				322.107	1 859–312 315	5–5	M2	2.87+00	3.34+00	B+	1
9		$^3\mathrm{P}-{}^3\mathrm{S}^\circ$									
				313.745	1 859–320 589	5–3	M2	3.12+00	1.91+00	B+	1
				312.606	698–320 589	3–3	M2	1.27+00	7.61−01	B+	1
10		$^3\mathrm{P}-{}^1\mathrm{P}^\circ$									
				286.024	698–350 319	3–3	M2	1.87+00	7.21−01	B+	1
				286.977	1 859–350 319	5–3	M2	6.24+00	2.44+00	B+	1
11		$^1\mathrm{D}-{}^5\mathrm{S}^\circ$									
				[1 473.5]	35 498–103 362	5–5	M2	1.43−06	3.33−03	C+	1
12		$^1\mathrm{D}-{}^3\mathrm{D}^\circ$									
				592.68	35 498–204 223	5–5	M2	3.72−01	9.12+00	B+	1
				592.55	35 498–204 261	5–3	M2	1.61−01	2.37+00	B+	1
				593.00	35 498–204 132	5–7	M2	4.17−01	1.43+01	B+	1
13		$^1\mathrm{D}-{}^3\mathrm{P}^\circ$									
				485.807	35 498–241 341	5–1	M2	5.34−01	9.69−01	B+	1
				485.807	35 498–241 341	5–3	M2	4.34−01	2.36+00	B+	1
				485.807	35 498–241 341	5–5	M2	2.39−01	2.17+00	B+	1

TABLE 26. Transition probabilities of forbidden lines for Na VI (references for this table are as follows: 1 = Tachiev and Froese Fischer,[94] 2 = Vilkas *et al.*,[118] 3 = Galavis *et al.*[40])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	$E_i - E_k$ (cm^{-1})	$g_i - g_k$	Type	A_{ki} (s^{-1})	S (a.u.)	Acc.	Source
14		$^1D-^1D^\circ$									
				361.249	35 498–312 315	5–5	M2	5.18−02	1.07−01	B	1
15		$^1D-^3S^\circ$									
				350.765	35 498–320 589	5–3	M2	2.55−03	2.73−03	C+	1
16		$^1D-^1P^\circ$									
				317.641	35 498–350 319	5–3	M2	3.72−03	2.42−03	C+	1
17		$^1S-^5S^\circ$									
			[3 454]	[3 454]	74 414–103 362	1–5	M2	2.33−09	3.85−04	C	1
18		$^1S-^3D^\circ$									
				770.36	74 414–204 223	1–5	M2	2.26−05	2.06−03	C+	1
19		$^1S-^3P^\circ$									
				599.06	74 414–241 341	1–5	M2	3.30−01	8.53+00	B+	1
20		$^1S-^1D^\circ$									
				420.343	74 414–312 315	1–5	M2	9.04−03	3.98−02	B	1
21	$2s^22p^2-2p^4$	$^3P-^3P$									
				209.513	1 859–479 157	5–1	E2	3.83+04	1.38−02	B+	2
				209.759	1 859–478 597	5–3	M1	7.93−01	8.14−07	C	2
				209.759	1 859–478 597	5–3	E2	2.65+04	2.89−02	B+	2
				209.004	698–479 157	3–1	M1	5.23−01	1.77−07	D+	2
				209.829	698–477 277	3–5	M1	5.17−01	8.85−07	C	2
				209.829	698–477 277	3–5	E2	1.59+04	2.89−02	B+	2
				209.522	0–477 277	1–5	E2	7.11+03	1.28−02	B+	2
22		$^3P-^1D$									
				197.584	0–506 114	1–5	E2	5.02−01	6.75−07	C	2
				197.857	698–506 114	3–5	M1	2.44−01	3.50−07	C	2
				197.857	698–506 114	3–5	E2	1.83+01	2.47−05	C+	2
23		$^3P-^1S$									
				173.216	1 859–579 173	5–1	E2	9.59+00	1.34−06	C	2
				172.868	698–579 173	3–1	M1	1.29+00	2.47−07	C	2
24		$^1D-^3P$									
				225.398	35 498–479 157	5–1	E2	2.49+00	1.29−06	C	2
				225.683	35 498–478 597	5–3	M1	4.21−01	5.38−07	C	2
				225.683	35 498–478 597	5–3	E2	1.50+01	2.36−05	C+	2
25		$^1D-^1S$									
				183.933	35 498–579 173	5–1	E2	6.22+04	1.17−02	B+	2
26		$^1S-^3P$									
				248.223	74 414–477 277	1–5	E2	4.93−02	2.08−07	C	2
				247.413	74 414–478 597	1–3	M1	2.05−01	3.46−07	C	2
27	$2s2p^3-2s2p^3$	$^5S^\circ-^3D^\circ$									
				[992.4]	103 362–204 132	5–7	M1	2.75−03	6.98−07	C	1
				[992.4]	103 362–204 132	5–7	E2	9.46−03	5.69−05	C+	1
				[991.5]	103 362–204 223	5–5	M1	3.50−02	6.32−06	C	1
				[991.1]	103 362–204 223	5–5	E2	8.34−03	3.57−05	C+	1
				[991.1]	103 362–204 261	5–3	M1	1.21−02	1.31−06	C	1
				[991.1]	103 362–204 261	5–3	E2	3.57−03	9.15−06	C	1
28		$^5S^\circ-^3P^\circ$									
				[724.8]	103 362–241 341	5–5	M1	8.93+00	6.30−04	B	1
				[724.8]	103 362–241 341	5–5	E2	1.41−04	1.26−07	D+	1

TABLE 26. Transition probabilities of forbidden lines for Na VI (references for this table are as follows: 1=Tachiev and Froese Fischer,[94] 2=Vilkas *et al.*,[118] 3=Galavis *et al.*[40])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i–E_k (cm^{-1})	g_i–g_k	Type	A_{ki} (s^{-1})	S (a.u.)	Acc.	Source
				[724.8]	103 362–241 341	5–3	M1	4.97+00	2.10−04	C+	1
				[724.8]	103 362–241 341	5–3	E2	4.11−05	2.20−08	D+	1
29		$^5S^\circ-^1D^\circ$									
				[478.58]	103 362–312 315	5–5	M1	1.71−04	3.48−09	D	1
30		$^5S^\circ-^3S^\circ$									
				[460.35]	103 362–320 589	5–3	M1	1.68−03	1.82−08	D+	1
31		$^3D^\circ-^3D^\circ$									
				129 cm^{-1}	204 132–204 261	7–3	E2	3.60−16	2.70−04	B	1
				91 cm^{-1}	204132–204 223	7–5	M1	1.90−05	4.66+00	A	1
				91 cm^{-1}	204132–204 223	7–5	E2	1.72−16	1.23−03	B	1
				38 cm^{-1}	204 223–204 261	5–3	M1	2.22−06	4.50+00	A	1
				38 cm^{-1}	204 223–204 261	5–3	E2	5.30−20	1.79−05	C+	1
32		$^3D^\circ-^3P^\circ$									
			2 686.7	2 687.5	204 132–241 341	7–3	E2	9.85−01	3.70−01	A	1
			2 693.3	2 694.1	204 223–241 341	5–1	E2	2.08+00	2.64−01	B+	1
			2 686.7	2 687.5	204 132–241 341	7–5	M1	1.15+00	4.13−03	B	1
			2 686.7	2 687.5	204 132–241 341	7–5	E2	1.18+00	7.37−01	A	1
			2 693.3	2 694.1	204 223–241 341	5–3	E2	1.72−01	6.54−02	B+	1
			2 696.1	2 696.9	204 261–241 341	3–1	M1	1.35+00	9.84−04	B	1
			2 693.3	2 694.1	204 223–241 341	5–5	M1	8.14−01	2.95−03	B	1
			2 693.3	2 694.1	204 223–241 341	5–5	E2	7.27−01	4.61−01	A	1
			2 696.1	2 696.9	204 261–241 341	3–3	M1	1.35+00	2.95−03	B	1
			2 696.1	2 696.9	204 261–241 341	3–3	E2	9.30−01	3.55−01	A	1
			2 696.1	2 696.9	204 261–241 341	3–5	M1	2.17−01	7.88−04	B	1
			2 696.1	2 696.9	204 261–241 341	3–5	E2	1.87−01	1.19−01	B+	1
33		$^3D^\circ-^1D^\circ$									
				925.14	204 223–312 315	5–5	M1	2.93−03	4.30−07	C	1
				925.14	204 223–312 315	5–5	E2	2.35−02	7.10−05	C+	1
				924.36	204 132–312 315	7–5	M1	5.51−03	8.07−07	C	1
				924.36	204 132–312 315	7–5	E2	4.20−02	1.27−04	C+	1
				925.46	204 261–312 315	3–5	M1	1.29−03	1.90−07	C	1
				925.46	204 261–312 315	3–5	E2	2.14−03	6.47−06	C	1
34		$^3D^\circ-^3S^\circ$									
				858.69	204 132–320 589	7–3	E2	1.32+00	1.65−03	B	1
				859.36	204 223–320 589	5–3	M1	2.41−02	1.70−06	C	1
				859.36	204 223–320 589	5–3	E2	1.37+00	1.72−03	B	1
				859.64	204 261–320 589	3–3	M1	1.61−02	1.14−06	C	1
				859.64	204 261–320 589	3–3	E2	1.02+00	1.29−03	B	1
35		$^3D^\circ-^1P^\circ$									
				684.06	204 132–350 319	7–3	E2	7.28−03	2.92−06	C	1
				684.48	204 223–350 319	5–3	M1	8.09+00	2.89−04	B	1
				684.48	204 223–350 319	5–3	E2	4.29−03	1.73−06	C	1
				684.66	204 261–350 319	3–3	M1	2.69+00	9.61−05	C+	1
				684.66	204 261–350 319	3–3	E2	1.73−03	6.99−07	C	1
36		$^3P^\circ-^1D^\circ$									
				1 408.97	241 341–312 315	1–5	E2	5.80−06	1.44−07	D+	1
				1 408.97	241 341–312 315	3–5	M1	7.80−01	4.04−04	B	1
				1 408.97	241 341–312 315	3–5	E2	9.11−06	2.26−07	C	1
				1 408.97	241 341–312 315	5–5	M1	2.34+00	1.21−03	B	1
				1 408.97	241 341–312 315	5–5	E2	1.23−04	3.05−06	C	1

TABLE 26. Transition probabilities of forbidden lines for Na VI (references for this table are as follows: 1=Tachiev and Froese Fischer,[94] 2=Vilkas *et al.*,[118] 3=Galavis *et al.*[40])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	Type	A_{ki} (s^{-1})	S (a.u.)	Acc.	Source
37		^{3}P°–^{3}S°									
				1 261.86	241 341–320 589	5–3	M1	9.60−01	2.15−04	B	1
				1 261.86	241 341–320 589	5–3	E2	7.72−05	6.62−07	C	1
				1 261.86	241 341–320 589	3–3	M1	5.76−01	1.29−04	C+	1
				1 261.86	241 341–320 589	3–3	E2	2.42−05	2.08−07	C	1
				1 261.86	241 341–320 589	1–3	M1	7.71−01	1.72−04	C+	1
38		^{3}P°–^{1}P°									
				917.62	241 341–350 319	3–3	M1	4.14−03	3.55−07	C	1
				917.62	241 341–350 319	3–3	E2	1.31−02	2.29−05	C+	1
				917.62	241 341–350 319	5–3	M1	1.28−02	1.10−06	C	1
				917.62	241 341–350 319	5–3	E2	4.20−02	7.31−05	C+	1
				917.62	241 341–350 319	1–3	M1	2.70−03	2.32−07	C	1
39		^{1}D°–^{3}S°									
			12 083	12 086	312 315–320 589	5–3	M1	1.78−07	3.50−08	D+	1
			12 083	12 086	312 315–320 589	5–3	E2	1.37−06	9.47−04	B	1
40		^{3}S°–^{1}P°									
			3 362.6	3 363.6	320 589–350 319	3–3	M1	1.73+00	7.34−03	B+	1
			3 362.6	3 363.6	320 589–350 319	3–3	E2	1.11−06	1.28−06	C	1

[a] Wavelengths (Å) are always given unless cm^{-1} is indicated.

10.7. Na VII

Boron isoelectronic sequence
Ground state: $1s^22s^22p\ ^2P^{\mathrm{o}}_{1/2}$
Ionization energy: 208.50 eV=1 681 700 cm^{-1}

10.7.1. Allowed Transitions for Na VII

In general the transition rates for this boronlike spectrum are in good agreement, including the results of the OP.[25] Most of the compiled data below have been taken from this source. The high-quality (based on good agreement) data from the other references[41,64,81,94] are available primarily for the lower-lying transitions. Tachiev and Froese Fischer[94] performed extensive MCHF calculations with Breit-Pauli corrections to order α^2. Merkelis *et al.*[64] used a second-order MBPT theory with Breit-Pauli corrections. As part of the Iron Project, Galavis *et al.*[41] used the SUPERSTRUCTURE code with CI, relativistic effects, and semiempirical energy corrections. Only OP results were available for energy levels above the $3d$.

To estimate accuracies, we pooled the relative standard deviation of the mean (RSDM) for each of the lines with transition rates published in two or more references,[25,41,64,81,94] as described in the general introduction. For this purpose the spin-allowed (non-OP) and intercombination data were treated separately and each of these was in turn divided into two upper-level energy groups having energies below and above 500 000 cm^{-1}. OP lines constituted a fifth group. However, Merkelis *et al.*,[64] Galavis *et al.*,[41] and Safronova *et al.*[81] contain only data for transitions from lower levels. To estimate the accuracy of lines from higher-lying levels of Tachiev and Froese Fischer,[94] we isoelectronically averaged the logarithmic quality factors (see Sec. 4.1 of the Introduction) observed for lines from the lower-lying levels of B-like ions of Na, Mg, Al, and Si and scaled them for lines from high-lying levels, as described in the introduction. Thus the listed accuracies for these higher-lying transitions are less well established than for those from lower levels.

10.7.2. References for Allowed Transitions for Na VII

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[41] M. E. Galavis, C. Mendoza, and C. J. Zeippen, Astron. Astrophys. Suppl. Ser. **131**, 499 (1998).

[64] G. Merkelis, J. J. Vilkas, G. Gaigalas, and R. Kisielius, Phys. Scr. **51**, 233 (1995).

[81] U. I. Safronova, W. R. Johnson, and A. E. Livingston, Phys. Rev. A **60**, 996 (1999). A complete data listing was made available by private communication.

[94] G. Tachiev and C. Froese Fischer, http://www.vuse.vanderbilt.edu/~cff/mchf_collection/ (MCHF, *ab initio*, downloaded on May 6, 2002).

TABLE 27. Wavelength finding list for allowed lines for Na VII

Wavelength (vac) (Å)	Mult. No.
63.142	25
63.227	25
63.357	24
63.443	24
64.025	23
64.113	23
64.828	87
64.859	87
64.904	87
65.311	86
65.342	86
65.383	22
65.388	86
65.474	22
67.793	84
67.827	84
67.829	83
67.863	83
67.876	84
67.912	83
68.422	21
68.519	21
68.522	21
68.866	20
68.908	20
68.967	20
69.292	19
69.314	19
69.395	19
69.417	19
69.803	18
69.826	18
69.907	18
69.930	18
70.640	17
70.747	17
71.919	16
72.020	85
72.030	16
72.077	85
72.079	85
72.865	82
72.867	82
74.121	73
74.180	73
74.217	72
74.255	72
74.257	72
74.268	72
74.314	72
74.316	72
74.861	15
74.980	15
74.981	15
74.988	80
74.991	80
75.124	14
75.198	14
75.244	14
76.502	68
76.564	68
76.827	110
76.862	110
77.225	13
77.353	13
78.797	76
78.840	76
78.842	76
78.907	75
78.980	75
78.982	75
79.436	12
79.451	74
79.453	74
79.571	12
79.676	81
79.759	11
79.760	81
79.786	11
79.893	10
79.895	11
79.923	11
80.008	10
80.030	10
80.130	62
80.177	62
80.246	62
81.359	61
81.430	61
81.487	69
81.489	69
81.855	60
82.636	77
82.685	77
83.987	79
84.038	79
84.080	79
84.131	79
84.218	66
84.221	66
84.828	78
85.260	65
85.295	65
85.297	65
85.299	9
85.455	9
85.602	70
86.597	8
86.652	8
86.757	8

TABLE 27. Wavelength finding list for allowed lines for Na VII—Continued

Wavelength (vac) (Å)	Mult. No.
87.053	71
87.153	71
87.465	63
87.468	63
88.697	7
88.746	7
88.866	7
88.915	7
90.177	67
90.284	67
90.822	56
90.825	56
91.058	55
91.061	55
91.072	55
91.075	55
92.003	54
92.006	54
92.746	44
92.775	44
92.809	44
92.839	44
92.883	44
92.931	44
92.976	44
93.393	43
93.434	43
93.457	43
93.486	43
93.528	43
93.550	43
93.910	64
94.026	64
94.288	6
94.468	6
94.479	6
95.963	57
96.058	107
96.066	107
96.173	107
96.181	107
96.845	97
96.872	97
96.922	97
97.006	106
97.014	106
97.058	106
97.790	59
97.916	59
98.010	103
98.019	103
98.064	103
98.080	58
98.191	58
98.207	58
98.378	102
98.386	102
98.394	102
98.765	47
98.836	47
98.839	47
99.421	46
99.552	46
99.556	46
99.669	101
99.678	101
100.717	51
100.721	51
101.190	109
101.309	109
101.318	109
101.783	45
101.787	45
101.914	45
101.918	45
102.233	108
102.235	99
102.243	108
102.244	99
102.282	108
102.291	108
102.390	98
102.439	98
102.448	98
103.349	105
103.359	105
103.399	105
103.410	105
103.778	39
103.842	39
103.893	39
103.921	39
104.000	39
104.036	39
104.871	48
104.955	48
105.114	5
105.195	104
105.206	104
105.351	5
107.057	50
107.079	52
107.144	50
107.209	50
107.296	50
108.058	100
108.069	100
108.193	94
108.373	94
108.736	95

TABLE 27. Wavelength finding list for allowed lines for Na VII—Continued

Wavelength (vac) (Å)	Mult. No.
108.746	95
108.834	95
108.844	95
109.359	53
109.517	53
110.771	49
110.779	49
110.933	49
111.209	40
111.213	40
111.387	40
115.359	96
115.457	96
115.470	96
118.840	92
118.852	92
118.912	92
119.016	41
119.215	41
121.840	42
122.036	42
122.048	42
122.245	42
124.532	37
124.537	37
126.781	93
126.796	93
126.850	93
126.865	93
134.405	38
134.432	89
134.447	89
134.686	89
134.701	89
139.837	88
139.853	88
139.975	88
141.378	91
141.397	91
144.703	90
144.977	90
144.997	90
170.074	134
173.816	133
175.460	132
178.044	131
191.924	130
193.338	144
193.382	144
207.792	116
208.108	162
208.716	162
210.469	161
211.091	161
220.668	129
220.702	129
224.754	128
225.388	128
228.290	191
228.446	191
229.022	191
234.610	160
235.383	160
235.743	127
236.005	127
236.390	190
237.175	190
242.701	143
243.321	143
243.392	143
247.850	142
247.924	142
251.819	228
252.621	228
255.284	227
256.108	227
259.437	244
263.116	243
267.501	229
268.456	229
272.116	276
272.814	231
273.254	276
273.381	231
275.028	242
276.886	230
277.469	230
279.096	159
280.136	159
280.191	159
280.836	275
281.595	115
282.048	275
284.107	225
285.185	225
285.606	28
285.682	28
286.205	28
286.282	28
286.632	158
286.755	158
287.082	28
287.588	185
287.786	158
288.101	185
288.184	185
288.700	185
290.107	226
290.748	226
292.475	269

TABLE 27. Wavelength finding list for allowed lines for Na VII—Continued

Wavelength (vac) (Å)	Mult. No.
293.126	269
293.419	269
294.161	157
294.559	157
295.377	157
295.779	157
297.071	184
301.005	141
301.114	141
303.150	341
303.591	156
304.025	156
304.887	156
305.325	156
305.427	126
305.446	126
306.617	268
306.937	268
308.556	342
309.071	125
309.129	342
309.866	125
309.962	154
310.241	154
310.665	154
310.945	154
311.459	154
312.237	154
312.744	188
312.754	154
313.450	188
314.832	188
314.861	140
315.219	140
315.338	140
315.676	187
315.906	187
317.078	187
323.342	186
324.812	186
326.829	343
327.022	181
327.472	343
327.686	181
330.918	189
331.708	189
336.228	27
337.059	27
337.154	27
338.276	27
338.372	27
343.159	306
344.911	310
348.092	265
348.153	155
348.505	265
349.052	124
349.858	155
350.140	266
350.645	4
350.668	266
352.275	4
353.294	4
354.950	4
356.773	308
356.977	308
357.054	267
359.945	182
361.768	182
363.689	223
363.769	307
363.782	223
363.980	307
365.364	223
365.457	223
367.809	309
370.975	302
374.925	219
375.094	113
376.166	113
376.690	219
376.705	219
378.215	3
378.487	219
379.348	305
379.795	241
379.896	241
381.300	3
384.231	183
385.061	31
385.115	31
385.254	31
386.892	374
386.937	303
387.177	303
387.462	330
387.687	374
388.123	374
389.090	330
389.120	330
389.803	218
390.503	218
391.512	304
391.727	218
392.065	240
393.996	240
396.335	26
397.489	26
399.182	26
399.265	123

TABLE 27. Wavelength finding list for allowed lines for Na VII—Continued

Wavelength (vac) (Å)	Mult. No.
404.760	373
404.957	114
405.400	322
405.630	373
406.108	373
406.421	396
406.537	214
406.686	139
406.769	322
406.884	139
407.315	214
407.415	396
407.564	122
408.280	122
408.630	214
409.165	224
409.283	224
409.769	314
410.526	121
410.560	224
410.779	220
411.100	121
411.472	138
411.675	138
411.743	138
411.946	138
412.899	220
413.035	220
413.070	213
413.223	329
413.257	329
415.093	213
415.231	213
420.133	180
422.619	180
423.442	222
425.695	222
427.077	222
429.941	153
431.499	137
431.723	137
432.507	153
432.545	153
435.483	340
436.681	212
438.750	152
439.097	212
439.850	152
441.462	152
442.517	221
443.420	221
444.010	221
444.919	221
448.350	179
448.451	301
448.712	261
450.167	261
450.207	179
450.633	177
450.857	261
451.182	179
451.896	177
452.120	263
453.001	263
453.063	260
453.597	263
454.483	263
454.773	260
455.477	260
456.850	216
457.018	216
459.643	216
459.812	216
460.109	239
463.714	264
464.209	217
465.224	217
465.268	264
465.853	217
466.875	217
466.962	205
467.596	205
468.165	205
468.209	151
468.757	205
469.329	205
469.969	151
470.389	205
470.854	259
471.143	151
471.587	151
471.609	259
474.563	151
475.579	262
482.509	208
483.045	208
483.131	30
483.216	30
483.328	30
483.412	30
483.723	208
483.746	208
483.840	208
484.168	423
484.262	423
484.520	208
484.966	208
485.578	423
485.625	355
485.673	423

TABLE 27. Wavelength finding list for allowed lines for Na VII—Continued

Wavelength (vac) (Å)	Mult. No.
486.098	215
486.741	2
486.760	355
487.638	423
489.261	215
490.028	424
490.629	207
491.473	424
491.862	2
491.949	2
492.271	328
492.320	328
493.681	207
494.144	370
495.368	206
497.315	206
498.229	33
498.462	33
498.480	206
515.623	178
519.373	178
520.400	238
523.560	372
523.725	357
525.017	372
525.707	371
525.818	372
527.176	371
527.983	371
533.732	369
538.938	356
551.748	36
552.035	36
552.700	256
553.741	256
553.894	210
555.796	36
556.087	36
556.731	313
557.880	257
558.005	210
558.472	209
558.971	313
559.222	257
559.942	209
560.884	388
562.65	209
564.14	209
564.37	388
566.12	172
567.60	172
568.12	172
575.64	258
577.17	211
579.71	211
580.08	274
580.21	274
582.45	274
585.27	274
585.41	274
590.81	298
591.05	298
610.05	120
616.60	386
617.75	29
617.89	29
621.04	293
625.90	293
632.35	299
632.63	299
632.99	299
633.27	299
642.43	150
644.66	300
644.95	300
648.26	150
652.44	112
658.46	112
659.24	175
661.64	395
664.19	149
665.38	175
666.09	149
667.11	295
667.82	295
670.42	149
670.74	387
671.10	387
671.91	174
672.36	149
672.63	174
672.72	295
673.45	295
673.63	148
676.77	119
678.29	174
678.47	148
679.02	174
680.04	148
680.83	297
683.25	119
686.11	394
686.67	297
688.04	201
691.99	201
694.06	201
697.40	321
698.08	201
700.92	321
705.02	321

TABLE 27. Wavelength finding list for allowed lines for Na VII—Continued

Wavelength (vac) (Å)	Mult. No.
708.57	254
710.28	254
710.43	320
710.63	405
711.39	405
712.15	320
715.72	294
716.38	320
716.54	294
717.00	405
717.10	255
718.08	294
719.32	255
726.27	312
727.01	173
727.06	237
727.17	237
730.46	327
731.53	296
732.76	287
733.19	287
734.00	296
734.48	173
736.65	327
736.76	327
745.55	176
748.06	236
752.39	319
752.73	236
752.79	273
755.69	410
757.12	319
761.56	273
761.61	410
762.02	410
773.46	393
774.23	290
775.19	290
777.06	290
778.05	35
785.48	136
786.13	35
786.23	136
786.65	35
791.83	253
792.71	253
792.77	292
793.34	136
794.09	136
794.16	204
794.28	204
794.85	253
795.48	404
795.73	292
798.28	289
798.79	289
799.30	289
802.63	204
803.47	404
810.90	384
811.03	286
815.73	422
819.27	202
820.55	422
824.88	202
828.29	202
835.49	418
840.27	118
844.67	118
859.92	409
860.44	409
864.22	1
869.73	1
871.23	203
872.30	1
874.89	417
877.58	203
880.50	1
883.47	203
886.22	1
891.42	419
892.70	288
900.82	419
909.67	421
915.67	421
916.09	291
936.24	385
940.38	385
944.82	198
947.15	198
951.47	198
955.75	339
956.57	420
958.68	198
961.08	198
963.21	420
967.31	339
971.91	32
985.61	318
993.74	318
1 007.76	199
1 013.07	199
1 015.02	416
1 022.08	413
1 023.54	199
1 027.22	416
1 029.02	199
1 030.40	251
1 032.42	392
1 032.63	199

TABLE 27. Wavelength finding list for allowed lines for Na VII—Continued

Wavelength (vac) (Å)	Mult. No.
1 033.16	326
1 033.38	326
1 034.02	251
1 034.77	282
1 034.98	235
1 039.07	402
1 039.83	282
1 044.06	402
1 048.55	252
1 053.30	252
1 058.76	338
1 063.94	338
1 097.21	164
1 104.73	164
1 106.44	164
1 107.05	414
1 114.08	164
1 121.58	414
1 135.33	415
1 144.69	415
1 149.43	284
1 151.41	403
1 151.54	284
1 168.22	403
1 171.51	283
1 175.78	283
1 178.00	283
1 187.23	363
1 189.34	366
1 190.76	285
1 192.04	337
1 193.74	354
1 193.89	363
1 194.74	354
1 198.74	34
1 198.75	337
1 199.62	366
1 200.62	354
1 203.95	363
1 210.80	363
1 215.36	365
1 218.01	34
1 232.89	365
1 248.75	336
1 250.00	336
1 286.67	200
1 299.38	200
1 323.63	362
1 323.98	351
1 331.91	362
1 332.45	351
1 346.26	351
1 358.70	364
1 371.37	272
1 398.99	169
1 400.76	272
1 411.23	169
1 446.76	147
1 476.67	147
1 489.20	193
1 494.54	335
1 498.80	193
1 517.68	193
1 519.76	368
1 529.52	192
1 532.10	368
1 537.52	192
1 551.35	427
1 557.63	367
1 559.58	192
1 567.89	192
1 578.03	367
1 578.28	427
1 579.03	367
1 583.03	167
1 591.34	367
1 592.36	367
1 599.74	367
1 602.31	167
1 621.80	317
1 639.08	167
1 643.93	317
1 650.44	234
1 651.53	353
1 653.99	163
1 671.68	163
1 686.34	353
1 689.19	163
1 697.79	379
1 718.80	379
1 727.12	411
1 740.64	432
1 751.31	378
1 752.23	111
1 754.69	325
1 755.31	325
1 762.74	411
1 787.9	378
1 796.9	412
1 802.1	233
1 813.9	166
1 816.2	233
1 820.5	412
1 824.8	271
1 826.5	331
1 836.2	247
1 844.3	331
1 861.2	166
1 861.5	232
1 873.4	232

TABLE 27. Wavelength finding list for allowed lines for Na VII—Continued

Wavelength (vac) (Å)	Mult. No.
1 877.2	271
1 882.5	249
1 897.9	249
1 912.8	117
1 917.2	117
1 925.3	246
1 931.2	246
1 938.0	246
1 939.5	146
1 944.0	246
1 961.6	347
1 964.6	347
1 980.2	347
1 983.3	347
1 985.3	352
1 993.6	146
1 996.0	248

Wavelength (air) (Å)	Mult. No.
2 003.0	352
2 006.2	248
2 012.6	248
2 064.6	377
2 067.6	426
2 100.6	250
2 132.0	270
2 141.6	316
2 157.8	316
2 180.3	316
2 191.8	168
2 229.0	168
2 231.9	431
2 270.0	135
2 271.5	381
2 275.6	381
2 276.2	135
2 297.6	170
2 298.1	280
2 299.2	280
2 333.6	381
2 337.9	381
2 344.5	135
2 353.9	324
2 358.3	383
2 371.8	360
2 374.0	170
2 374.6	194
2 379.7	324
2 380.8	324
2 384.8	383
2 393.9	194
2 395.6	333
2 397.9	197
2 399.1	383
2 426.4	383
2 442.5	197
2 452.0	194
2 458.7	245
2 479.4	245
2 483.7	332
2 511.2	350
2 513.1	332
2 521.9	277
2 537.3	430
2 541.2	350
2 575.9	277
2 644.0	346
2 678.0	346
2 707.8	334
2 729.2	334
2 732.2	196
2 764.7	196
2 769.3	334
2 777.0	349
2 783.1	349
2 790.1	196
2 824.0	196
2 829.6	380
2 836.0	380
2 871.1	195
2 899.4	195
2 964.7	195
3 019.4	165
3 121.2	434
3 138.8	165
3 141.8	398
3 152.7	165
3 179.7	382
3 187.9	398
3 211.4	429
3 214.5	398
3 232.2	434
3 262.8	398
3 283.1	165
3 405.0	281
3 407.3	281
3 448.5	391
3 456.8	391
3 505.3	278
3 525.1	278
3 610.4	278
3 631.4	278
3 852.5	171
3 920.5	279
4 052.4	279
4 129.4	145
4 193.4	436
4 197.0	361
4 237.9	145

TABLE 27. Wavelength finding list for allowed lines for Na VII—Continued

Wavelength (air) (Å)	Mult. No.
4 292.5	361
4 358.0	428
4 379.0	348
4 382.8	441
4 396.3	436
4 457.1	401
4 501.2	441
4 505.3	145
4 604.9	401
4 787.9	397
4 817.9	390
4 886.2	401
5 126.8	390
5 137.3	400
5 158.5	400
5 377.7	438
5 490.0	400
5 687	315
5 891	375
5 968	315
6 280	433
7 684	408
7 744	323
7 756	323
7 915	345
8 134	408
8 181	408
8 228	345
8 366	399
8 648	311

TABLE 27. Wavelength finding list for allowed lines for Na VII—Continued

Wavelength (air) (Å)	Mult. No.
8 770	442
8 966	344
8 974	407
9 257	442
9 343	399
9 361	344
9 370	344
9 458	389
9 801	344
9 820	439
9 888	389
9 957	407
10 027	407
10 535	425
11 010	439
12 933	435
16 859	437

Wavenumber (cm^{-1})	Mult. No.
4 300	358
3 830	358
3 580	440
2 530	406
2 480	440
2 460	406
2 350	359
460	376

TABLE 28. Transition probabilities of allowed lines for Na VII (references for this table are as follows: 1=Fernley *et al.*,[25] 2=Tachiev and Froese Fischer,[94] 3=Merkelis *et al.*,[64] 4=Galavis *et al.*, [41]and 5=Safronova *et al.*[81])

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} ($10^8\ s^{-1}$)	f_{ik}	S (a.u.)	log gf	Acc.	Source
1	$2s^22p-2s2p^2$	$^2P^\circ-{}^4P$										
				[880.5]	2 139–115 711	4–4	7.77−05	9.03−07	1.05−05	−5.442	C+	2,3,4
				[869.7]	0–114 978	2–2	3.68−04	4.18−06	2.39−05	−5.078	C+	2,3,4
				[886.2]	2 139–114 978	4–2	3.25−04	1.91−06	2.23−05	−5.117	C+	2,3,4
				[872.3]	2 139–116 778	4–6	2.84−04	4.85−06	5.58−05	−4.712	C+	2,3,4
				[864.2]	0–115 711	2–4	8.95−06	2.01−07	1.14−06	−6.396	C	2,3,4
2		$^2P^\circ-{}^2D$		*490.20*	*1 426–205 426*	6–10	1.35+01	8.11−02	7.85−01	−0.313	A	2,3,4,5
				491.949	2 139–205 412	4–6	1.33+01	7.26−02	4.70−01	−0.537	A	2,3,4,5
				486.741	0–205 448	2–4	1.17+01	8.33−02	2.67−01	−0.778	A	2,3,4,5
				491.862	2 139–205 448	4–4	2.04+00	7.38−03	4.78−02	−1.530	B+	2,3,4,5
3		$^2P^\circ-{}^2S$		*380.27*	*1 426*–264 400	6–2	6.20+01	4.48−02	3.37−01	−0.571	A	2,3,4,5
				381.300	2 139–264 400	4–2	3.70+01	4.03−02	2.02−01	−0.793	A	2,3,4,5
				378.215	0–264 400	2–2	2.52+01	5.40−02	1.34−01	−0.967	A	2,3,4,5
4		$^2P^\circ-{}^2P$		*352.95*	*1 426–284 749*	6–6	1.18+02	2.21−01	1.54+00	0.123	B+	2,3,4,5
				353.294	2 139–285 189	4–4	9.88+01	1.85−01	8.60−01	−0.131	A	2,3,4,5

TABLE 28. Transition probabilities of allowed lines for Na VII (references for this table are as follows: 1=Fernley *et al.*,[25] 2=Tachiev and Froese Fischer,[94] 3=Merkelis *et al.*,[64] 4=Galavis *et al.*, [41]and 5=Safronova *et al.*[81])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})$^{\mathrm{a}}$	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				352.275	0–283 869	2–2	7.41+01	1.38−01	3.20−01	−0.559	A	2,3,4,5
				354.950	2 139–283 869	4–2	4.23+01	3.99−02	1.87−01	−0.797	B+	2,3,4,5
				350.645	0–285 189	2–4	2.03+01	7.48−02	1.73−01	−0.825	B+	2,3,4,5
5	$2p-3s$	$^2\mathrm{P}^\circ-^2\mathrm{S}$		*105.27*	1 426–951 350	6–2	4.93+02	2.73−02	5.68−02	−0.786	C	2
				105.351	2 139–951 350	4–2	3.29+02	2.74−02	3.80−02	−0.960	C	2
				105.114	0–951 350	2–2	1.64+02	2.71−02	1.88−02	−1.266	D+	2
6	$2p-3d$	$^2\mathrm{P}^\circ-^2\mathrm{D}$		*94.41*	*1 426–1 060 652*	6–10	2.64+03	5.88−01	1.10+00	0.548	B	2
				94.468	2 139–1 060 700	4–6	2.63+03	5.29−01	6.58−01	0.326	B	2
				94.288	0–1 060 580	2–4	2.20+03	5.88−01	3.65−01	0.070	B	2
				94.479	2 139–1 060 580	4–4	4.40+02	5.88−02	7.32−02	−0.629	C	2
7	$2s^22p-2s2p(^3\mathrm{P}^\circ)3p$	$^2\mathrm{P}^\circ-^2\mathrm{P}$		*88.83*	*1 426–1 127 223*	6–6	9.55+02	1.13−01	1.98−01	−0.169	C	1
				88.866	2 139–1 127 430	4–4	7.95+02	9.41−02	1.10−01	−0.424	C+	LS
				88.746	0–1 126 810	2–2	6.39+02	7.54−02	4.41−02	−0.822	C	LS
				88.915	2 139–1 126 810	4–2	3.17+02	1.88−02	2.20−02	−1.124	C	LS
				88.697	0–1 127 430	2–4	1.60+02	3.77−02	2.20−02	−1.123	C	LS
8		$^2\mathrm{P}^\circ-^2\mathrm{D}$		*86.64*	*1 426–1 155 620*	6–10	1.01+03	1.89−01	3.23−01	0.055	C+	1
				86.652	2 139–1 156 180	4–6	1.01+03	1.70−01	1.94−01	−0.167	C+	LS
				86.597	0–1 154 780	2–4	8.41+02	1.89−01	1.08−01	−0.423	C+	LS
				86.757	2 139–1 154 780	4–4	1.67+02	1.89−02	2.16−02	−1.121	C	LS
9		$^2\mathrm{P}^\circ-^2\mathrm{S}$		*85.40*	*1 426*–1 172 340	6–2	9.61+02	3.50−02	5.91−02	−0.678	C	1
				85.455	2 139–1 172 340	4–2	6.39+02	3.50−02	3.94−02	−0.854	C	LS
				85.299	0–1 172 340	2–2	3.22+02	3.51−02	1.97−02	−1.154	C	LS
10	$2s^22p-2s2p(^1\mathrm{P}^\circ)3p$	$^2\mathrm{P}^\circ-^2\mathrm{D}$		*79.97*	*1 426–1 251 874*	6–10	1.17+02	1.87−02	2.95−02	−0.950	D+	1
				80.008	2 139–1 252 010	4–6	1.17+02	1.68−02	1.77−02	−1.173	C	LS
				79.893	0–1 251 670	2–4	9.77+01	1.87−02	9.84−03	−1.427	D+	LS
				80.030	2 139–1 251 670	4–4	1.95+01	1.87−03	1.97−03	−2.126	D	LS
11		$^2\mathrm{P}^\circ-^2\mathrm{P}$		*79.86*	*1 426–1 253 637*	6–6	3.33+02	3.18−02	5.02−02	−0.719	D+	1
				79.895	2 139–1 253 780	4–4	2.77+02	2.65−02	2.79−02	−0.975	C	LS
				79.786	0–1 253 350	2–2	2.23+02	2.13−02	1.12−02	−1.371	D+	LS
				79.923	2 139–1 253 350	4–2	1.11+02	5.31−03	5.59−03	−1.673	D+	LS
				79.759	0–1 253 780	2–4	5.56+01	1.06−02	5.57−03	−1.674	D+	LS
12		$^2\mathrm{P}^\circ-^2\mathrm{S}$		*79.53*	1 426–1 258 880	6–2	4.02+02	1.27−02	1.99−02	−1.118	D+	1
				79.571	2 139–1 258 880	4–2	2.68+02	1.27−02	1.33−02	−1.294	D+	LS
				79.436	0–1 258 880	2–2	1.34+02	1.27−02	6.64−03	−1.595	D+	LS
13	$2p-4s$	$^2\mathrm{P}^\circ-^2\mathrm{S}$		*77.31*	*1 426*–1 294 910	6–2	3.92+01	1.17−03	1.79−03	−2.154	E+	1
				77.353	2 139–1 294 910	4–2	2.61+01	1.17−03	1.19−03	−2.330	D	LS
				77.225	0–1 294 910	2–2	1.31+01	1.17−03	5.95−04	−2.631	E+	LS
14	$2s^22p-2p^2(^1\mathrm{D})3s$	$^2\mathrm{P}^\circ-^2\mathrm{D}$		*75.18*	*1 426–1 331 638*	6–10	1.80+01	2.54−03	3.77−03	−1.817	D	1
				75.198	2 139–1 331 970	4–6	1.79+01	2.28−03	2.26−03	−2.040	D	LS
				75.124	0–1 331 140	2–4	1.50+01	2.54−03	1.26−03	−2.294	D	LS
				75.244	2 139–1 331 140	4–4	2.99+00	2.54−04	2.52−04	−2.993	E+	LS
15	$2p-4d$	$^2\mathrm{P}^\circ-^2\mathrm{D}$		*74.94*	*1 426–1 335 822*	6–10	8.70+02	1.22−01	1.81−01	−0.135	C	1

TABLE 28. Transition probabilities of allowed lines for Na VII (references for this table are as follows: 1=Fernley *et al.*,[25] 2=Tachiev and Froese Fischer,[94] 3=Merkelis *et al.*,[64] 4=Galavis *et al.*, [41]and 5=Safronova *et al.*[81])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				74.980	2 139–1 335 830	4–6	8.70+02	1.10−01	1.09−01	−0.357	C+	LS
				74.861	0–1 335 810	2–4	7.26+02	1.22−01	6.01−02	−0.613	C	LS
				74.981	2 139–1 335 810	4–4	1.45+02	1.22−02	1.20−02	−1.312	D+	LS
16	$2s^22p-2p^2(^3\text{P})3d$	$^2\text{P}^\circ-^2\text{D}$		*71.99*	*1 426–1 390 450*	6–10	1.13+02	1.47−02	2.09−02	−1.055	D+	1
				[72.03]	2 139–1 390 450	4–6	1.13+02	1.32−02	1.25−02	−1.277	D+	LS
				[71.92]	0–1 390 450	2–4	9.48+01	1.47−02	6.96−03	−1.532	D+	LS
				[72.03]	2 139–1 390 450	4–4	1.89+01	1.47−03	1.39−03	−2.231	D	LS
17	$2s^22p-2p^2(^1\text{D})3d$	$^2\text{P}^\circ-^2\text{D}$		*70.71*	*1 426–1 415 630*	6–10	6.12+01	7.65−03	1.07−02	−1.338	D	1
				70.747	2 139–1 415 630	4–6	6.11+01	6.88−03	6.41−03	−1.560	D+	LS
				70.640	0–1 415 630	2–4	5.11+01	7.65−03	3.56−03	−1.815	D	LS
				70.747	2 139–1 415 630	4–4	1.02+01	7.64−04	7.12−04	−2.515	E+	LS
18		$^2\text{P}^\circ-^2\text{P}$		*69.88*	*1 426–1 432 453*	6–6	3.75+01	2.75−03	3.79−03	−1.783	D	1
				69.907	2 139–1 432 610	4–4	3.13+01	2.29−03	2.11−03	−2.038	D	LS
				69.826	0–1 432 140	2–2	2.50+01	1.83−03	8.41−04	−2.437	E+	LS
				69.930	2 139–1 432 140	4–2	1.25+01	4.58−01	4.22−04	−2.737	E+	LS
				69.803	0–1 432 610	2–4	6.28+00	9.17−04	4.21−04	−2.737	E+	LS
19	$2s^22p-2s2p(^3\text{P}^\circ)4p$	$^2\text{P}^\circ-^2\text{P}$		*69.37*	*1 426–1 443 017*	6–6	4.44+02	3.21−02	4.39−02	−0.715	D+	1
				69.395	2 139–1 443 170	4–4	3.70+02	2.67−02	2.44−02	−0.971	C	LS
				69.314	0–1 442 710	2–2	2.97+02	2.14−02	9.77−03	−1.369	D+	LS
				69.417	2 139–1 442 710	4–2	1.48+02	5.34−03	4.88−03	−1.670	D	LS
				69.292	0–1 443 170	2–4	7.43+01	1.07−02	4.88−03	−1.670	D	LS
20		$^2\text{P}^\circ-^2\text{D}$		*68.90*	*1 426–1 452 850*	6–10	3.87+02	4.59−02	6.25−02	−0.560	C	1
				68.908	2 139–1 453 350	4–6	3.87+02	4.13−02	3.75−02	−0.782	C	LS
				68.866	0–1 452 100	2–4	3.23+02	4.60−02	2.09−02	−1.036	C	LS
				68.967	2 139–1 452 100	4–4	6.44+01	4.59−03	4.17−03	−1.736	D	LS
21	$2p-5d$	$^2\text{P}^\circ-^2\text{D}$		*68.49*	*1 426–1 461 562*	6–10	3.97+02	4.66−02	6.30−02	−0.553	C	1
				68.519	2 139–1 461 590	4–6	3.97+02	4.19−02	3.78−02	−0.776	C	LS
				68.422	0–1 461 520	2–4	3.32+02	4.66−02	2.10−02	−1.031	C	LS
				68.522	2 139–1 461 520	4–4	6.62+01	4.66−03	4.20−03	−1.730	D	LS
22	$2p-6d$	$^2\text{P}^\circ-^2\text{D}$		*65.44*	*1 426–1 529 460*	6–10	2.36+02	2.52−02	3.26−02	−0.820	D+	1
				65.474	2 139–1 529 460	4–6	2.35+02	2.27−02	1.96−02	−1.042	C	LS
				65.383	0–1 529 460	2–4	1.97+02	2.52−02	1.08−02	−1.298	D+	LS
				65.474	2 139–1 529 460	4–4	3.92+01	2.52−03	2.17−03	−1.997	D	LS
23	$2s^22p-2s2p(^1\text{P}^\circ)4p$	$^2\text{P}^\circ-^2\text{D}$		*64.08*	*1 426–1 561 890*	6–10	1.26+02	1.29−02	1.63−02	−1.111	D+	1
				[64.11]	2 139–1 561 890	4–6	1.25+02	1.16−02	9.79−03	−1.333	D+	LS
				[64.03]	0–1 561 890	2–4	1.05+02	1.29−02	5.44−03	−1.588	D+	LS
				[64.11]	2 139–1 561 890	4–4	2.09+01	1.29−03	1.09−03	−2.287	E+	LS
24	$2s^22p-2s2p(^3\text{P}^\circ)5p$	$^2\text{P}^\circ-^2\text{P}$		*63.41*	*1 426–1 578 350*	6–6	2.89+02	1.74−02	2.18−02	−0.981	D+	1
				63.443	2 139–1 578 350	4–4	2.40+02	1.45−02	1.21−02	−1.237	D+	LS
				63.357	0–1 578 350	2–2	1.93+02	1.16−02	4.84−03	−1.635	D	LS
				63.443	2 139–1 578 350	4–2	9.61+01	2.90−03	2.42−03	−1.936	D	LS
				63.357	0–1 578 350	2–4	4.82+01	5.80−03	2.42−03	−1.936	D	LS
25		$^2\text{P}^\circ-^2\text{D}$		*63.20*	*1 426–1 583 740*	6–10	1.97+02	1.97−02	2.46−02	−0.927	D+	1

TABLE 28. Transition probabilities of allowed lines for Na VII (references for this table are as follows: 1=Fernley *et al.*,[25] 2=Tachiev and Froese Fischer,[94] 3=Merkelis *et al.*,[64] 4=Galavis *et al.*, [41]and 5=Safronova *et al.*[81])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				63.227	2 139–1 583 740	4–6	1.97+02	1.77−02	1.47−02	−1.150	D+	LS
				63.142	0–1 583 740	2–4	1.65+02	1.97−02	8.19−03	−1.405	D+	LS
				63.227	2 139–1 583 740	4–4	3.29+01	1.97−03	1.64−03	−2.103	D	LS
26	$2s2p^2$–$2p^3$	^{4}P–^{4}S$^\circ$		*398.14*	*116 122*–367 290	12–4	1.09+02	8.62−02	1.36+00	0.015	A	2,3,4,5
				399.182	116 778–367 290	6–4	5.39+01	8.59−02	6.77−01	−0.288	A	2,3,4,5
				397.489	115 711–367 290	4–4	3.64+01	8.63−02	4.52−01	−0.462	A	2,3,4,5
				396.335	114 978–367 290	2–4	1.84+01	8.66−02	2.26−01	−0.761	A	2,3,4,5
27		^{4}P–^{2}D$^\circ$										
				[337.15]	115 711–412 311	4–6	2.63−04	6.72−07	2.98−06	−5.571	D+	2,3,4
				[336.23]	114 978–412 395	2–4	1.29−04	4.38−07	9.70−07	−6.057	D	2,3,4
				[338.37]	116 778–412 311	6–6	1.12−02	1.93−05	1.29−04	−3.936	B+	2,3,4
				[337.06]	115 711–412 395	4–4	3.67−03	6.24−06	2.77−05	−4.603	B+	2,3,4
				[338.28]	116 778–412 395	6–4	5.68−04	6.50−07	4.34−06	−5.409	C	2,3,4
28		^{4}P–^{2}P$^\circ$										
				[286.20]	115 711–465 111	4–4	7.65−03	9.40−06	3.54−05	−4.425	C+	2,3,4
				[285.68]	114 978–465 017	2–2	2.89−03	3.54−06	6.65−06	−5.150	C	2,3,4
				[287.08]	116 778–465 111	6–4	2.72−03	2.24−06	1.27−05	−4.872	C	2,3,4
				[286.28]	115 711–465 017	4–2	6.42−04	3.94−07	1.49−06	−5.802	B+	2,3,4
				[285.61]	114 978–465 111	2–4	1.68−04	4.12−07	7.74−07	−6.084	E+	2,3,4
29		^{2}D–^{4}S$^\circ$										
				[617.8]	205 412–367 290	6–4	3.30−05	1.26−07	1.54−06	−6.121	D	2,3,4
				[617.9]	205 448–367 290	4–4	2.70−06	1.55−08	1.26−07	−7.208	D	2,3,4
30		^{2}D–^{2}D$^\circ$		*483.28*	*205 426–412 345*	10–10	2.90+01	1.02−01	1.62+00	0.009	A	2,3,4,5
				483.328	205 412–412 311	6–6	2.71+01	9.48−02	9.05−01	−0.245	A	2,3,4,5
				483.216	205 448–412 395	4–4	2.54+01	8.89−02	5.66−01	−0.449	A	2,3,4,5
				483.131	205 412–412 395	6–4	3.38+00	7.88−03	7.52−02	−1.325	B+	2,3,4,5
				483.412	205 448–412 311	4–6	2.10+00	1.11−02	7.04−02	−1.353	B+	2,3,4,5
31		^{2}D–^{2}P$^\circ$		*385.13*	*205 426–465 080*	10–6	4.98+01	6.65−02	8.43−01	−0.177	A	2,3,4,5
				385.061	205 412–465 111	6–4	4.39+01	6.51−02	4.95−01	−0.408	A	2,3,4,5
				385.254	205 448–465 017	4–2	5.06+01	5.63−02	2.86−01	−0.647	A	2,3,4,5
				385.115	205 448–465 111	4–4	5.47+00	1.22−02	6.17−02	−1.312	B+	2,3,4,5
32		^{2}S–^{4}S$^\circ$										
				[971.9]	264 400–367 290	2–4	8.71−06	2.47−07	1.58−06	−6.306	D+	2,3,4
33		^{2}S–^{2}P$^\circ$		*498.31*	264 400–*465 080*	2–6	8.51+00	9.51−02	3.12−01	−0.721	A	2,3,4,5
				498.229	264 400–465 111	2–4	9.31+00	6.93−02	2.27−01	−0.858	A	2,3,4,5
				498.462	264 400–465 017	2–2	6.92+00	2.58−02	8.46−02	−1.287	B+	2,3,4,5
34		^{2}P–^{4}S$^\circ$										
				[1 218.0]	285 189–367 290	4–4	3.41−04	7.59−06	1.22−04	−4.518	C	2,3,4
				[1 198.7]	283 869–367 290	2–4	9.36−05	4.03−06	3.18−05	−5.094	D+	2,3,4
35		^{2}P–^{2}D$^\circ$		*783.7*	*284 749–412 345*	6–10	6.26+00	9.61−02	1.49+00	−0.239	B+	2,3,4,5
				786.65	285 189–412 311	4–6	6.17+00	8.59−02	8.89−01	−0.464	B+	2,3,4,5
				778.05	283 869–412 395	2–4	5.48+00	9.95−02	5.10−01	−0.701	B+	2,3,4,5
				786.13	285 189–412 395	4–4	9.29−01	8.60−03	8.91−02	−1.463	B+	2,3,4,5
36		^{2}P–^{2}P$^\circ$		*554.54*	*284 749–465 080*	6–6	2.80+01	1.29−01	1.41+00	−0.111	A	2,3,4,5
				555.796	285 189–465 111	4–4	2.38+01	1.10−01	8.06−01	−0.357	A	2,3,4,5

TABLE 28. Transition probabilities of allowed lines for Na VII (references for this table are as follows: 1 = Fernley *et al.*,[25] 2 = Tachiev and Froese Fischer,[94] 3 = Merkelis *et al.*,[64] 4 = Galavis *et al.*, [41]and 5 = Safronova *et al.*[81])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				552.035	283 869–465 017	2–2	2.01+01	9.17−02	3.33−01	−0.737	A	2,3,4,5
				556.087	285 189–465 017	4–2	8.97+00	2.08−02	1.52−01	−1.080	A	2,3,4,5
				551.748	283 869–465 111	2–4	3.70+00	3.38−02	1.23−01	−1.170	A	2,3,4,5
37	$2s2p^2-2s^23p$	$^2\mathrm{D}-^2\mathrm{P}^\circ$				10–6						
				124.532	205 412–1 008 420	6–4	3.22+01	4.99−03	1.23−02	−1.524	D+	2
				124.537	205 448–1 008 420	4–4	3.53+00	8.21−04	1.35−03	−2.484	E+	2
38		$^2\mathrm{S}-^2\mathrm{P}^\circ$				2–6						
				134.405	264 400–1 008 420	2–4	5.19+00	2.81−03	2.49−03	−2.250	D	2
39	$2s2p^2-2s2p(^3\mathrm{P}^\circ)3s$	$^4\mathrm{P}-^4\mathrm{P}^\circ$		*103.91*	*116 122–1 078 523*	12–12	5.95+02	9.64−02	3.96−01	0.063	C	2
				103.893	116 778–1 079 310	6–6	4.19+02	6.77−02	1.39−01	−0.391	C+	2
				103.921	115 711–1 077 980	4–4	7.91+01	1.28−02	1.75−02	−1.291	D+	2
				103.921	114 978–1 077 250	2–2	9.86+01	1.60−02	1.09−02	−1.495	D+	2
				104.036	116 778–1 077 980	6–4	2.67+02	2.89−02	5.93−02	−0.761	C	2
				104.000	115 711–1 077 250	4–2	4.92+02	3.99−02	5.47−02	−0.797	C	2
				103.778	115 711–1 079 310	4–6	1.80+02	4.35−02	5.95−02	−0.759	C	2
				103.842	114 978–1 077 980	2–4	2.48+02	8.00−02	5.47−02	−0.796	C	2
40		$^2\mathrm{D}-^2\mathrm{P}^\circ$		*111.27*	*205 426–1 104 153*	10–6	3.18+02	3.55−02	1.30−01	−0.450	C	1
				111.209	205 412–1 104 620	6–4	2.87+02	3.55−02	7.80−02	−0.672	C	LS
				111.387	205 448–1 103 220	4–2	3.17+02	2.95−02	4.33−02	−0.928	C	LS
				111.213	205 448–1 104 620	4–4	3.19+01	5.91−03	8.66−03	−1.626	D+	LS
41		$^2\mathrm{S}-^2\mathrm{P}^\circ$		*119.08*	264 400–*1104 153*	2–6	9.83+01	6.27−02	4.92−02	−0.902	C	1
				119.016	264 400–1 104 620	2–4	9.84+01	4.18−02	3.28−02	−1.078	C	LS
				119.215	264 400–1 103 220	2–2	9.81+01	2.09−02	1.64−02	−1.379	D+	LS
42		$^2\mathrm{P}-^2\mathrm{P}^\circ$		*122.04*	*284 749–1 104 153*	6–6	2.86+01	6.38−03	1.54−02	−1.417	D	1
				122.036	285 189–1 104 620	4–4	2.38+01	5.32−03	8.55−03	−1.672	D+	LS
				122.048	283 869–1 103 220	2–2	1.91+01	4.26−03	3.42−03	−2.070	D	LS
				122.245	285 189–1 103 220	4–2	9.46+00	1.06−03	1.71−03	−2.373	D	LS
				121.840	283 869–1 104 620	2–4	4.79+00	2.13−03	1.71−03	−2.371	D	LS
43	$2s2p^2-2s2p(^3\mathrm{P}^\circ)3d$	$^4\mathrm{P}-^4\mathrm{D}^\circ$				12–20						1
				93.486	116 778–1 186 460	6–8	4.05+03	7.07−01	1.31+00	0.628	B+	LS
				93.434	115 711–1 185 980	4–6	2.84+03	5.57−01	6.85−01	0.348	B	LS
				93.393	114 978–1 185 720	2–4	1.69+03	4.43−01	2.72−01	−0.053	B	LS
				93.528	116 778–1 185 980	6–6	1.21+03	1.59−01	2.94−01	−0.020	B	LS
				93.457	115 711–1 185 720	4–4	2.16+03	2.83−01	3.48−01	0.054	B	LS
				93.550	116 778–1 185 720	6–4	2.02+02	1.77−02	3.27−02	−0.974	C	LS
44		$^4\mathrm{P}-^4\mathrm{P}^\circ$		*92.89*	*116 122–1 192 647*	12–12	2.17+03	2.80−01	1.03+00	0.526	C+	1
				92.976	116 778–1 192 330	6–6	1.51+03	1.96−01	3.60−01	0.070	B	LS
				92.839	115 711–1 192 850	4–4	2.89+02	3.74−02	4.57−02	−0.825	C	LS
				92.746	114 978–1 193 190	2–2	3.63+02	4.68−02	2.86−02	−1.029	C	LS
				92.931	116 778–1 192 850	6–4	9.74+02	8.41−02	1.54−01	−0.297	C+	LS
				92.809	115 711–1 193 190	4–2	1.81+03	1.17−01	1.43−01	−0.330	C+	LS
				92.883	115 711–1 192 330	4–6	6.49+02	1.26−01	1.54−01	−0.298	C+	LS
				92.775	114 978–1 192 850	2–4	9.07+02	2.34−01	1.43−01	−0.330	C+	LS
45		$^2\mathrm{D}-^2\mathrm{D}^\circ$		*101.84*	*205 426–1 187 386*	10–10	1.09+03	1.69−01	5.67−01	0.228	C+	1
				101.783	205 412–1 187 890	6–6	1.02+03	1.58−01	3.18−01	−0.023	B	LS

TABLE 28. Transition probabilities of allowed lines for Na VII (references for this table are as follows: 1=Fernley *et al.*,[25] 2=Tachiev and Froese Fischer,[94] 3=Merkelis *et al.*,[64] 4=Galavis *et al.*, [41]and 5=Safronova *et al.*[81])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})$^{\mathrm{a}}$	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				101.918	205 448–1 186 630	4–4	9.76+02	1.52−01	2.04−01	−0.216	C+	LS
				101.914	205 412–1 186 630	6–4	1.09+02	1.13−02	2.27−02	−1.169	C	LS
				101.787	205 448–1 187 890	4–6	7.30+01	1.70−02	2.28−02	−1.167	C	LS
46		$^{2}\mathrm{D}-{}^{2}\mathrm{F}^{\circ}$		*99.48*	*205 426–1 210 670*	10–14	2.58+03	5.35−01	1.75+00	0.728	B	1
				99.421	205 412–1 211 240	6–8	2.58+03	5.10−01	1.00+00	0.486	B+	LS
				99.556	205 448–1 209 910	4–6	2.40+03	5.35−01	7.01−01	0.330	B	LS
				99.552	205 412–1 209 910	6–6	1.72+02	2.55−02	5.01−02	−0.815	C	LS
47		$^{2}\mathrm{D}-{}^{2}\mathrm{P}^{\circ}$		*98.81*	*205 426–1 217 443*	10–6	2.71+01	2.38−03	7.75−03	−1.623	D	1
				98.836	205 412–1 217 190	6–4	2.44+01	2.38−03	4.65−03	−1.845	D	LS
				98.765	205 448–1 217 950	4–2	2.72+01	1.99−03	2.59−03	−2.099	D	LS
				98.839	205 448–1 217 190	4–4	2.71+00	3.97−04	5.17−04	−2.799	E+	LS
48		$^{2}\mathrm{S}-{}^{2}\mathrm{P}^{\circ}$		*104.93*	*264 400–1 217 443*	2–6	1.42+03	7.02−01	4.85−01	0.147	B	1
				104.955	264 400–1 217 190	2–4	1.42+03	4.68−01	3.23−01	−0.029	B	LS
				104.871	264 400–1 217 950	2–2	1.42+03	2.34−01	1.62−01	−0.330	C+	LS
49		$^{2}\mathrm{P}-{}^{2}\mathrm{D}^{\circ}$		*110.79*	*284 749–1 187 386*	6–10	3.32+02	1.02−01	2.23−01	−0.213	C+	1
				110.779	285 189–1 187 890	4–6	3.32+02	9.15−02	1.33−01	−0.437	C+	LS
				110.771	283 869–1 186 630	2–4	2.77+02	1.02−01	7.44−02	−0.690	C	LS
				110.933	285 189–1 186 630	4–4	5.53+01	1.02−02	1.49−02	−1.389	D+	LS
50		$^{2}\mathrm{P}-{}^{2}\mathrm{P}^{\circ}$		*107.22*	*284 749–1 217 443*	6–6	2.13+02	3.68−02	7.78−02	−0.656	C	1
				107.296	285 189–1 217 190	4–4	1.77+02	3.06−02	4.32−02	−0.912	C	LS
				107.057	283 869–1 217 950	2–2	1.43+02	2.45−02	1.73−02	−1.310	C	LS
				107.209	285 189–1 217 950	4–2	7.11+01	6.13−03	8.65−03	−1.610	D+	LS
				107.144	283 869–1 217 190	2–4	3.57+01	1.23−02	8.68−03	−1.609	D+	LS
51	$2s2p^{2}-2s2p(^{1}\mathrm{P}^{\circ})3s$	$^{2}\mathrm{D}-{}^{2}\mathrm{P}^{\circ}$		*100.72*	*205 426–1 198 290*	10–6	2.83+02	2.58−02	8.55−02	−0.588	C	1
				100.717	205 412–1 198 290	6–4	2.54+02	2.58−02	5.13−02	−0.810	C	LS
				100.721	205 448–1 198 290	4–2	2.83+02	2.15−02	2.85−02	−1.066	C	LS
				100.721	205 448–1 198 290	4–4	2.83+01	4.30−03	5.70−03	−1.764	D+	LS
52		$^{2}\mathrm{S}-{}^{2}\mathrm{P}^{\circ}$		*107.08*	264 400–*1 198 290*	2–6	2.47+2	1.27−01	8.97−02	−0.595	C	1
				107.079	264 400–1 198 290	2–4	2.47+2	8.48−02	5.98−02	−0.771	C	LS
				107.079	264 400–1 198 290	2–2	2.47+2	4.24−02	2.99−02	−1.072	C	LS
53		$^{2}\mathrm{P}-{}^{2}\mathrm{P}^{\circ}$		*109.46*	*284 749–1 198 290*	6–6	4.07+2	7.31−02	1.58−01	−0.358	C	1
				109.517	285 189–1 198 290	4–4	3.39+2	6.09−02	8.78−02	−0.613	C+	LS
				109.359	283 869–1 198 290	2–2	2.72+2	4.88−02	3.51−02	−1.011	C	LS
				109.517	285 189–1 198 290	4–2	1.36+2	1.22−02	1.76−02	−1.312	C	LS
				109.359	283 869–1 198 290	2–4	6.80+01	2.44−02	1.76−02	−1.312	C	LS
54	$2s2p^{2}-2s2p(^{1}\mathrm{P}^{\circ})3d$	$^{2}\mathrm{D}-{}^{2}\mathrm{F}^{\circ}$		*92.00*	*205 426–1 292 330*	10–14	1.77+03	3.14−01	9.51−01	0.497	B	1
				92.003	205 412–1 292 330	6–8	1.77+03	2.99−01	5.43−01	0.254	B	LS
				92.006	205 448–1 292 330	4–6	1.65+03	3.14−01	3.80−01	0.099	B	LS
				92.003	205 412–1 292 330	6–6	1.18+02	1.50−02	2.73−02	−1.046	C	LS
55		$^{2}\mathrm{D}-{}^{2}\mathrm{D}^{\circ}$		*91.06*	*205 426–1 303 546*	10–10	3.52+02	4.38−02	1.31−01	−0.359	C	1
				91.058	205 412–1 303 610	6–6	3.29+02	4.09−02	7.36−02	−0.610	C	LS
				[91.08]	205 448–1 303 450	4–4	3.17+02	3.94−02	4.73−02	−0.802	C	LS
				[91.07]	205 412–1 303 450	6–4	3.52+01	2.92−03	5.25−03	−1.756	D+	LS
				91.061	205 448–1 303 610	4–6	2.35+01	4.38−03	5.25−03	−1.756	D+	LS

TABLE 28. Transition probabilities of allowed lines for Na VII (references for this table are as follows: 1=Fernley *et al.*,[25] 2=Tachiev and Froese Fischer,[94] 3=Merkelis *et al.*,[64] 4=Galavis *et al.*, [41]and 5=Safronova *et al.*[81])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
56		^{2}D–^{2}P°		*90.82*	*205 426–1 306 470*	10–6	1.31+01	9.70−04	2.90−03	−2.013	D	1
				90.822	205 412–1 306 470	6–4	1.18+01	9.70−04	1.74−03	−2.235	D	LS
				90.825	205 448–1 306 470	4–2	1.31+01	8.08−04	9.66−04	−2.491	E +	LS
				90.825	205 448–1 306 470	4–4	1.31+00	1.62−04	1.94−04	−3.188	E +	LS
57		^{2}S–^{2}P°		*95.96*	264 400–*1 306 470*	2–6	4.20+02	1.74−01	1.10−01	−0.458	C	1
				95.963	264 400–1 306 470	2–4	4.20+02	1.16−01	7.33−02	−0.635	C	LS
				95.963	264 400–1 306 470	2–2	4.20+02	5.80−02	3.66−02	−0.936	C	LS
58		^{2}P–^{2}D°		*98.15*	*284 749–1 303 546*	6–10	2.78+03	6.69−01	1.30+00	0.604	B	1
				98.191	285 189–1 303 610	4–6	2.78+03	6.02−01	7.78−01	0.382	B	LS
				[98.08]	283 869–1 303 450	2–4	2.32+03	6.70−01	4.33−01	0.127	B	LS
				[98.21]	285 189–1 303 450	4–4	4.63+02	6.69−02	8.65−02	−0.573	C+	LS
59		^{2}P–^{2}P°		*97.87*	*284 749–1 306 470*	6–6	5.73+02	8.23−02	1.59−01	−0.306	C	1
				97.916	285 189–1 306 470	4–4	4.77+02	6.86−02	8.85−02	−0.562	C+	LS
				97.790	283 869–1 306 470	2–2	3.83+02	5.49−02	3.53−02	−0.959	C	LS
				97.916	285 189–1 306 470	4–2	1.91+02	1.37−02	1.77−02	−1.261	C	LS
				97.790	283 869–1 306 470	2–4	9.59+01	2.75−02	1.77−02	−1.260	C	LS
60	$2s2p^2-2p^2(^3\mathrm{P})3p$	^{4}P–^{4}D°				12–20						1
				81.855	116 778–1 338 450	6–8	3.24+02	4.34−02	7.02−02	−0.584	C	LS
61		^{4}P–^{4}P°				12–12						1
				81.430	116 778–1 344 830	6–6	3.33+02	3.31−02	5.32−02	−0.702	C	LS
				81.359	115 711–1 344 830	4–6	1.43+02	2.13−02	2.28−02	−1.070	C	LS
62		^{4}P–^{4}S°		*80.20*	*116 122–1 362 950*	12–4	5.55+02	1.78−02	5.66−02	−0.670	C	1
				80.246	116 778–1 362 950	6–4	2.77+02	1.78−02	2.82−02	−0.971	C	LS
				80.177	115 711–1 362 950	4–4	1.86+02	1.79−02	1.89−02	−1.145	C	LS
				80.130	114 978–1 362 950	2–4	9.30+01	1.79−02	9.44−03	−1.446	D+	LS
63		^{2}D–^{2}D°		*87.47*	*205 426–1 348 720*	10–10	8.65+01	9.92−03	2.86−02	−1.003	D+	1
				87.465	205 412–1 348 720	6–6	8.07+01	9.26−03	1.60−02	−1.255	D+	LS
				87.468	205 448–1 348 720	4–4	7.79+01	8.93−03	1.03−02	−1.447	D+	LS
				87.465	205 412–1 348 720	6–4	8.64+00	6.61−04	1.14−03	−2.402	D	LS
				87.468	205 448–1 348 720	4–6	5.77+00	9.92−04	1.14−03	−2.401	D	LS
64		^{2}P–^{2}D°		*93.99*	*284 749–1 348 720*	6–10	4.38+02	9.67−02	1.80−01	−0.236	C	1
				94.026	285 189–1 348 720	4–6	4.38+02	8.70−02	1.08−01	−0.458	C+	LS
				93.910	283 869–1 348 720	2–4	3.66+02	9.68−02	5.99−02	−0.713	C	LS
				94.026	285 189–1 348 720	4–4	7.29+01	9.66−03	1.20−02	−1.413	D+	LS
65	$2s2p^2-2p^2(^1\mathrm{D})3p$	^{2}D–^{2}F°		*85.28*	*205 426–1 378 094*	10–14	2.55+02	3.90−02	1.09−01	−0.409	C	1
				85.260	205 412–1 378 300	6–8	2.55+02	3.71−02	6.25−02	−0.652	C	LS
				85.297	205 448–1 377 820	4–6	2.38+02	3.90−02	4.38−02	−0.807	C	LS
				85.295	205 412–1 377 820	6–6	1.71+01	1.86−03	3.13−03	−1.952	D	LS
66		^{2}D–^{2}D°		*84.22*	*205 426–1 392 800*	10–10	4.29+02	4.57−02	1.27−01	−0.340	C	1
				84.218	205 412–1 392 800	6–6	4.01+02	4.26−02	7.09−02	−0.592	C	LS
				84.221	205 448–1 392 800	4–4	3.86+02	4.11−02	4.56−02	−0.784	C	LS
				84.218	205 412–1 392 800	6–4	4.30+01	3.05−03	5.07−03	−1.738	D+	LS
				84.221	205 448–1 392 800	4–6	2.87+01	4.57−03	5.07−03	−1.738	D+	LS

TABLE 28. Transition probabilities of allowed lines for Na VII (references for this table are as follows: 1=Fernley *et al.*,[25] 2=Tachiev and Froese Fischer,[94] 3=Merkelis *et al.*,[64] 4=Galavis *et al.*, [41]and 5=Safronova *et al.*[81])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})$^{\mathrm{a}}$	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
67		^{2}P$-^2$D$^{\circ}$		*90.25*	*284 749–1 392 800*	6–10	3.42+02	6.96−02	1.24−01	−0.379	C	1
				90.284	285 189–1 392 800	4–6	3.42+02	6.26−02	7.44−02	−0.601	C	LS
				90.177	283 869–1 392 800	2–4	2.85+02	6.96−02	4.13−02	−0.856	C	LS
				90.284	285 189–1 392 800	4–4	5.69+01	6.95−03	8.26−03	−1.556	D+	LS
68	$2s2p^2-2s2p(^3$P$^{\circ})4s$	^{4}P$-^4$P$^{\circ}$				12–12						1
				76.564	116 778–1 422 870	6–6	8.84+01	7.77−03	1.18−02	−1.331	D+	LS
				76.502	115 711–1 422 870	4–6	3.80+01	5.00−03	5.04−03	−1.699	D+	LS
69		^{2}D$-^2$P$^{\circ}$				10–6						1
				[81.49]	205 412–1 432 600	6–4	1.91+02	1.27−02	2.04−02	−1.118	C	LS
				[81.49]	205 448–1 432 600	4–4	2.13+01	2.12−03	2.27−03	−2.072	D	LS
70		^{2}S$-^2$P$^{\circ}$				2–6						1
				[85.60]	264 400–1 432 600	2–4	2.04+01	4.48−03	2.53−03	−2.048	D	LS
71		^{2}P$-^2$P$^{\circ}$				6–6						1
				[87.15]	285 189–1 432 600	4–4	5.39+01	6.14−03	7.05−03	−1.610	D+	LS
				[87.05]	283 869–1 432 600	2–4	1.08+01	2.46−03	1.41−03	−2.308	D	LS
72	$2s2p^2-2s2p(^3$P$^{\circ})4d$	^{4}P$-^4$D$^{\circ}$				12–20						1
				74.268	116 778–1 463 250	6–8	1.40+03	1.54−01	2.26−01	−0.034	C+	LS
				74.255	115 711–1 462 420	4–6	9.76+02	1.21−01	1.18−01	−0.315	C+	LS
				74.217	114 978–1 462 380	2–4	5.81+02	9.60−02	4.69−02	−0.717	C	LS
				74.314	116 778–1 462 420	6–6	4.17+02	3.45−02	5.06−02	−0.684	C	LS
				74.257	115 711–1 462 380	4–4	7.43+02	6.14−02	6.00−02	−0.610	C	LS
				74.316	116 778–1 462 380	6–4	6.96+01	3.84−03	5.64−03	−1.638	D+	LS
73		^{4}P$-^4$P$^{\circ}$				12–12						1
				74.180	116 778–1 464 850	6–6	5.30+02	4.37−02	6.40−02	−0.581	C	LS
				74.121	115 711–1 464 850	4–6	2.27+02	2.81−02	2.74−02	−0.949	C	LS
74		^{2}D$-^2$D$^{\circ}$				10–10						1
				79.451	205 412–1 464 050	6–6	2.81+02	2.66−02	4.17−02	−0.797	C	LS
				79.453	205 448–1 464 050	4–6	2.01+01	2.85−03	2.98−03	−1.943	D	LS
75		^{2}D$-^2$F$^{\circ}$		*78.94*	*205 426–1 472 229*	10–14	1.10+03	1.43−01	3.73−01	0.155	C+	1
				78.907	205 412–1 472 730	6–8	1.10+03	1.37−01	2.14−01	−0.085	C+	LS
				78.982	205 448–1 471 560	4–6	1.02+03	1.43−01	1.49−01	−0.243	C+	LS
				78.980	205 412–1 471 560	6–6	7.29+01	6.82−03	1.06−02	−1.388	D+	LS
76		^{2}D$-^2$P$^{\circ}$		*78.83*	*205 426–1 474 050*	10–6	3.78+01	2.11−03	5.48−03	−1.676	D	1
				[78.80]	205 412–1 473 810	6–4	3.40+01	2.11−03	3.29−03	−1.898	D	LS
				[78.80]	205 448–1 474 530	4–2	3.78+01	1.76−03	1.83−03	−2.152	D	LS
				[78.84]	205 448–1 473 810	4–4	3.78+00	3.52−04	3.65−04	−2.851	E+	LS
77		^{2}S$-^2$P$^{\circ}$		*82.67*	*264 400–1 474 050*	2–6	4.05+02	1.25−01	6.78−02	−0.602	C	1
				[82.69]	264 400–1 473 810	2–4	4.05+02	8.30−02	4.52−02	−0.780	C	LS
				[82.64]	264 400–1 474 530	2–2	4.05+02	4.15−02	2.26−02	−1.081	C	LS
78		^{2}P$-^2$D$^{\circ}$				6–10						1
				84.828	285 189–1 464 050	4–6	2.49+02	4.03−02	4.50−02	−0.793	C	LS

TABLE 28. Transition probabilities of allowed lines for Na VII (references for this table are as follows: 1=Fernley *et al.*,[25] 2=Tachiev and Froese Fischer,[94] 3=Merkelis *et al.*,[64] 4=Galavis *et al.*, [41]and 5=Safronova *et al.*[81])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^{a}	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
79		$^{2}\mathrm{P}-{}^{2}\mathrm{P}^{\circ}$		*84.08*	*284 749–1 474 050*	6–6	9.77+01	1.04−02	1.72−02	−1.205	D+	1
				[84.13]	285 189–1 473 810	4–4	8.12+01	8.62−03	9.55−03	−1.462	D+	LS
				[83.99]	283 869–1 474 530	2–2	6.53+01	6.91−03	3.82−03	−1.859	D	LS
				[84.08]	285 189–1 474 530	4–2	3.26+01	1.73−03	1.92−03	−2.160	D	LS
				[84.04]	283 869–1 473 810	2–4	1.63+01	3.45−03	1.91−03	−2.161	D	LS
80	$2s2p^2-2s2p(^1\mathrm{P}^{\circ})4s$	$^{2}\mathrm{D}-{}^{2}\mathrm{P}^{\circ}$		*74.99*	*205 426–1 538 950*	10–6	5.51+01	2.79−03	6.88−03	−1.554	D	1
				[74.99]	205 412–1 538 950	6–4	4.96+01	2.79−03	4.13−03	−1.776	D	LS
				[74.99]	205 448–1 538 950	4–2	5.50+01	2.32−03	2.29−03	−2.032	D	LS
				[74.99]	205 448–1 538 950	4–4	5.52+00	4.65−04	4.59−04	−2.730	E+	LS
81		$^{2}\mathrm{P}-{}^{2}\mathrm{P}^{\circ}$		*79.73*	*284 749–1 538 950*	6–6	8.27+01	7.88−03	1.24−02	−1.325	D	1
				[79.76]	285 189–1 538 950	4–4	6.89+01	6.57−03	6.90−03	−1.580	D+	LS
				[79.68]	283 869–1 538 950	2–2	5.53+01	5.26−03	2.76−03	−1.978	D	LS
				[79.76]	285 189–1 538 950	4–2	2.75+01	1.31−03	1.38−03	−2.281	D	LS
				[79.68]	283 869–1 538 950	2–4	1.38+01	2.63−03	1.38−03	−2.279	D	LS
82	$2s2p^2-2s2p(^1\mathrm{P}^{\circ})4d$	$^{2}\mathrm{D}-{}^{2}\mathrm{F}^{\circ}$		*72.87*	*205 426–1 577 810*	10–14	3.09+02	3.44−02	8.26−02	−0.463	C	1
				[72.86]	205 412–1 577 810	6–8	3.09+02	3.28−02	4.72−02	−0.706	C	LS
				[72.87]	205 448–1 577 810	4–6	2.88+02	3.44−02	3.30−02	−0.861	C	LS
				[72.86]	205 412–1 577 810	6–6	2.06+01	1.64−03	2.36−03	−2.007	D	LS
83	$2s2p^2-2s2p(^3\mathrm{P}^{\circ})5d$	$^{4}\mathrm{P}-{}^{4}\mathrm{D}^{\circ}$		*67.88*	*116 122–1 589 270*	12–20	6.90+02	7.95−02	2.13−01	−0.020	C	1
				67.912	116 778–1 589 270	6–8	6.89+02	6.35−02	8.52−02	−0.419	C+	LS
				67.863	115 711–1 589 270	4–6	4.84+02	5.01−02	4.48−02	−0.698	C	LS
				67.829	114 978–1 589 270	2–4	2.89+02	3.98−02	1.78−02	−1.099	C	LS
				67.912	116 778–1 589 270	6–6	2.07+02	1.43−02	1.92−02	−1.067	C	LS
				67.863	115 711–1 589 270	4–4	3.68+02	2.54−02	2.27−02	−0.993	C	LS
				67.829	114 978–1 589 270	2–2	5.77+02	3.98−02	1.78−02	−1.099	C	LS
				67.912	116 778–1 589 270	6–4	3.45+01	1.59−03	2.13−03	−2.020	D	LS
				67.863	115 711–1 589 270	4–2	1.15+02	3.97−03	3.55−03	−1.799	D	LS
84		$^{4}\mathrm{P}-{}^{4}\mathrm{P}^{\circ}$		*67.85*	1 16 122–1 590 050	12–12	3.73+02	2.57−02	6.89−02	−0.511	D+	1
				67.876	116 778–1 590 050	6–6	2.61+02	1.80−02	2.41−02	−0.967	C	LS
				67.827	115 711–1 590 050	4–4	4.97+01	3.43−03	3.06−03	−1.863	D	LS
				67.793	114 978–1 590 050	2–2	6.23+01	4.29−03	1.91−03	−2.067	D	LS
				67.876	116 778–1 590 050	6–4	1.67+02	7.71−03	1.03−02	−1.335	D+	LS
				67.827	115 711–1 590 050	4–2	3.10+02	1.07−02	9.56−03	−1.369	D+	LS
				67.827	115 711–1 590 050	4–6	1.12+02	1.16−02	1.04−02	−1.333	D+	LS
				67.793	114 978–1 590 050	2–4	1.55+02	2.14−02	9.55−03	−1.369	D+	LS
85		$^{2}\mathrm{D}-{}^{2}\mathrm{F}^{\circ}$		*72.04*	*205 426–1 593 449*	10–14	6.94+02	7.56−02	1.79−01	−0.121	C	1
				72.020	205 412–1 593 920	6–8	6.94+02	7.20−02	1.02−01	−0.365	C+	LS
				72.079	205 448–1 592 820	4–6	6.47+02	7.56−02	7.18−02	−0.519	C	LS
				72.077	205 412–1 592 820	6–6	4.62+01	3.60−03	5.13−03	−1.666	D+	LS
86	$2s2p^2-2p^2(^3\mathrm{P})4p$	$^{4}\mathrm{P}-{}^{4}\mathrm{D}^{\circ}$				12–20						1
				65.388	116 778–1 646 110	6–8	2.28+02	1.95−02	2.52−02	−0.932	C	LS
				65.342	115 711–1 646 110	4–6	1.60+02	1.54−02	1.33−02	−1.210	D+	LS
				65.311	114 978–1 646 110	2–4	9.54+01	1.22−02	5.25−03	−1.613	D+	LS
				65.388	116 778–1 646 110	6–6	6.85+01	4.39−03	5.67−03	−1.579	D+	LS
				65.342	115 711–1 646 110	4–4	1.22+02	7.81−03	6.72−03	−1.505	D+	LS
				65.388	116 778–1 646 110	6–4	1.14+01	4.88−04	6.30−04	−2.533	E+	LS

TABLE 28. Transition probabilities of allowed lines for Na VII (references for this table are as follows: 1=Fernley *et al.*,[25] 2=Tachiev and Froese Fischer,[94] 3=Merkelis *et al.*,[64] 4=Galavis *et al.*, [41]and 5=Safronova *et al.*[81])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
87	$2s2p^2-2s2p(^3P^\circ)6d$	$^4P-^4D^\circ$		*64.88*	*116 122–1 657 520*	12–20	3.36+02	3.54−02	9.07−02	−0.372	D+	1
				64.904	116 778–1 657 520	6–8	3.36+02	2.83−02	3.63−02	−0.770	C	LS
				64.859	115 711–1 657 520	4–6	2.36+02	2.23−02	1.90−02	−1.050	C	LS
				64.828	114 978–1 657 520	2–4	1.40+02	1.77−02	7.56−03	−1.451	D+	LS
				64.904	116 778–1 657 520	6–6	1.01+02	6.37−03	8.17−03	−1.418	D+	LS
				64.859	115 711–1 657 520	4–4	1.79+02	1.13−02	9.65−03	−1.345	D+	LS
				64.828	114 978–1 657 520	2–2	2.81+02	1.77−02	7.56−03	−1.451	D+	LS
				64.904	116 778–1 657 520	6–4	1.68+01	7.08−04	9.08−04	−2.372	E+	LS
				64.859	115 711–1 657 520	4–2	5.61+01	1.77−03	1.51−03	−2.150	D	LS
88	$2p^3-2s2p(^3P^\circ)3p$	$^2D^\circ-^2P$		*139.88*	*412 345–1 127 223*	10–6	2.41+01	4.24−03	1.95−02	−1.373	D+	1
				139.837	412 311–1 127 430	6–4	2.17+01	4.24−03	1.17−02	−1.594	D+	LS
				139.975	412 395–1 126 810	4–2	2.40+01	3.53−03	6.51−03	−1.850	D+	LS
				139.853	412 395–1 127 430	4–4	2.41+00	7.06−04	1.30−03	−2.549	D	LS
89		$^2D^\circ-^2D$		*134.54*	*412 345–1 155 620*	10–10	1.21+01	3.28−03	1.45−02	−1.484	D+	1
				134.432	412 311–1 156 180	6–6	1.13+01	3.07−03	8.15−03	−1.735	D+	LS
				134.701	412 395–1 154 780	4–4	1.08+01	2.95−03	5.23−03	−1.928	D+	LS
				134.686	412 311–1 154 780	6–4	1.21+00	2.19−04	5.83−04	−2.881	E+	LS
				134.447	412 395–1 156 180	4–6	8.09−01	3.29−04	5.82−04	−2.881	E+	LS
90		$^2P^\circ-^2D$		*144.81*	*465 080–1 155 620*	6–10	8.33+00	4.36−03	1.25−02	−1.582	D+	1
				144.703	465 111–1 156 180	4–6	8.35+00	3.93−03	7.49−03	−1.804	D+	LS
				144.977	465 017–1 154 780	2–4	6.92+00	4.36−03	4.16−03	−2.059	D	LS
				144.997	465 111–1 154 780	4–4	1.38+00	4.36−04	8.32−04	−2.758	E+	LS
91		$^2P^\circ-^2S$		*141.39*	*465 080–1 172 340*	6–2	6.10+01	6.09−03	1.70−02	−1.437	D+	1
				141.397	465 111–1 172 340	4–2	4.06+01	6.09−03	1.13−02	−1.613	D+	LS
				141.378	465 017–1 172 340	2–2	2.03+01	6.09−03	5.67−03	−1.914	D+	LS
92	$2p^3-2s2p(^1P^\circ)3p$	$^2D^\circ-^2P$		*118.86*	*412 345–1 253 637*	10–6	9.74+01	1.24−02	4.85−02	−0.907	C	1
				118.840	412 311–1 253 780	6–4	8.78+01	1.24−02	2.91−02	−1.128	C	LS
				118.912	412 395–1 253 350	4–2	9.72+01	1.03−02	1.61−02	−1.385	D+	LS
				118.852	412 395–1 253 780	4–4	9.73+00	2.06−03	3.22−03	−2.084	D	LS
93		$^2P^\circ-^2P$		*126.81*	*465 080–1 253 637*	6–6	2.90+01	6.98−03	1.75−02	−1.378	D+	1
				126.796	465 111–1 253 780	4–4	2.41+01	5.82−03	9.72−03	−1.633	D+	LS
				126.850	465 017–1 253 350	2–2	1.93+01	4.66−03	3.89−03	−2.031	D	LS
				126.865	465 111–1 253 350	4–2	9.61+00	1.16−03	1.94−03	−2.333	D	LS
				126.781	465 017–1 253 780	2–4	4.83+00	2.33−03	1.94−03	−2.332	D	LS
94	$2p^3-2p^2(^3P)3s$	$^4S^\circ-^4P$				4–12						1
				108.193	367 290–1 291 560	4–6	3.15+02	8.29−02	1.18−01	−0.479	C+	LS
				108.373	367 290–1 290 030	4–4	3.14+02	5.52−02	7.88−02	−0.656	C	LS
95	$2p^3-2p^2(^1D)3s$	$^2D^\circ-^2D$		*108.78*	*412 345–1 331 638*	10–10	4.11+02	7.29−02	2.61−01	−0.137	C+	1
				108.736	412 311–1 331 970	6–6	3.84+02	6.81−02	1.46−01	−0.389	C+	LS
				108.844	412 395–1 331 140	4–4	3.69+02	6.56−02	9.40−02	−0.581	C+	LS
				108.834	412 311–1 331 140	6–4	4.11+01	4.86−03	1.04−02	−1.535	D+	LS
				108.746	412 395–1 331 970	4–6	2.74+01	7.29−03	1.04−02	−1.535	D+	LS
96		$^2P^\circ-^2D$		*115.40*	*465 080–1 331 638*	6–10	1.24+02	4.12−02	9.39−02	−0.607	C	1
				115.359	465 111–1 331 970	4–6	1.24+02	3.71−02	5.64−02	−0.829	C	LS

TABLE 28. Transition probabilities of allowed lines for Na VII (references for this table are as follows: 1=Fernley *et al.*,[25] 2=Tachiev and Froese Fischer,[94] 3=Merkelis *et al.*,[64] 4=Galavis *et al.*, [41]and 5=Safronova *et al.*[81])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	$E_i - E_k$ (cm^{-1})	$g_i - g_k$	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				115.457	465 017–1 331 140	2–4	1.03+02	4.12−02	3.13−02	−1.084	C	LS
				115.470	465 111–1 331 140	4–4	2.06+01	4.12−03	6.26−03	−1.783	D+	LS
97	$2p^3-2p^2(^3P)3d$	$^4S^\circ-^4P$		*96.89*	*367 290–1 399 363*	4–12	3.62+03	1.53+00	1.95+00	0.787	B	1
				96.922	367 290–1 399 050	4–6	3.62+03	7.65−01	9.76−01	0.486	B+	LS
				96.872	367 290–1 399 580	4–4	3.63+03	5.10−01	6.51−01	0.310	B	LS
				96.845	367 290–1 399 870	4–2	3.63+03	2.55−01	3.25−01	0.009	B	LS
98		$^2D^\circ-^2F$		*102.41*	*412 345–1 388 769*	10–14	4.48+02	9.86−02	3.32−01	−0.006	C+	1
				[102.39]	412 311–1 388 970	6–8	4.48+02	9.39−02	1.90−01	−0.249	C+	LS
				[102.45]	412 395–1 388 500	4–6	4.17+02	9.85−02	1.33−01	−0.405	C+	LS
				[102.44]	412 311–1 388 500	6–6	2.98+01	4.69−03	9.49−03	−1.551	D+	LS
99		$^2D^\circ-^2D$		*102.24*	*412 345–1 390 450*	10–10	1.13+03	1.78−01	5.98−01	0.250	C+	1
				[102.24]	412 311–1 390 450	6–6	1.06+03	1.66−01	3.35−01	−0.002	B	LS
				[102.24]	412 395–1 390 450	4–4	1.02+03	1.60−01	2.15−01	−0.194	C+	LS
				[102.24]	412 311–1 390 450	6–4	1.13+02	1.18−02	2.38−02	−1.150	C	LS
				[102.24]	412 395–1 390 450	4–6	7.57+01	1.78−02	2.40−02	−1.148	C	LS
100		$^2P^\circ-^2D$		*108.06*	*465 080–1 390 450*	6–10	8.53+02	2.49−01	5.31−01	0.174	C+	1
				[108.07]	465 111–1 390 450	4–6	8.53+02	2.24−01	3.19−01	−0.048	B	LS
				[108.06]	465 017–1 390 450	2–4	7.11+02	2.49−01	1.77−01	−0.303	C+	LS
				[108.07]	465 111–1 390 450	4–4	1.42+02	2.49−02	3.54−02	−1.002	C	LS
101	$2p^3-2p^2(^1D)3d$	$^2D^\circ-^2D$		*99.67*	*412 345–1 415 630*	10–10	1.30+03	1.94−01	6.37−01	0.288	C+	1
				99.669	412 311–1 415 630	6–6	1.22+03	1.81−01	3.56−01	0.036	B	LS
				99.678	412 395–1 415 630	4–4	1.17+03	1.75−01	2.30−01	−0.155	C+	LS
				99.669	412 311–1 415 630	6–4	1.30+02	1.29−02	2.54−02	−1.111	C	LS
				99.678	412 395–1 415 630	4–6	8.68+01	1.94−02	2.55−02	−1.110	C	LS
102		$^2D^\circ-^2F$		*98.38*	*412 345–1 428 766*	10–14	4.11+03	8.35−01	2.70+00	0.922	B+	1
				98.378	412 311–1 428 800	6–8	4.11+03	7.95−01	1.54+00	0.679	B+	LS
				98.394	412 395–1 428 720	4–6	3.84+03	8.35−01	1.08+00	0.524	B+	LS
				98.386	412 311–1 428 720	6–6	2.74+02	3.97−02	7.72−02	−0.623	C	LS
103		$^2D^\circ-^2P$		*98.03*	*412 345–1 432 453*	10–6	3.76+02	3.25−02	1.05−01	−0.488	C	1
				98.010	412 311–1 432 610	6–4	3.39+02	3.25−02	6.29−02	−0.710	C	LS
				98.064	412 395–1 432 140	4–2	3.76+02	2.71−02	3.50−02	−0.965	C	LS
				98.019	412 395–1 432 610	4–4	3.76+01	5.42−03	7.00−03	−1.664	D+	LS
104		$^2P^\circ-^2D$		*105.20*	*465 080–1 415 630*	6–10	1.18+03	3.27−01	6.79−01	0.293	B	1
				105.206	465 111–1 415 630	4–6	1.18+03	2.94−01	4.07−01	0.070	B	LS
				105.195	465 017–1 415 630	2–4	9.86+02	3.27−01	2.26−01	−0.184	C+	LS
				105.206	465 111–1 415 630	4–4	1.97+02	3.27−02	4.53−02	−0.883	C	LS
105		$^2P^\circ-^2P$		*103.37*	*465 080–1 432 453*	6–6	1.30+03	2.08−01	4.24−01	0.096	C+	1
				103.359	465 111–1 432 610	4–4	1.08+03	1.73−01	2.35−01	−0.160	C+	LS
				103.399	465 017–1 432 140	2–2	8.67+02	1.39−01	9.46−02	−0.556	C+	LS
				103.410	465 111–1 432 140	4–2	4.32+02	3.46−02	4.71−02	−0.859	C	LS
				103.349	465 017–1 432 610	2–4	2.16+02	6.93−02	4.72−02	−0.858	C	LS
106	$2p^3-2s2p(^3P^\circ)4p$	$^2D^\circ-^2P$		*97.02*	*412 345–1 443 017*	10–6	2.67+02	2.26−02	7.23−02	−0.646	C	1
				97.006	412 311–1 443 170	6–4	2.40+02	2.26−02	4.33−02	−0.868	C	LS

TABLE 28. Transition probabilities of allowed lines for Na VII (references for this table are as follows: 1=Fernley *et al.*,[25] 2=Tachiev and Froese Fischer,[94] 3=Merkelis *et al.*,[64] 4=Galavis *et al.*, [41]and 5=Safronova *et al.*[81])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})$^{\mathrm{a}}$	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				97.058	412 395–1 442 710	4–2	2.68+02	1.89−02	2.42−02	−1.121	C	LS
				97.014	412 395–1 443 170	4–4	2.67+01	3.77−03	4.82−03	−1.822	D	LS
107		^{2}D°–^{2}D		*96.11*	*412 345–1 452 850*	10–10	5.33+00	7.38−04	2.34−03	−2.132	E+	1
				96.058	412 311–1 453 350	6–6	4.98+00	6.89−04	1.31−03	−2.384	D	LS
				96.181	412 395–1 452 100	4–4	4.79+00	6.64−04	8.41−04	−2.576	E+	LS
				96.173	412 311–1 452 100	6–4	5.32−01	4.92−05	9.35−05	−3.530	E	LS
				96.066	412 395–1 453 350	4–6	3.56−01	7.38−05	9.34−05	−3.530	E	LS
108		^{2}P°–^{2}P		*102.26*	*465 080–1 443 017*	6–6	3.86+02	6.06−02	1.22−01	−0.439	C	1
				102.243	465 111–1 443 170	4–4	3.22+02	5.05−02	6.80−02	−0.695	C	LS
				102.282	465 017–1 442 710	2–2	2.57+02	4.03−02	2.71−02	−1.094	C	LS
				102.291	465 111–1 442 710	4–2	1.29+02	1.01−02	1.36−02	−1.394	D+	LS
				102.233	465 017–1 443 170	2–4	6.45+01	2.02−02	1.36−02	−1.394	D+	LS
109		^{2}P°–^{2}D		*101.24*	*465 080–1 452 850*	6–10	1.30+02	3.32−02	6.64−02	−0.701	C	1
				101.190	465 111–1 453 350	4–6	1.30+02	2.99−02	3.98−02	−0.922	C	LS
				101.309	465 017–1 452 100	2–4	1.08+02	3.32−02	2.21−02	−1.178	C	LS
				101.318	465 111–1 452 100	4–4	2.16+01	3.32−03	4.43−03	−1.877	D	LS
110	$2p^3$–$2p^2(^3\mathrm{P})4d$	^{4}S°–^{4}P				4–12						1
				76.862	367 290–1 668 320	4–6	1.37+03	1.82−01	1.84−01	−0.138	C+	LS
				76.827	367 290–1 668 920	4–4	1.37+03	1.21−01	1.22−01	−0.315	C+	LS
111	$3s$–$3p$	^{2}S–^{2}P°				2–6						2
				1 752.23	951 350–1 008 420	2–4	2.61+00	2.40−01	2.77+00	−0.319	B+	2
112	$2s^23s$–$2s2p(^3\mathrm{P}^\circ)3s$	^{2}S–^{2}P°		*654.4*	*951 350–1 104 153*	2–6	1.69+00	3.26−02	1.40−01	−1.186	C	1
				652.44	951 350–1 104 620	2–4	1.71+00	2.18−02	9.36−02	−1.361	C+	LS
				658.46	951 350–1 103 220	2–2	1.66+00	1.08−02	4.68−02	−1.666	C	LS
113	$2s^23s$–$2s2p(^3\mathrm{P}^\circ)3d$	^{2}S–^{2}P°		*375.81*	*951 350–1 217 443*	2–6	5.65+00	3.59−02	8.88−02	−1.144	C	1
				376.166	951 350–1 217 190	2–4	5.63+00	2.39−02	5.92−02	−1.321	C	LS
				375.094	951 350–1 217 950	2–2	5.69+00	1.20−02	2.96−02	−1.620	C	LS
114	$2s^23s$–$2s2p(^1\mathrm{P}^\circ)3s$	^{2}S–^{2}P°		*404.96*	*951 350–1 198 290*	2–6	4.88+01	3.60−01	9.60−01	−0.143	B	1
				404.957	951 350–1 198 290	2–4	4.88+01	2.40−01	6.40−01	−0.319	B	LS
				404.957	951 350–1 198 290	2–2	4.88+01	1.20−01	3.20−01	−0.620	B	LS
115	$2s^23s$–$2s2p(^1\mathrm{P}^\circ)3d$	^{2}S–^{2}P°		*281.59*	951 350–*1 306 470*	2–6	2.94+01	1.05−01	1.94−01	−0.678	C+	1
				281.595	951 350–1 306 470	2–4	2.94+01	6.98−02	1.29−01	−0.855	C+	LS
				281.595	951 350–1 306 470	2–2	2.94+01	3.49−02	6.47−02	−1.156	C	LS
116	$2s^23s$–$2s2p(^3\mathrm{P}^\circ)4s$	^{2}S–^{2}P°				2–6						1
				[207.79]	951 350–1 432 600	2–4	1.30+00	1.68−03	2.30−03	−2.474	D	LS
117	$3p$–$3d$	^{2}P°–^{2}D				6–10						2
				1 912.8	1 008 420–1 060 700	4–6	1.86+00	1.53−01	3.86+00	−0.213	B+	2
				1 917.2	1 008 420–1 060 580	4–4	3.08−01	1.70−02	4.28−01	−1.167	B	2
118	$2s^23p$–$2s2p(^3\mathrm{P}^\circ)3p$	^{2}P°–^{2}P				6–6						1
				840.27	1 008 420–1 127 430	4–4	7.97−01	8.44−03	9.34−02	−1.472	C+	LS
				844.67	1 008 420–1 126 810	4–2	3.14−01	1.68−03	1.87−02	−2.173	C	LS

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No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
119		^{2}P°–^{2}D				6–10						1
				676.77	1 008 420–1 156 180	4–6	3.25+00	3.35−02	2.99−01	−0.873	B	LS
				683.25	1 008 420–1 154 780	4–4	5.27−01	3.69−03	3.32−02	−1.831	C	LS
120		^{2}P°–^{2}S				6–2						1
				610.05	1 008 420–1 172 340	4–2	1.58+00	4.41−03	3.54−02	−1.754	C	LS
121	$2s^23p$–$2s2p(^1P°)3p$	^{2}P°–^{2}D				6–10						1
				410.526	1 008 420–1 252 010	4–6	3.54+01	1.34−01	7.24−01	−0.271	B	LS
				411.100	1 008 420–1 251 670	4–4	5.88+00	1.49−02	8.07−02	−1.225	C	LS
122		^{2}P°–^{2}P				6–6						1
				407.564	1 008 420–1 253 780	4–4	4.30+01	1.07−01	5.74−01	−0.369	B	LS
				408.280	1 008 420–1 253 350	4–2	1.70+01	2.13−02	1.15−01	−1.070	C+	LS
123		^{2}P°–^{2}S				6–2						1
				399.265	1 008 420–1 258 880	4–2	7.05+01	8.43−02	4.43−01	−0.472	B	LS
124	$3p$–$4s$	^{2}P°–^{2}S				6–2						1
				349.052	1 008 420–1 294 910	4–2	2.76+01	2.52−02	1.16−01	−0.997	C+	LS
125	$2s^23p$–$2p^2(^1D)3s$	^{2}P°–^{2}D				6–10						1
				309.071	1 008 420–1 331 970	4–6	8.24+00	1.77−02	7.20−02	−1.150	C	LS
				309.866	1 008 420–1 331 140	4–4	1.37+00	1.97−03	8.04−03	−2.103	D+	LS
126	$3p$–$4d$	^{2}P°–^{2}D				6–10						1
				305.427	1 008 420–1 335 830	4–6	1.52+02	3.19−01	1.28+00	0.106	B+	LS
				305.446	1 008 420–1 335 810	4–4	2.53+01	3.54−02	1.42−01	−0.849	C+	LS
127	$2s^23p$–$2p^2(^1D)3d$	^{2}P°–^{2}P				6–6						1
				235.743	1 008 420–1 432 610	4–4	2.03+00	1.69−03	5.25−03	−2.170	D+	LS
				236.005	1 008 420–1 432 140	4–2	8.10−01	3.38−04	1.05−03	−2.869	E+	LS
128	$2s^23p$–$2s2p(^3P°)4p$	^{2}P°–^{2}D				6–10						1
				224.754	1 008 420–1 453 350	4–6	5.33−01	6.05−04	1.79−03	−2.616	D	LS
				225.388	1 008 420–1 452 100	4–4	8.80−02	6.70−05	1.99−04	−3.572	E+	LS
129	$3p$–$5d$	^{2}P°–^{2}D				6–10						1
				220.668	1 008 420–1 461 590	4–6	9.01+01	9.87−02	2.87−01	−0.404	B	LS
				220.702	1 008 420–1 461 520	4–4	1.51+01	1.10−02	3.20−02	−1.357	C	LS
130	$3p$–$6d$	^{2}P°–^{2}D				6–10						1
				191.924	1 008 420–1 529 460	4–6	5.31+01	4.40−02	1.11−01	−0.754	C+	LS
				191.924	1 008 420–1 529 460	4–4	8.86+00	4.89−03	1.24−02	−1.709	D+	LS
131	$3p$–$7d$	^{2}P°–^{2}D				6–10						1
				178.044	1 008 420–1 570 080	4–6	3.32+01	2.37−02	5.56−02	−1.023	D+	LS
				178.044	1 008 420–1 570 080	4–4	5.56+00	2.64−03	6.19−03	−1.976	E+	LS
132	$2s^23p$–$2s2p(^3P°)5p$	^{2}P°–^{2}P				6–6						1
				175.460	1 008 420–1 578 350	4–4	1.06+00	4.91−04	1.13−03	−2.707	D	LS
				175.460	1 008 420–1 578 350	4–2	4.26−01	9.82−05	2.27−04	−3.406	E+	LS

TABLE 28. Transition probabilities of allowed lines for Na VII (references for this table are as follows: 1=Fernley *et al.*,[25] 2=Tachiev and Froese Fischer,[94] 3=Merkelis *et al.*,[64] 4=Galavis *et al.*, [41]and 5=Safronova *et al.*[81])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})$^{\mathrm{a}}$	$E_i - E_k$ (cm^{-1})	$g_i - g_k$	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
133		^{2}P$^\circ$–^{2}D				6–10						1
				173.816	1 008 420–1 583 740	4–6	1.12+00	7.62−04	1.74−03	−2.516	D	LS
				173.816	1 008 420–1 583 740	4–4	1.87−01	8.47−05	1.94−04	−3.470	E+	LS
134	$3p-8d$	^{2}P$^\circ$–^{2}D				6–10						1
				170.074	1 008 420–1 596 400	4–6	2.11+01	1.37−02	3.07−02	−1.261	D	LS
				170.074	1 008 420–1 596 400	4–4	3.51+00	1.52−03	3.40−03	−2.216	E	LS
135	$2s^23d-2s2p(^3P^\circ)3s$	^{2}D–^{2}P$^\circ$	*2 298*	*2 299*	*1 060 652–1 104 153*	10–6	8.75−02	4.16−03	3.15−01	−1.381	C+	1
			2 276.2	2 276.9	1 060 700–1 104 620	6–4	8.11−02	4.20−03	1.89−01	−1.599	C+	LS
			2 344.5	2 345.2	1 060 580–1 103 220	4–2	8.25−02	3.40−03	1.05−01	−1.866	C+	LS
			2 270.0	2 270.7	1 060 580–1 104 620	4–4	9.08−03	7.02−04	2.10−02	−2.552	C	LS
136	$2s^23d-2s2p(^3P^\circ)3d$	^{2}D–^{2}D$^\circ$		*789.1*	*1 060 652–1 187 386*	10–10	3.58−02	3.35−04	8.69−03	−2.475	D	1
				786.23	1 060 700–1 187 890	6–6	3.38−02	3.13−04	4.86−03	−2.726	D	LS
				793.34	1 060 580–1 186 630	4–4	3.18−02	3.00−04	3.13−03	−2.921	D	LS
				794.09	1 060 700–1 186 630	6–4	3.52−03	2.22−05	3.48−04	−3.875	E+	LS
				785.48	1 060 580–1 187 890	4–6	2.42−03	3.36−05	3.48−04	−3.872	E+	LS
137	$2s^23d-2s2p(^1P^\circ)3d$	^{2}D–^{2}F$^\circ$		*431.63*	*1 060 652–1 292 330*	10–14	3.14−01	1.23−03	1.75−02	−1.910	D+	1
				431.723	1 060 700–1 292 330	6–8	3.14−01	1.17−03	9.98−03	−2.154	D+	LS
				431.499	1 060 580–1 292 330	4–6	2.94−01	1.23−03	6.99−03	−2.308	D+	LS
				431.723	1 060 700–1 292 330	6–6	2.09−02	5.85−05	4.99−04	−3.455	E+	LS
138		^{2}D–^{2}D$^\circ$		*411.70*	*1 060 652–1 303 546*	10–10	4.88+01	1.24−01	1.68+00	0.093	B	1
				411.675	1 060 700–1 303 610	6–6	4.57+01	1.16−01	9.43−01	−0.157	B+	LS
				[411.74]	1 060 580–1 303 450	4–4	4.37+01	1.11−01	6.02−01	−0.353	B	LS
				[411.95]	1 060 700–1 303 450	6–4	4.86+00	8.25−03	6.71−02	−1.305	C	LS
				411.472	1 060 580–1 303 610	4–6	3.26+00	1.24−02	6.72−02	−1.305	C	LS
139		^{2}D–^{2}P$^\circ$		*406.81*	*1 060 652–1 306 470*	10–6	1.61+00	2.39−03	3.20−02	−1.622	D+	1
				406.884	1 060 700–1 306 470	6–4	1.44+00	2.39−03	1.92−02	−1.843	C	LS
				406.686	1 060 580–1 306 470	4–2	1.61+00	1.99−03	1.07−02	−2.099	D+	LS
				406.686	1 060 580–1 306 470	4–4	1.61−01	3.99−04	2.14−03	−2.797	D	LS
140	$2s^23d-2p^2(^1D)3p$	^{2}D–^{2}F$^\circ$		*315.02*	*1 060 652–1 378 094*	10–14	8.83+00	1.84−02	1.91−01	−0.735	C+	1
				314.861	1 060 700–1 378 300	6–8	8.83+00	1.75−02	1.09−01	−0.979	C+	LS
				315.219	1 060 580–1 377 820	4–6	8.23+00	1.84−02	7.64−02	−1.133	C	LS
				315.338	1 060 700–1 377 820	6–6	5.87−01	8.75−04	5.45−03	−2.280	D+	LS
141		^{2}D–^{2}D$^\circ$		*301.07*	*1 060 652–1 392 800*	10–10	4.86−01	6.60−04	6.54−03	−2.180	D	1
				301.114	1 060 700–1 392 800	6–6	4.53−01	6.16−04	3.66−03	−2.432	D	LS
				301.005	1 060 580–1 392 800	4–4	4.37−01	5.94−04	2.35−03	−2.624	D	LS
				301.114	1 060 700–1 392 800	6–4	4.86−02	4.40−05	2.62−04	−3.578	E+	LS
				301.005	1 060 580–1 392 800	4–6	3.24−02	6.60−05	2.62−04	−3.578	E+	LS
142	$2s^23d-2s2p(^3P^\circ)4d$	^{2}D–^{2}D$^\circ$				10–10						1
				247.924	1 060 700–1 464 050	6–6	4.05−01	3.73−04	1.83−03	−2.650	D	LS
				247.850	1 060 580–1 464 050	4–6	2.89−02	3.99−05	1.30−04	−3.797	E	LS
143		^{2}D–^{2}F$^\circ$		*242.97*	*1 060 652–1 472 229*	10–14	1.36+01	1.69−02	1.35−01	−0.772	C	1
				242.701	1 060 700–1 472 730	6–8	1.37+01	1.61−02	7.72−02	−1.015	C	LS
				243.321	1 060 580–1 471 560	4–6	1.27+01	1.69−02	5.42−02	−1.170	C	LS

TABLE 28. Transition probabilities of allowed lines for Na VII (references for this table are as follows: 1=Fernley *et al.*,[25] 2=Tachiev and Froese Fischer,[94] 3=Merkelis *et al.*,[64] 4=Galavis *et al.*, [41]and 5=Safronova *et al.*[81])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				243.392	1 060 700–1 471 560	6–6	9.03−01	8.02−04	3.86−03	−2.318	D	LS
144	$2s^23d-2s2p(^1P^\circ)4d$	$^2D-^2F^\circ$		*193.36*	*1 060 652–1 577 810*	10–14	8.06+00	6.32−03	4.03−02	−1.199	C	1
				[193.38]	1 060 700–1 577 810	6–8	8.05+00	6.02−03	2.30−02	−1.442	C	LS
				[193.34]	1 060 580–1 577 810	4–6	7.53+00	6.33−03	1.61−02	−1.597	D+	LS
				[193.38]	1 060 700–1 577 810	6–6	5.37−01	3.01−04	1.15−03	−2.743	D	LS
145	$2s2p(^3P^\circ)3s-$ $2s2p(^3P^\circ)3p$	$^2P^\circ-^2P$	*4 333*	*4 335*	*1 104 153–1 127 223*	6–6	1.60−01	4.50−02	3.85+00	−0.569	B+	1
			4 382.8	4 384.0	1 104 620–1 127 430	4–4	1.29−01	3.71−02	2.14+00	−0.829	B+	LS
			4 237.9	4 239.1	1 103 220–1 126 810	2–2	1.14−01	3.07−02	8.57−01	−1.212	B	LS
			4 505.3	4 506.5	1 104 620–1 126 810	4–2	4.74−02	7.21−03	4.28−01	−1.540	B	LS
			4 129.4	4 130.5	1 103 220–1 127 430	2–4	3.07−02	1.57−02	4.27−01	−1.503	B	LS
146		$^2P^\circ-^2D$		*1 943*	*1 104 153–1 155 620*	6–10	2.03+00	1.92−01	7.36+00	0.061	B+	1
				1 939.5	1 104 620–1 156 180	4–6	2.05+00	1.73−01	4.42+00	−0.160	B+	LS
				1 939.5	1 103 220–1 154 780	2–4	1.70+00	1.92−01	2.45+00	−0.416	B+	LS
				1 993.6	1 104 620–1 154 780	4–4	3.14−01	1.87−02	4.91−01	−1.126	B	LS
147		$^2P^\circ-^2S$		*1 466.6*	*1 104 153–1 172 340*	6–2	5.27+00	5.67−02	1.64+00	−0.468	B	1
				1 476.67	1 104 620–1 172 340	4–2	3.44+00	5.63−02	1.09+00	−0.647	B+	LS
				1 446.76	1 103 220–1 172 340	2–2	1.83+00	5.74−02	5.47−01	−0.940	B	LS
148	$2s2p(^3P^\circ)3s-$ $2s2p(^1P^\circ)3p$	$^2P^\circ-^2D$		*677.0*	*1 104 153–1 251 874*	6–10	3.42+00	3.92−02	5.24−01	−0.629	C+	1
				678.47	1 104 620–1 252 010	4–6	3.40+00	3.52−02	3.14−01	−0.851	B	LS
				673.63	1 103 220–1 251 670	2–4	2.89+00	3.93−02	1.74−01	−1.105	C+	LS
				680.04	1 104 620–1 251 670	4–4	5.63−01	3.90−03	3.49−02	−1.807	C	LS
149		$^2P^\circ-^2P$		*669.0*	*1 104 153–1 253 637*	6–6	1.84−01	1.24−03	1.63−02	−2.128	D+	1
				670.42	1 104 620–1 253 780	4–4	1.53−01	1.03−03	9.09−03	−2.385	D+	LS
				666.09	1 103 220–1 253 350	2–2	1.24−01	8.26−04	3.62−03	−2.782	D	LS
				672.36	1 104 620–1 253 350	4–2	6.02−02	2.04−04	1.81−03	−3.088	D	LS
				664.19	1 103 220–1 253 780	2–4	3.13−02	4.14−04	1.81−03	−3.082	D	LS
150		$^2P^\circ-^2S$		*646.3*	*1 104 153–1 258 880*	6–2	9.98+00	2.08−02	2.66−01	−0.904	C+	1
				648.26	1 104 620–1 258 880	4–2	6.60+00	2.08−02	1.78−01	−1.080	C+	LS
				642.43	1 103 220–1 258 880	2–2	3.38+00	2.09−02	8.84−02	−1.379	C+	LS
151	$2s2p(^3P^\circ)3s-$ $2p^2(^3P)3s$	$^4P^\circ-^4P$				12–12						1
				471.143	1 079 310–1 291 560	6–6	2.78+01	9.24−02	8.60−01	−0.256	B	LS
				471.587	1 077 980–1290 030	4–4	5.28+00	1.76−02	1.09−01	−1.152	C+	LS
				474.563	1 079 310–1 290 030	6–4	1.75+01	3.93−02	3.68−01	−0.627	B	LS
				468.209	1 077 980–1 291 560	4–6	1.21+01	5.98−02	3.69−01	−0.621	B	LS
				469.969	1 077 250–1 290 030	2–4	1.66+01	1.10−01	3.40−01	−0.658	B	LS
152	$2s2p(^3P^\circ)3s-$ $2p^2(^1D)3s$	$^2P^\circ-^2D$		*439.59*	*1 104 153–1 331 638*	6–10	2.29−01	1.11−03	9.60−03	−2.177	D	1
				439.850	1 104 620–1 331 970	4–6	2.28−01	9.93−04	5.75−03	−2.401	D+	LS
				438.750	1 103 220–1 331 140	2–4	1.92−01	1.11−03	3.21−03	−2.654	D	LS
				441.462	1 104 620–1 331 140	4–4	3.76−02	1.10−04	6.39−04	−3.357	E+	LS
153	$2s2p(^3P^\circ)3s-2s^24d$	$^2P^\circ-^2D$		*431.65*	*1 104 153–1 335 822*	6–10	6.72+00	3.13−02	2.67−01	−0.726	C+	1

TABLE 28. Transition probabilities of allowed lines for Na VII (references for this table are as follows: 1=Fernley *et al.*,[25] 2=Tachiev and Froese Fischer,[94] 3=Merkelis *et al.*,[64] 4=Galavis *et al.*, [41]and 5=Safronova *et al.*[81])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				432.507	1 104 620–1 335 830	4–6	6.68+00	2.81−02	1.60−01	−0.949	C+	LS
				429.941	1 103 220–1 335 810	2–4	5.67+00	3.14−02	8.89−02	−1.202	C+	LS
				432.545	1 104 620–1 335 810	4–4	1.11+00	3.12−03	1.78−02	−1.904	C	LS
154	$2s2p(^{3}\mathrm{P}^{\circ})3s$– $2p^{2}(^{3}\mathrm{P})3d$	$^{4}\mathrm{P}^{\circ}-^{4}\mathrm{P}$		*311.68*	*1078 523–1 399 363*	12–12	9.84−01	1.43−03	1.77−02	−1.765	D	1
				312.754	1 079 310–1 399 050	6–6	6.82−01	1.00−03	6.18−03	−2.222	D+	LS
				310.945	1 077 980–1 399 580	4–4	1.32−01	1.92−04	7.86−04	−3.115	E+	LS
				309.962	1 077 250–1 399 870	2–2	1.67−01	2.40−04	4.90−04	−3.319	E+	LS
				312.237	1 079 310–1 399 580	6–4	4.40−01	4.29−04	2.65−03	−2.589	D	LS
				310.665	1 077 980–1 399 870	4–2	8.28−01	5.99−04	2.45−03	−2.621	D	LS
				311.459	1 077 980–1 399 050	4–6	2.96−01	6.46−04	2.65−03	−2.588	D	LS
				310.241	1 077 250–1 399 580	2–4	4.16−01	1.20−03	2.45−03	−2.620	D	LS
155		$^{2}\mathrm{P}^{\circ}-^{2}\mathrm{D}$		*349.29*	*1 104 153–1 390 450*	6–10	2.22−01	6.78−04	4.68−03	−2.391	D	1
				[349.86]	1 104 620–1 390 450	4–6	2.21−01	6.09−04	2.81−03	−2.613	D	LS
				[348.15]	1 103 220–1 390 450	2–4	1.87−01	6.80−04	1.56−03	−2.866	D	LS
				[349.86]	1 104 620–1 390 450	4–4	3.69−02	6.77−05	3.12−04	−3.567	E+	LS
156	$2s2p(^{3}\mathrm{P}^{\circ})3s$– $2p^{2}(^{1}\mathrm{D})3d$	$^{2}\mathrm{P}^{\circ}-^{2}\mathrm{P}$		*304.60*	*1 104 153–1 432 453*	6–6	2.38+01	3.31−02	1.99−01	−0.702	C	1
				304.887	1 104 620–1 432 610	4–4	1.97+01	2.75−02	1.10−01	−0.959	C+	LS
				304.025	1 103 220–1 432 140	2–2	1.59+01	2.21−02	4.42−02	−1.355	C	LS
				305.325	1 104 620–1 432 140	4–2	7.86+00	5.49−03	2.21−02	−1.658	C	LS
				303.591	1 103 220–1 432 610	2–4	4.02+00	1.11−02	2.22−02	−1.654	C	LS
157	$2s2p(^{3}\mathrm{P}^{\circ})3s$– $2s2p(^{3}\mathrm{P}^{\circ})4p$	$^{2}\mathrm{P}^{\circ}-^{2}\mathrm{P}$		*295.10*	*1 104 153–1 443 017*	6–6	2.91+01	3.81−02	2.22−01	−0.641	C	1
				295.377	1 104 620–1 443 170	4–4	2.42+01	3.17−02	1.23−01	−0.897	C+	LS
				294.559	1 103 220–1 442 710	2–2	1.95+01	2.54−02	4.93−02	−1.294	C	LS
				295.779	1 104 620–1 442 710	4–2	9.65+00	6.33−03	2.47−02	−1.597	C	LS
				294.161	1 103 220–1 443 170	2–4	4.89+00	1.27−02	2.46−02	−1.595	C	LS
158		$^{2}\mathrm{P}^{\circ}-^{2}\mathrm{D}$		*286.78*	*1 104 153–1 452 850*	6–10	5.79+01	1.19−01	6.74−01	−0.146	B	1
				286.755	1 104 620–1 453 350	4–6	5.79+01	1.07−01	4.04−01	−0.369	B	LS
				286.632	1 103 220–1 452 100	2–4	4.83+01	1.19−01	2.25−01	−0.623	C+	LS
				287.786	1 104 620–1 452 100	4–4	9.58+00	1.19−02	4.51−02	−1.322	C	LS
159	$2s2p(^{3}\mathrm{P}^{\circ})3s-2s^{2}5d$	$^{2}\mathrm{P}^{\circ}-^{2}\mathrm{D}$		*279.79*	*1 104 153–1 461 562*	6–10	1.54+00	3.00−03	1.66−02	−1.745	D+	1
				280.136	1 104 620–1 461 590	4–6	1.53+00	2.70−03	9.96−03	−1.967	D+	LS
				279.096	1 103 220–1 461 520	2–4	1.29+00	3.01−03	5.53−03	−2.220	D+	LS
				280.191	1 104 620–1 461 520	4–4	2.55−01	3.00−04	1.11−03	−2.921	E+	LS
160	$2s2p(^{3}\mathrm{P}^{\circ})3s-2s^{2}6d$	$^{2}\mathrm{P}^{\circ}-^{2}\mathrm{D}$		*235.12*	*1 104 153–1 529 460*	6–10	1.17+00	1.61−03	7.50−03	−2.015	D	1
				235.383	1 104 620–1 529 460	4–6	1.16+00	1.45−03	4.49−03	−2.237	D	LS
				234.610	1 103 220–1 529 460	2–4	9.82−01	1.62−03	2.50−03	−2.489	D	LS
				235.383	1 104 620–1 529 460	4–4	1.94−01	1.61−04	4.99−04	−3.191	E+	LS
161	$2s2p(^{3}\mathrm{P}^{\circ})3s$– $2s2p(^{3}\mathrm{P}^{\circ})5p$	$^{2}\mathrm{P}^{\circ}-^{2}\mathrm{P}$		*210.88*	*1 104 153–1 578 350*	6–6	3.57+01	2.38−02	9.91−02	−0.845	C	1
				211.091	1 104 620–1 578 350	4–4	2.96+01	1.98−02	5.50−02	−1.101	C	LS
				210.469	1 103 220–1 578 350	2–2	2.39+01	1.59−02	2.20−02	−1.498	C	LS
				211.091	1 104 620–1 578 350	4–2	1.19+01	3.96−03	1.10−02	−1.800	D+	LS
				210.469	1 103 220–1 578 350	2–4	5.98+00	7.94−03	1.10−02	−1.799	D+	LS

TABLE 28. Transition probabilities of allowed lines for Na VII (references for this table are as follows: 1=Fernley *et al.*,[25] 2=Tachiev and Froese Fischer,[94] 3=Merkelis *et al.*,[64] 4=Galavis *et al.*, [41]and 5=Safronova *et al.*[81])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
162		^{2}P$^\circ$–^{2}D		*208.51*	*1 104 153–1 583 740*	6–10	3.56+01	3.87−02	1.59−01	−0.634	C	1
				208.716	1 104 620–1 583 740	4–6	3.55+01	3.48−02	9.56−02	−0.856	C+	LS
				208.108	1 103 220–1 583 740	2–4	2.99+01	3.88−02	5.32−02	−1.110	C	LS
				208.716	1 104 620–1 583 740	4–4	5.93+00	3.87−03	1.06−02	−1.810	D+	LS
163	$2s2p(^3\mathrm{P}^\circ)3p$–$2s2p(^3\mathrm{P}^\circ)3d$	^{2}P–^{2}D$^\circ$		*1 662.2*	*1 127 223–1 187 386*	6–10	2.30+00	1.59−01	5.22+00	−0.020	B+	1
				1 653.99	1 127 430–1 187 890	4–6	2.34+00	1.44−01	3.14+00	−0.240	B+	LS
				1 671.68	1 126 810–1 186 630	2–4	1.89+00	1.58−01	1.74+00	−0.500	B+	LS
				1 689.19	1 127 430–1 186 630	4–4	3.67−01	1.57−02	3.49−01	−1.202	B	LS
164		^{2}P–^{2}P$^\circ$		*1 108.4*	*1 127 223–1 217 443*	6–6	4.42+00	8.14−02	1.78+00	−0.311	B	1
				1 114.08	1 127 430–1 217 190	4–4	3.63+00	6.75−02	9.90−01	−0.569	B+	LS
				1 097.21	1 126 810–1 217 950	2–2	3.04+00	5.48−02	3.96−01	−0.960	B	LS
				1 104.73	1 127 430–1 217 950	4–2	1.49+00	1.36−02	1.98−01	−1.264	C+	LS
				1 106.44	1 126 810–1 217 190	2–4	7.41−01	2.72−02	1.98−01	−1.264	C+	LS
165		^{2}D–^{2}D$^\circ$	*3 147*	*3 148*	*1 155 620–1 187 386*	10–10	9.75−02	1.45−02	1.50+00	−0.839	B	1
			3 152.7	3 153.6	1 156 180–1 187 890	6–6	9.05−02	1.35−02	8.41−01	−1.092	B	LS
			3 138.8	3 139.7	1 154 780–1 186 630	4–4	8.86−02	1.31−02	5.42−01	−1.281	B	LS
			3 283.1	3 284.1	1 156 180–1 186 630	6–4	8.60−03	9.27−04	6.01−02	−2.255	C	LS
			3 019.4	3 020.2	1 154 780–1 187 890	4–6	7.36−03	1.51−03	6.01−02	−2.219	C	LS
166		^{2}D–^{2}F$^\circ$		*1 817*	*1 155 620–1 210 670*	10–14	2.71+00	1.88−01	1.12+01	0.274	B+	1
				1 816.2	1 156 180–1 211 240	6–8	2.71+00	1.79−01	6.42+00	0.031	A	LS
				1 813.9	1 154 780–1 209 910	4–6	2.54+00	1.88−01	4.49+00	−0.124	B+	LS
				1 861.2	1 156 180–1 209 910	6–6	1.68−01	8.74−03	3.21−01	−1.280	B	LS
167		^{2}D–^{2}P$^\circ$		*1 617.5*	*1 155 620–1 217 443*	10–6	3.10−01	7.31−03	3.89−01	−1.136	C+	1
				1 639.08	1 156 180–1 217 190	6–4	2.69−01	7.21−03	2.33−01	−1.364	C+	LS
				1 583.03	1 154 780–1 217 950	4–2	3.31−01	6.22−03	1.30−01	−1.604	C+	LS
				1 602.31	1 154 780–1 217 190	4–4	3.20−02	1.23−03	2.60−02	−2.308	C	LS
168		^{2}S–^{2}P$^\circ$	*2 216*	*2 217*	1 172 340–*1 217 443*	2–6	8.74−01	1.93−01	2.82+00	−0.413	B+	1
			2 229.0	2 229.7	1 172 340–1 217 190	2–4	8.59−01	1.28−01	1.88+00	−0.592	B+	LS
			2 191.8	2 192.5	1 172 340–1 217 950	2–2	9.06−01	6.53−02	9.43−01	−0.884	B+	LS
169	$2s2p(^3\mathrm{P}^\circ)3p$–$2s2p(^1\mathrm{P}^\circ)3s$	^{2}P–^{2}P$^\circ$		*1 407.1*	*1 127 223–1 198 290*	6–6	4.38−02	1.30−03	3.62−02	−2.108	D+	1
				1 411.23	1 127 430–1 198 290	4–4	3.62−02	1.08−03	2.01−02	−2.365	C	LS
				1 398.99	1 126 810–1 198 290	2–2	2.98−02	8.73−04	8.04−03	−2.758	D+	LS
				1 411.23	1 127 430–1 198 290	4–2	1.45−02	2.16−04	4.01−03	−3.063	D	LS
				1 398.99	1 126 810–1 198 290	2–4	7.45−03	4.37−04	4.03−03	−3.058	D	LS
170		^{2}D–^{2}P$^\circ$	*2 343*	*2 344*	*1 155 620–1 198 290*	10–6	8.98−03	4.44−04	3.42−02	−2.353	D+	1
			2 374.0	2 374.7	1 156 180–1 198 290	6–4	7.77−03	4.38−04	2.05−02	−2.580	C	LS
			2 297.6	2 298.3	1 154 780–1 198 290	4–2	9.52−03	3.77−04	1.14−02	−2.822	D+	LS
			2 297.6	2 298.3	1 154 780–1 198 290	4–4	9.52−04	7.54−05	2.28−03	−3.521	D	LS
171		^{2}S–^{2}P$^\circ$	*3 852*	*3 854*	1 172 340–*1 198 290*	2–6	1.64−03	1.10−03	2.78−02	−2.658	D+	1
			3 852.5	3 853.6	1 172 340–1 198 290	2–4	1.64−03	7.30−04	1.85−02	−2.836	C	LS
			3 852.5	3 853.6	1 172 340–1 198 290	2–2	1.64−03	3.65−04	9.26−03	−3.137	D+	LS

TABLE 28. Transition probabilities of allowed lines for Na VII (references for this table are as follows: 1=Fernley *et al.*,[25] 2=Tachiev and Froese Fischer,[94] 3=Merkelis *et al.*,[64] 4=Galavis *et al.*, [41]and 5=Safronova *et al.*[81])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
172	$2s2p(^3\mathrm{P}^\circ)3p$– $2s2p(^1\mathrm{P}^\circ)3d$	$^2\mathrm{P}-^2\mathrm{D}^\circ$		*567.1*	*1 127 223–1 303 546*	6–10	3.96−01	3.18−03	3.56−02	−1.719	D+	1
				567.60	1 127 430–1 303 610	4–6	3.95−01	2.86−03	2.14−02	−1.942	C	LS
				[566.1]	1 126 810–1 303 450	2–4	3.32−01	3.19−03	1.19−02	−2.195	D+	LS
				[568.1]	1 127 430–1 303 450	4–4	6.57−02	3.18−04	2.38−03	−2.896	D	LS
173		$^2\mathrm{D}-^2\mathrm{F}^\circ$		*731.5*	*1 155 620–1 292 330*	10–14	2.44−02	2.74−04	6.59−03	−2.562	D	1
				734.48	1 156 180–1 292 330	6–8	2.41−02	2.60−04	3.77−03	−2.807	D	LS
				727.01	1 154 780–1 292 330	4–6	2.31−02	2.75−04	2.63−03	−2.959	D	LS
				734.48	1 156 180–1 292 330	6–6	1.61−03	1.30−05	1.89−04	−4.108	E	LS
174		$^2\mathrm{D}-^2\mathrm{D}^\circ$		*676.0*	*1 155 620–1 303 546*	10–10	1.08+00	7.37−03	1.64−01	−1.133	C	1
				678.29	1 156 180–1 303 610	6–6	9.95−01	6.86−03	9.19−02	−1.386	C+	LS
				[672.6]	1 154 780–1 303 450	4–4	9.83−01	6.67−03	5.91−02	−1.574	C	LS
				[679.0]	1 156 180–1 303 450	6–4	1.06−01	4.90−04	6.57−03	−2.532	D+	LS
				671.91	1 154 780–1 303 610	4–6	7.31−02	7.42−04	6.57−03	−2.528	D+	LS
175		$^2\mathrm{D}-^2\mathrm{P}^\circ$		*662.9*	*1 155 620–1 306 470*	10–6	1.48−01	5.84−04	1.28−02	−2.234	D+	1
				665.38	1 156 180–1 306 470	6–4	1.32−01	5.82−04	7.65−03	−2.457	D+	LS
				659.24	1 154 780–1 306 470	4–2	1.50−01	4.90−04	4.25−03	−2.708	D	LS
				659.24	1 154 780–1 306 470	4–4	1.50−02	9.80−05	8.51−04	−3.407	E+	LS
176		$^2\mathrm{S}-^2\mathrm{P}^\circ$		*745.5*	1 172 340–*1 306 470*	2–6	6.12−01	1.53−02	7.51−02	−1.514	C	1
				745.55	1 172 340–1 306 470	2–4	6.12−01	1.02−02	5.01−02	−1.690	C	LS
				745.55	1 172 340–1 306 470	2–2	6.11−01	5.09−03	2.50−02	−1.992	C	LS
177	$2s2p(^3\mathrm{P}^\circ)3p$– $2p^2(^3\mathrm{P})3p$	$^2\mathrm{P}-^2\mathrm{D}^\circ$		*451.47*	*1 127 223–1 348 720*	6–10	3.12+00	1.59−02	1.42−01	−1.020	C	1
				451.896	1 127 430–1 348 720	4–6	3.11+00	1.43−02	8.51−02	−1.243	C+	LS
				450.633	1 126 810–1 348 720	2–4	2.61+00	1.59−02	4.72−02	−1.498	C	LS
				451.896	1 127 430–1 348 720	4–4	5.19−01	1.59−03	9.46−03	−2.197	D+	LS
178		$^2\mathrm{D}-^2\mathrm{D}^\circ$		*517.87*	*1 155 620–1 348 720*	10–10	2.30+01	9.27−02	1.58+00	−0.033	B	1
				519.373	1 156 180–1 348 720	6–6	2.13+01	8.62−02	8.84−01	−0.286	B	LS
				515.623	1 154 780–1 348 720	4–4	2.10+01	8.38−02	5.69−01	−0.475	B	LS
				519.373	1 156 180–1 348 720	6–4	2.28+00	6.16−03	6.32−02	−1.432	C	LS
				515.623	1 154 780–1 348 720	4–6	1.56+00	9.31−03	6.32−02	−1.429	C	LS
179	$2s2p(^3\mathrm{P}^\circ)3p$– $2p^2(^1\mathrm{D})3p$	$^2\mathrm{D}-^2\mathrm{F}^\circ$		*449.49*	*1 155 620–1 378 094*	10–14	1.97−01	8.34−04	1.23−02	−2.079	D+	1
				450.207	1 156 180–1 378 300	6–8	1.96−01	7.93−04	7.05−03	−2.323	D+	LS
				448.350	1 154 780–1 377 820	4–6	1.85−01	8.36−04	4.94−03	−2.476	D	LS
				451.182	1 156 180–1 377 820	6–6	1.30−02	3.96−05	3.53−04	−3.624	E+	LS
180		$^2\mathrm{D}-^2\mathrm{D}^\circ$		*421.62*	*1 155 620–1 392 800*	10–10	2.78+00	7.42−03	1.03−01	−1.130	C	1
				422.619	1 156 180–1 392 800	6–6	2.58+00	6.91−03	5.77−02	−1.382	C	LS
				420.133	1 154 780–1 392 800	4–4	2.53+00	6.70−03	3.71−02	−1.572	C	LS
				422.619	1 156 180–1 392 800	6–4	2.77−01	4.94−04	4.12−03	−2.528	D	LS
				420.133	1 154 780–1 392 800	4–6	1.88−01	7.45−04	4.12−03	−2.526	D	LS
181	$2s2p(^3\mathrm{P}^\circ)3p$– $2s2p(^3\mathrm{P}^\circ)4s$	$^2\mathrm{P}-^2\mathrm{P}^\circ$				6–6						1
				[327.69]	1 127 430–1 432 600	4–4	1.83+01	2.95−02	1.27−01	−0.928	C+	LS

TABLE 28. Transition probabilities of allowed lines for Na VII (references for this table are as follows: 1=Fernley *et al.*,[25] 2=Tachiev and Froese Fischer,[94] 3=Merkelis *et al.*,[64] 4=Galavis *et al.*, [41]and 5=Safronova *et al.*[81])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				[327.02]	1 126 810–1 432 600	2–4	3.68+00	1.18−02	2.54−02	−1.627	C	LS
182		^{2}D$-^{2}$P$^{\circ}$				1 0–6						1
				[361.77]	1 156 180–1 432 600	6–4	2.68+01	3.50−02	2.50−01	−0.678	B	LS
				[359.94]	1 154 780–1 432 600	4–4	3.02+00	5.86−03	2.78−02	−1.630	C	LS
183		^{2}S$-^{2}$P$^{\circ}$				2–6						1
				[384.23]	1 172 340–1 432 600	2–4	1.48+01	6.54−02	1.65−01	−0.883	C+	LS
184	$2s2p(^{3}\mathrm{P}^{\circ})3p-$ $2s2p(^{3}\mathrm{P}^{\circ})4d$	^{2}P$-^{2}$D$^{\circ}$				6–10						1
				297.071	1 127 430–1 464 050	4–6	1.18+02	2.34−01	9.15−01	−0.029	B+	LS
185		^{2}P$-^{2}$P$^{\circ}$		*288.33*	*1 127 223–1 474 050*	6–6	4.19+01	5.22−02	2.97−01	−0.504	C+	1
				[288.70]	1 127 430–1 473 810	4–4	3.47+01	4.34−02	1.65−01	−0.760	C+	LS
				[287.59]	1 126 810–1 474 530	2–2	2.81+01	3.49−02	6.61−02	−1.156	C	LS
				[288.10]	1 127 430–1 474 530	4–2	1.40+01	8.71−03	3.30−02	−1.458	C	LS
				[288.18]	1 126 810–1 473 810	2–4	6.99+00	1.74−02	3.30−02	−1.458	C	LS
186		^{2}D$-^{2}$D$^{\circ}$				10–10						1
				324.812	1 156 180–1 464 050	6–6	3.94+01	6.23−02	4.00−01	−0.427	B	LS
				323.342	1 154 780–1 464 050	4–6	2.85+00	6.70−03	2.85−02	−1.572	C	LS
187		^{2}D$-^{2}$F$^{\circ}$		*315.85*	*1 155 620–1 472 229*	10–14	1.33+02	2.78−01	2.89+00	0.444	B+	1
				315.906	1 156 180–1 472 730	6–8	1.33+02	2.65−01	1.65+00	0.201	B+	LS
				315.676	1 154 780–1 471 560	4–6	1.24+02	2.78−01	1.16+00	0.046	B+	LS
				317.078	1 156 180–1 471 560	6–6	8.76+00	1.32−02	8.27−02	−1.101	C+	LS
188		^{2}D$-^{2}$P$^{\circ}$		*314.04*	*1 155 620–1 474 050*	10–6	4.02+00	3.57−03	3.69−02	−1.447	D+	1
				[314.83]	1 156 180–1 473 810	6–4	3.59+00	3.56−03	2.21−02	−1.670	C	LS
				[312.74]	1 154 780–1 474 530	4–2	4.08+00	2.99−03	1.23−02	−1.922	D+	LS
				[313.45]	1 154 780–1 473 810	4–4	4.05−01	5.96−04	2.46−03	−2.623	D	LS
189		^{2}S$-^{2}$P$^{\circ}$		*331.44*	1 172 340–*1 474 050*	2–6	7.61+01	3.76−01	8.21−01	−0.124	B	1
				[331.71]	1 172 340–1 473 810	2–4	7.58+01	2.50−01	5.46−01	−0.301	B	LS
				[330.92]	1 172 340–1 474 530	2–2	7.67+01	1.26−01	2.75−01	−0.599	B	LS
190	$2s2p(^{3}\mathrm{P}^{\circ})3p-$ $2s2p(^{1}\mathrm{P}^{\circ})4d$	^{2}D$-^{2}$F$^{\circ}$		*236.86*	*1 155 620–1 577 810*	10–14	7.29+00	8.58−03	6.69−02	−1.067	C	1
				[237.18]	1 156 180–1 577 810	6–8	7.26+00	8.16−03	3.82−02	−1.310	C	LS
				[236.39]	1 154 780–1 577 810	4–6	6.84+00	8.60−03	2.68−02	−1.463	C	LS
				[237.18]	1 156 180–1 577 810	6–6	4.84−01	4.08−04	1.91−03	−2.611	D	LS
191	$2s2p(^{3}\mathrm{P}^{\circ})3p-$ $2s2p(^{3}\mathrm{P}^{\circ})5d$	^{2}D$-^{2}$F$^{\circ}$		*228.40*	*1 155 620–1 593 449*	10–14	7.43+01	8.14−02	6.12−01	−0.089	B	1
				228.446	1 156 180–1 593 920	6–8	7.43+01	7.75−02	3.50−01	−0.333	B	LS
				228.290	1 154 780–1 592 820	4–6	6.95+01	8.14−02	2.45−01	−0.487	C+	LS
				229.022	1 156 180–1 592 820	6–6	4.91+00	3.86−03	1.75−02	−1.635	C	LS
192	$2s2p(^{3}\mathrm{P}^{\circ})3d-$ $2s2p(^{1}\mathrm{P}^{\circ})3p$	^{2}D$^{\circ}-^{2}$D		*1 550.7*	*1 187 386–1 251 874*	10–10	6.10−02	2.20−03	1.12−01	−1.658	C	1
				1 559.58	1 187 890–1 252 010	6–6	5.59−02	2.04−03	6.28−02	−1.912	C	LS
				1 537.52	1 186 630–1 251 670	4–4	5.64−02	2.00−03	4.05−02	−2.097	C	LS
				1 567.89	1 187 890–1 251 670	6–4	5.90−03	1.45−04	4.49−03	−3.060	D	LS

TABLE 28. Transition probabilities of allowed lines for Na VII (references for this table are as follows: 1=Fernley *et al.*,[25] 2=Tachiev and Froese Fischer,[94] 3=Merkelis *et al.*,[64] 4=Galavis *et al.*, [41]and 5=Safronova *et al.*[81])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})$^{\mathrm{a}}$	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				1 529.52	1 186 630–1 252 010	4–6	4.24−03	2.23−04	4.49−03	−3.050	D	LS
193		$^{2}\mathrm{D}^{\circ}-{}^{2}\mathrm{P}$		*1 509.4*	*1 187 386–1 253 637*	10–6	5.50−03	1.13−04	5.60−03	−2.947	D	1
				1 517.68	1 187 890–1 253 780	6–4	4.87−03	1.12−04	3.36−03	−3.173	D	LS
				1 498.80	1 186 630–1 253 350	4–2	5.62−03	9.46−05	1.87−03	−3.422	D	LS
				1 489.20	1 186 630–1 253 780	4–4	5.71−04	1.90−05	3.73−04	−4.119	E+	LS
194		$^{2}\mathrm{F}^{\circ}-{}^{2}\mathrm{D}$	*2 426*	*2 427*	*1 210 670–1 251 874*	14–10	1.02−02	6.42−04	7.18−02	−2.046	C	1
			2 452.0	2 452.8	1 211 240–1 252 010	8–6	9.39−03	6.35−04	4.10−02	−2.294	C	LS
			2 393.9	2 394.6	1 209 910–1 251 670	6–4	1.06−02	6.07−04	2.87−02	−2.439	C	LS
			2 374.6	2 375.3	1 209 910–1 252 010	6–6	5.17−04	4.37−05	2.05−03	−3.581	D	LS
195		$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{D}$	*2 904*	*2 904*	*1 217 443–1 251 874*	6–10	1.85−02	3.90−03	2.24−01	−1.631	C+	1
			2 871.1	2 871.9	1 217 190–1 252 010	4–6	1.91−02	3.55−03	1.34−01	−1.848	C+	LS
			2 964.7	2 965.6	1 217 950–1 251 670	2–4	1.45−02	3.82−03	7.46−02	−2.117	C	LS
			2 899.4	2 900.2	1 217 190–1 251 670	4–4	3.10−03	3.91−04	1.49−02	−2.806	D+	LS
196		$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{P}$	*2 762*	*2 763*	*1 217 443–1 253 637*	6–6	1.85−02	2.11−03	1.15−01	−1.898	C	1
			2 732.2	2 733.0	1 217 190–1 253 780	4–4	1.59−02	1.78−03	6.41−02	−2.148	C	LS
			2 824.0	2 824.9	1 217 950–1 253 350	2–2	1.15−02	1.38−03	2.57−02	−2.559	C	LS
			2 764.7	2 765.5	1 217 190–1 253 350	4–2	6.14−03	3.52−04	1.28−02	−2.851	D+	LS
			2 790.1	2 791.0	1 217 950–1 253 780	2–4	2.98−03	6.97−04	1.28−02	−2.856	D+	LS
197		$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{S}$	*2 413*	*2 413*	*1 217 443–1 258 880*	6–2	4.02−03	1.17−04	5.58−03	−3.154	D	1
			2 397.9	2 398.7	1 217 190–1 258 880	4–2	2.74−03	1.18−04	3.73−03	−3.326	D	LS
			2 442.5	2 443.2	1 217 950–1 258 880	2–2	1.29−03	1.15−04	1.85−03	−3.638	D	LS
198	$2s2p(^{3}\mathrm{P}^{\circ})3d$–$2p^{2}(^{3}\mathrm{P})3s$	$^{4}\mathrm{D}^{\circ}-{}^{4}\mathrm{P}$				20–12						1
				951.47	1 186 460–1 291 560	8–6	1.71−01	1.74−03	4.36−02	−1.856	C	LS
				961.08	1 185 980–1 290 030	6–4	1.31−01	1.21−03	2.30−02	−2.139	C	LS
				947.15	1 185 980–1 291 560	6–6	3.91−02	5.26−04	9.84−03	−2.501	D+	LS
				958.68	1 185 720–1 290 030	4–4	6.70−02	9.23−04	1.17−02	−2.433	D+	LS
				944.82	1 185 720–1 291 560	4–6	4.37−03	8.78−05	1.09−03	−3.454	E+	LS
199		$^{4}\mathrm{P}^{\circ}-{}^{4}\mathrm{P}$				12–12						1
				1 007.76	1 192 330–1 291 560	6–6	3.55−02	5.41−04	1.08−02	−2.489	D+	LS
				1 029.02	1 192 850–1 290 030	4–4	6.36−03	1.01−04	1.37−03	−3.394	D	LS
				1 023.54	1 192 330–1 290 030	6–4	2.18−02	2.28−04	4.61−03	−2.864	D	LS
				1 013.07	1 192 850–1 291 560	4–6	1.50−02	3.46−04	4.62−03	−2.859	D	LS
				1 032.63	1 193 190–1 290 030	2–4	1.96−02	6.28−04	4.27−03	−2.901	D	LS
200	$2s2p(^{3}\mathrm{P}^{\circ})3d-2s^{2}4s$	$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{S}$		*1 290.9*	*1 217 443*–1 294 910	6–2	6.32−02	5.26−04	1.34−02	−2.501	D+	1
				1 286.67	1 217 190–1 294 910	4–2	4.25−02	5.28−04	8.95−03	−2.675	D+	LS
				1 299.38	1 217 950–1 294 910	2–2	2.07−02	5.23−04	4.47−03	−2.980	D	LS
201	$2s2p(^{3}\mathrm{P}^{\circ})3d$–$2p^{2}(^{1}\mathrm{D})3s$	$^{2}\mathrm{D}^{\circ}-{}^{2}\mathrm{D}$		*693.2*	*1 187 386–1 331 638*	10–10	1.95−01	1.41−03	3.21−02	−1.851	D+	1
				694.06	1 187 890–1 331 970	6–6	1.81−01	1.31−03	1.80−02	−2.105	C	LS
				691.99	1 186 630–1 331 140	4–4	1.77−01	1.27−03	1.16−02	−2.294	D+	LS
				698.08	1 187 890–1 331 140	6–4	1.92−02	9.33−05	1.29−03	−3.252	D	LS
				688.04	1 186 630–1 331 970	4–6	1.33−02	1.42−04	1.29−03	−3.246	D	LS
202		$^{2}\mathrm{F}^{\circ}-{}^{2}\mathrm{D}$		*826.7*	*1 210 670–1 331 638*	14–10	4.88−01	3.57−03	1.36−01	−1.301	C	1

TABLE 28. Transition probabilities of allowed lines for Na VII (references for this table are as follows: 1=Fernley *et al.*,[25] 2=Tachiev and Froese Fischer,[94] 3=Merkelis *et al.*,[64] 4=Galavis *et al.*, [41]and 5=Safronova *et al.*[81])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				828.29	1 211 240–1 331 970	8–6	4.63−01	3.57−03	7.79−02	−1.544	C	LS
				824.88	1 209 910–1 331 140	6–4	4.91−01	3.34−03	5.44−02	−1.698	C	LS
				819.27	1 209 910–1 331 970	6–6	2.39−02	2.40−04	3.88−03	−2.842	D	LS
203		$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{D}$		*875.7*	*1 217 443–1 331 638*	6–10	3.37−01	6.47−03	1.12−01	−1.411	C	1
				871.23	1 217 190–1 331 970	4–6	3.43−01	5.85−03	6.71−02	−1.631	C	LS
				883.47	1 217 950–1 3311 40	2–4	2.74−01	6.41−03	3.73−02	−1.892	C	LS
				877.58	1 217 190–1 331 140	4–4	5.59−02	6.45−04	7.45−03	−2.588	D+	LS
204	$2s2p(^{3}\mathrm{P}^{\circ})3d-2s^{2}4d$	$^{2}\mathrm{F}^{\circ}-{}^{2}\mathrm{D}$		*799.0*	*1 210 670–1 335 822*	14–10	1.18−02	8.05−05	2.96−03	−2.948	D	1
				802.63	1 211 240–1 335 830	8–6	1.11−02	8.01−05	1.69−03	−3.193	D	LS
				794.28	1 209 910–1 335 810	6–4	1.20−02	7.56−05	1.19−03	−3.343	D	LS
				794.16	1 209 910–1 335 830	6–6	5.71−04	5.40−06	8.47−05	−4.489	E	LS
205	$2s2p(^{3}\mathrm{P}^{\circ})3d-$ $2p^{2}(^{3}\mathrm{P})3d$	$^{4}\mathrm{D}^{\circ}-{}^{4}\mathrm{P}$				20–12						1
				470.389	1 186 460–1 399 050	8–6	3.12+01	7.76−02	9.61−01	−0.207	B+	LS
				468.165	1 185 980–1 399 580	6–4	2.49+01	5.46−02	5.05−01	−0.485	B	LS
				466.962	1 185 720–1 399 870	4–2	1.99+01	3.26−02	2.00−01	−0.885	C+	LS
				469.329	1 185 980–1 399 050	6–6	7.06+00	2.33−02	2.16−01	−0.854	C+	LS
				467.596	1 185 720–1 399 580	4–4	1.27+01	4.16−02	2.56−01	−0.779	B	LS
				468.757	1 185 720–1 399 050	4–6	7.87−01	3.89−03	2.40−02	−1.808	C	LS
206		$^{2}\mathrm{D}^{\circ}-{}^{2}\mathrm{F}$		*496.57*	*1 187 386–1 388 769*	10–14	5.15−02	2.67−04	4.36−03	−2.573	D	1
				[497.32]	1 187 890–1 388 970	6–8	5.14−02	2.54−04	2.50−03	−2.817	D	LS
				[495.37]	1 186 630–1 388 500	4–6	4.84−02	2.67−04	1.74−03	−2.971	D	LS
				[498.48]	1 187 890–1 388 500	6–6	3.38−03	1.26−05	1.24−04	−4.121	E	LS
207		$^{2}\mathrm{D}^{\circ}-{}^{2}\mathrm{D}$		*492.46*	*1 187 386–1 390 450*	10–10	5.08−01	1.85−03	3.00−02	−1.733	D+	1
				[493.68]	1 187 890–1 390 450	6–6	4.71−01	1.72−03	1.68−02	−1.986	C	LS
				[490.63]	1 186 630–1 390 450	4–4	4.63−01	1.67−03	1.08−02	−2.175	D+	LS
				[493.68]	1 187 890–1 390 450	6–4	5.05−02	1.23−04	1.20−03	−3.132	D	LS
				[490.63]	1 186 630–1 390 450	4–6	3.42−02	1.85−04	1.20−03	−3.131	D	LS
208		$^{4}\mathrm{P}^{\circ}-{}^{4}\mathrm{P}$		*483.75*	*1 192 647–1 399 363*	12–12	1.09+01	3.82−02	7.30−01	−0.339	C+	1
				483.746	1 192 330–1 399 050	6–6	7.61+00	2.67−02	2.55−01	−0.795	B	LS
				483.723	1 192 850–1 399 580	4–4	1.45+00	5.09−03	3.24−02	−1.691	C	LS
				483.840	1 193 190–1 399 870	2–2	1.82+00	6.37−03	2.03−02	−1.895	C	LS
				482.509	1 192 330–1 399 580	6–4	4.94+00	1.15−02	1.10−01	−1.161	C+	LS
				483.045	1 192 850–1 399 870	4–2	9.09+00	1.59−02	1.01−01	−1.197	C+	LS
				484.966	1 192 850–1 399 050	4–6	3.25+00	1.72−02	1.10−01	−1.162	C+	LS
				484.520	1 193 190–1 399 580	2–4	4.52+00	3.18−02	1.01−01	−1.197	C+	LS
209		$^{2}\mathrm{F}^{\circ}-{}^{2}\mathrm{F}$		*561.49*	*1 210 670–1 388 769*	14–14	1.13+01	5.36−02	1.39+00	−0.125	B	1
				[562.6]	1 211 240–1 388 970	8–8	9.95+00	4.72−02	6.99−01	−0.423	B	LS
				[559.94]	1 209 910–1 388 500	6–6	1.22+01	5.74−02	6.35−01	−0.463	B	LS
				[564.1]	1 211 240–1 388 500	8–6	4.86−01	1.74−03	2.59−02	−1.856	C	LS
				[558.47]	1 209 910–1 388 970	6–8	3.77−01	2.35−03	2.59−02	−1.851	C	LS
210		$^{2}\mathrm{F}^{\circ}-{}^{2}\mathrm{D}$		*556.24*	*1 210 670–1 390 450*	14–10	1.75+01	5.81−02	1.49+00	−0.090	B	1
				[558.01]	1 211 240–1 390 450	8–6	1.65+01	5.79−02	8.51−01	−0.334	B	LS
				[553.89]	1 209 910–1 390 450	6–4	1.78+01	5.45−02	5.96−01	−0.485	B	LS
				[553.89]	1 209 910–1 390 450	6–6	8.46−01	3.89−03	4.26−02	−1.632	C	LS

TABLE 28. Transition probabilities of allowed lines for Na VII (references for this table are as follows: 1=Fernley *et al.*,[25] 2=Tachiev and Froese Fischer,[94] 3=Merkelis *et al.*,[64] 4=Galavis *et al.*, [41]and 5=Safronova *et al.*[81])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})$^{\mathrm{a}}$	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
211		$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{D}$		*578.0*	*1 217 443–1 390 450*	6–10	2.50−02	2.09−04	2.38−03	−2.902	E+	1
				[577.2]	1 217 190–1 390 450	4–6	2.51−02	1.88−04	1.43−03	−3.124	D	LS
				[579.7]	1 217 950–1 390 450	2–4	2.06−02	2.08−04	7.94−04	−3.381	E+	LS
				[577.2]	1 217 190–1 390 450	4–4	4.18−03	2.09−05	1.59−04	−4.078	E	LS
212	$2s2p(^{3}\mathrm{P}^{\circ})3d-$ $2p^{2}(^{1}\mathrm{D})3d$	$^{2}\mathrm{D}^{\circ}-{}^{2}\mathrm{D}$		*438.13*	*1 187 386–1 415 630*	10–10	7.31−01	2.10−03	3.04−02	−1.678	D+	1
				439.097	1 187 890–1 415 630	6–6	6.78−01	1.96−03	1.70−02	−1.930	C	LS
				436.681	1 186 630–1 415 630	4–4	6.65−01	1.90−03	1.09−02	−2.119	D+	LS
				439.097	1 187 890–1 415 630	6–4	7.27−02	1.40−04	1.21−03	−3.076	D	LS
				436.681	1 186 630–1 415 630	4–6	4.92−02	2.11−04	1.21−03	−3.074	D	LS
213		$^{2}\mathrm{D}^{\circ}-{}^{2}\mathrm{F}$		*414.29*	*1 187 386–1 428 766*	10–14	3.38+00	1.22−02	1.66−01	−0.914	C	1
				415.093	1 187 890–1 428 800	6–8	3.37+00	1.16−02	9.51−02	−1.157	C+	LS
				413.070	1 186 630–1 428 720	4–6	3.18+00	1.22−02	6.64−02	−1.312	C	LS
				415.231	1 187 890–1 428 720	6–6	2.23−01	5.77−04	4.73−03	−2.461	D	LS
214		$^{2}\mathrm{D}^{\circ}-{}^{2}\mathrm{P}$		*408.05*	*1 187 386–1 432 453*	10–6	7.43−01	1.11−03	1.49−02	−1.955	D+	1
				408.630	1 187 890–1 432 610	6–4	6.65−01	1.11−03	8.96−03	−2.177	D+	LS
				407.315	1 186 630–1 432 140	4–2	7.48−01	9.30−04	4.99−03	−2.429	D	LS
				406.537	1 186 630–1 432 610	4–4	7.51−02	1.86−04	9.96−04	−3.128	E+	LS
215		$^{2}\mathrm{F}^{\circ}-{}^{2}\mathrm{D}$		*487.90*	*1 210 670–1 415 630*	14–10	2.33+00	5.95−03	1.34−01	−1.079	C	1
				489.261	1 211 240–1 415 630	8–6	2.20+00	5.93−03	7.64−02	−1.324	C	LS
				486.098	1 209 910–1 415 630	6–4	2.36+00	5.57−03	5.35−02	−1.476	C	LS
				486.098	1 209 910–1 415 630	6–6	1.12−01	3.98−04	3.82−03	−2.622	D	LS
216		$^{2}\mathrm{F}^{\circ}-{}^{2}\mathrm{F}$		*458.51*	*1 210 670–1 428 766*	14–14	2.25+00	7.09−03	1.50−01	−1.003	C	1
				459.643	1 211 240–1 428 800	8–8	1.97+00	6.25−03	7.57−02	−1.301	C	LS
				457.018	1 209 910–1 428 720	6–6	2.43+00	7.60−03	6.86−02	−1.341	C	LS
				459.812	1 211 240–1 428 720	8–6	9.72−02	2.31−04	2.80−03	−2.733	D	LS
				456.850	1 209 910–1 428 800	6–8	7.43−02	3.10−04	2.80−03	−2.730	D	LS
217		$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{P}$		*465.09*	*1 217 443–1 432 453*	6–6	3.61+00	1.17−02	1.08−01	−1.154	C	1
				464.209	1 217 190–1 432 610	4–4	3.03+00	9.78−03	5.98−02	−1.408	C	LS
				466.875	1 217 950–1 432 140	2–2	2.38+00	7.78−03	2.39−02	−1.808	C	LS
				465.224	1 217 190–1 432 140	4–2	1.20+00	1.95−03	1.19−02	−2.108	D+	LS
				465.853	1 217 950–1 432 610	2–4	5.99−01	3.90−03	1.20−02	−2.108	D+	LS
218	$2s2p(^{3}\mathrm{P}^{\circ})3d-$ $2s2p(^{3}\mathrm{P}^{\circ})4p$	$^{2}\mathrm{D}^{\circ}-{}^{2}\mathrm{P}$		*391.19*	*1 187 386–1 443 017*	10–6	1.41+01	1.94−02	2.50−01	−0.712	C+	1
				391.727	1 187 890–1 443 170	6–4	1.26+01	1.94−02	1.50−01	−0.934	C+	LS
				390.503	1 186 630–1 442 710	4–2	1.42+01	1.62−02	8.33−02	−1.188	C+	LS
				389.803	1 186 630–1 443 170	4–4	1.43+00	3.25−03	1.67−02	−1.886	D+	LS
219		$^{2}\mathrm{D}^{\circ}-{}^{2}\mathrm{D}$		*376.70*	*1 187 386–1 452 850*	10–10	2.76+00	5.88−03	7.29−02	−1.231	C	1
				376.705	1 187 890–1 453 350	6–6	2.58+00	5.49−03	4.09−02	−1.482	C	LS
				376.690	1 186 630–1 452 100	4–4	2.49+00	5.29−03	2.62−02	−1.674	C	LS
				378.487	1 187 890–1 452 100	6–4	2.72−01	3.90−04	2.92−03	−2.631	D	LS
				374.925	1 186 630–1 453 350	4–6	1.87−01	5.91−04	2.92−03	−2.626	D	LS
220		$^{2}\mathrm{F}^{\circ}-{}^{2}\mathrm{D}$		*412.92*	*1 210 670–1 452 850*	14–10	1.02+01	1.86−02	3.53−01	−0.584	C+	1
				413.035	1 211 240–1 453 350	8–6	9.70+00	1.86−02	2.02−01	−0.827	C+	LS

TABLE 28. Transition probabilities of allowed lines for Na VII (references for this table are as follows: 1=Fernley *et al.*,[25] 2=Tachiev and Froese Fischer,[94] 3=Merkelis *et al.*,[64] 4=Galavis *et al.*, [41]and 5=Safronova *et al.*[81])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				412.899	1 209 910–1 452 100	6–4	1.02+01	1.73−02	1.41−01	−0.984	C+	LS
				410.779	1 209 910–1 453 350	6–6	4.90−01	1.24−03	1.01−02	−2.128	D+	LS
221		^{2}P°–^{2}P		*443.31*	*1 217 443–1 443 017*	6–6	3.75+00	1.11−02	9.68−02	−1.177	C	1
				442.517	1 217 190–1 443 170	4–4	3.14+00	9.23−03	5.38−02	−1.433	C	LS
				444.919	1 217 950–1 442 710	2–2	2.47+00	7.34−03	2.15−02	−1.833	C	LS
				443.420	1 217 190–1 442 710	4–2	1.25+00	1.84−03	1.07−02	−2.133	D+	LS
				444.010	1 217 950–1 443 170	2–4	6.23−01	3.68−03	1.08−02	−2.133	D+	LS
222		^{2}P°–^{2}D		*424.80*	*1 217 443–1 452 850*	6–10	5.50−01	2.48−03	2.08−02	−1.827	D+	1
				423.442	1 217 190–1 453 350	4–6	5.56−01	2.24−03	1.25−02	−2.048	D+	LS
				427.077	1 217 950–1 452 100	2–4	4.52−01	2.47−03	6.95−03	−2.306	D+	LS
				425.695	1 217 190–1 452 100	4–4	9.13−02	2.48−04	1.39−03	−3.003	D	LS
223	$2s2p(^3$P°$)3d$–$2s^25d$	^{2}D°–^{2}D		*364.73*	*1 187 386–1 461 562*	10–10	9.85−02	1.96−04	2.36−03	−2.708	E+	1
				365.364	1 187 890–1 461 590	6–6	9.14−02	1.83−04	1.32−03	−2.959	D	LS
				363.782	1 186 630–1 461 520	4–4	8.92−02	1.77−04	8.48−04	−3.150	E+	LS
				365.457	1 187 890–1 461 520	6–4	9.81−03	1.31−05	9.46−05	−4.105	E	LS
				363.689	1 186 630–1 461 590	4–6	6.62−03	1.97−05	9.43−05	−4.103	E	L
224		^{2}P°–^{2}D		*409.64*	*1 217 443–1 461 562*	6–10	6.01−01	2.52−03	2.04−02	−1.820	D+	1
				409.165	1 217 190–1 461 590	4–6	6.03−01	2.27−03	1.22−02	−2.042	D+	LS
				410.560	1 217 950–1 461 520	2–4	4.99−01	2.52−03	6.81−03	−2.298	D+	LS
				409.283	1 217 190–1 461 520	4–4	1.00−01	2.52−04	1.36−03	−2.997	D	LS
225	$2s2p(^3$P°$)3d$– $2s2p(^1$P°$)4p$	^{2}F°–^{2}D		*284.72*	*1 210 670–1 561 890*	14–10	2.95−01	2.56−04	3.37−03	−2.446	D	1
				[285.19]	1 211 240–1 561 890	8–6	2.80−01	2.56−04	1.92−03	−2.689	D	LS
				[284.11]	1 209 910–1 561 890	6–4	2.97−01	2.40−04	1.35−03	−2.842	D	LS
				[284.11]	1 209 910–1 561 890	6–6	1.41−02	1.71−05	9.60−05	−3.989	E	LS
226		^{2}P°–^{2}D		*290.32*	*1 217 443–1 561 890*	6–10	3.79+00	7.97−03	4.57−02	−1.320	C	1
				[290.11]	1 217 190–1 561 890	4–6	3.79+00	7.18−03	2.74−02	−1.542	C	LS
				[290.75]	1 217 950–1 561 890	2–4	3.14+00	7.96−03	1.52−02	−1.798	D+	LS
				[290.11]	1 217 190–1 561 890	4–4	6.32−01	7.97−04	3.04−03	−2.496	D	LS
227	$2s2p(^3$P°$)3d$– $2s2p(^3$P°$)5p$	^{2}D°–^{2}P		*255.78*	*1 187 386–1 578 350*	10–6	6.65+00	3.92−03	3.30−02	−1.407	D+	1
				256.108	1 187 890–1 578 350	6–4	5.96+00	3.91−03	1.98−02	−1.630	C	LS
				255.284	1 186 630–1 578 350	4–2	6.69+00	3.27−03	1.10−02	−1.883	D+	LS
				255.284	1 186 630–1 578 350	4–4	6.70−01	6.55−04	2.20−03	−2.582	D	LS
228		^{2}D°–^{2}D		*252.30*	*1 187 386–1 583 740*	10–10	5.01−01	4.78−04	3.97−03	−2.321	D	1
				252.621	1 187 890–1 583 740	6–6	4.66−01	4.46−04	2.23−03	−2.573	D	LS
				251.819	1 186 630–1 583 740	4–4	4.53−01	4.31−04	1.43−03	−2.763	D	LS
				252.621	1 187 890–1 583 740	6–4	5.00−02	3.19−05	1.59−04	−3.718	E	LS
				251.819	1 186 630–1 583 740	4–6	3.36−02	4.79−05	1.59−04	−3.718	E	LS
229		^{2}F°–^{2}D		*268.05*	*1 210 670–1 583 740*	14–10	6.39+00	4.92−03	6.08−02	−1.162	C	1
				268.456	1 211 240–1 583 740	8–6	6.06+00	4.91−03	3.47−02	−1.406	C	LS
				267.501	1 209 910–1 583 740	6–4	6.43+00	4.60−03	2.43−02	−1.559	C	LS
				267.501	1 209 910–1 583 740	6–6	3.06−01	3.28−04	1.73−03	−2.706	D	LS
230		^{2}P°–^{2}P		*277.08*	*1 217 443–1 578 350*	6–6	2.20+00	2.53−03	1.38−02	−1.819	D	1

TABLE 28. Transition probabilities of allowed lines for Na VII (references for this table are as follows: 1=Fernley *et al.*,[25] 2=Tachiev and Froese Fischer,[94] 3=Merkelis *et al.*,[64] 4=Galavis *et al.*, [41]and 5=Safronova *et al.*[81])—Continued

No.	Transition array	Mult.	$\lambda_{\rm air}$ (Å)	$\lambda_{\rm vac}$ (Å) or σ (cm^{-1})$^{\rm a}$	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				276.886	1 217 190–1 578 350	4–4	1.84+00	2.11−03	7.69−03	−2.074	D+	LS
				277.469	1 217 950–1 578 350	2–2	1.46+00	1.68−03	3.07−03	−2.474	D	LS
				276.886	1 217 190–1 578 350	4–2	7.34−01	4.22−04	1.54−03	−2.773	D	LS
				277.469	1 217 950–1 578 350	2–4	3.65−01	8.42−04	1.54−03	−2.774	D	LS
231		^{2}P$^\circ$−^{2}D		*273.00*	*1 217 443–1 583 740*	6–10	8.82−01	1.64−03	8.86−03	−2.007	D	1
				272.814	1 217 190–1 583 740	4–6	8.84−01	1.48−03	5.32−03	−2.228	D+	LS
				273.381	1 217 950–1 583 740	2–4	7.32−01	1.64−03	2.95−03	−2.484	D	LS
				272.814	1 217 190–1 583 740	4–4	1.47−01	1.64−04	5.89−04	−3.183	E+	LS
232	$2s2p(^1$P$^\circ)3s$– $2s2p(^1$P$^\circ)3p$	^{2}P$^\circ$−^{2}D		*1 866*	*1 198 290–1 251 874*	6–10	1.88+00	1.64−01	6.04+00	−0.007	B+	1
				1 861.5	1 198 290–1 252 010	4–6	1.90+00	1.48−01	3.63+00	−0.228	B+	LS
				1 873.4	1 198 290–1 251 670	2–4	1.55+00	1.63−01	2.01+00	−0.487	B+	LS
				1 873.4	1 198 290–1 251 670	4–4	3.10−01	1.63−02	4.02−01	−1.186	B	LS
233		^{2}P$^\circ$−^{2}P		*1 807*	*1 198 290–1 253 637*	6–6	2.30+00	1.12−01	4.01+00	−0.173	B+	1
				1 802.1	1 198 290–1 253 780	4–4	1.93+00	9.39−02	2.23+00	−0.425	B+	LS
				1 816.2	1 198 290–1 253 350	2–2	1.51+00	7.46−02	8.92−01	−0.826	B	LS
				1 816.2	1 198 290–1 253 350	4–2	7.52−01	1.86−02	4.45−01	−1.128	B	LS
				1 802.1	1 198 290–1 253 780	2–4	3.86−01	3.76−02	4.46−01	−1.124	B	LS
234		^{2}P$^\circ$−^{2}S		*1 650.4*	*1 198 290–1 258 880*	6–2	2.70+00	3.67−02	1.20+00	−0.657	B	1
				1 650.44	1 198 290–1 258 880	4–2	1.80+00	3.67−02	7.98−01	−0.833	B	LS
				1 650.44	1 198 290–1 258 880	2–2	8.99−01	3.67−02	3.99−01	−1.134	B	LS
235	$2s2p(^1$P$^\circ)3s-2s^24s$	^{2}P$^\circ$−^{2}S		*1 035.0*	*1 198 290–1 294 910*	6–2	8.69−01	4.65−03	9.51−02	−1.554	C	1
				1 034.98	1 198 290–1 294 910	4–2	5.79−01	4.65−03	6.34−02	−1.730	C	LS
				1 034.98	1 198 290–1 2949 10	2–2	2.90−01	4.65−03	3.17−02	−2.032	C	LS
236	$2s2p(^1$P$^\circ)3s$– $2p^2(^1$D$)3s$	^{2}P$^\circ$−^{2}D		*749.9*	*1 198 290–1 331 638*	6–10	1.32+01	1.85−01	2.75+00	0.045	B+	1
				748.06	1 198 290–1 331 970	4–6	1.33+01	1.67−01	1.65+00	−0.175	B+	LS
				752.73	1 198 290–1 331 140	2–4	1.09+01	1.85−01	9.17−01	−0.432	B+	LS
				752.73	1 198 290–1 331 140	4–4	2.18+00	1.85−02	1.83−01	−1.131	C+	LS
237	$2s2p(^1$P$^\circ)3s-2s^24d$	^{2}P$^\circ$−^{2}D		*727.1*	*1 198 290–1 335 822*	6–10	2.97−02	3.92−04	5.63−03	−2.629	D	1
				727.06	1 198 290–1 335 830	4–6	2.97−02	3.53−04	3.38−03	−2.850	D	LS
				727.17	1 198 290–1 335 810	2–4	2.47−02	3.92−04	1.88−03	−3.106	D	LS
				727.17	1 198 290–1 335 810	4–4	4.94−03	3.92−05	3.75−04	−3.805	E+	LS
238	$2s2p(^1$P$^\circ)3s$– $2p^2(^3$P$)3d$	^{2}P$^\circ$−^{2}D		*520.40*	*1 198 290–1 390 450*	6–10	1.09−01	7.34−04	7.55−03	−2.356	D	1
				[520.40]	1 198 290–1 390 450	4–6	1.09−01	6.61−04	4.53−03	−2.578	D	LS
				[520.40]	1 198 290–1 390 450	2–4	9.04−02	7.34−04	2.52−03	−2.833	D	LS
				[520.40]	1 198 290–1 390 450	4–4	1.81−02	7.34−05	5.03−04	−3.532	E+	LS
239	$2s2p(^1$P$^\circ)3s$– $2p^2(^1$D$)3d$	^{2}P$^\circ$−^{2}D		*460.11*	*1 198 290–1 415 630*	6–10	1.46−01	7.73−04	7.03−03	−2.334	D	1
				460.109	1 198 290–1 415 630	4–6	1.46−01	6.96−04	4.22−03	−2.555	D	LS
				460.109	1 198 290–1 415 630	2–4	1.22−01	7.73−04	2.34−03	−2.811	D	LS
				460.109	1 198 290–1 415 630	4–4	2.44−02	7.73−05	4.68−04	−3.510	E+	LS
240	$2s2p(^1$P$^\circ)3s$– $2s2p(^3$P$^\circ)4p$	^{2}P$^\circ$−^{2}D		*392.83*	*1 198 290–1 452 850*	6–10	1.96−01	7.55−04	5.86−03	−2.344	D	1

TABLE 28. Transition probabilities of allowed lines for Na VII (references for this table are as follows: 1=Fernley *et al.*,[25] 2=Tachiev and Froese Fischer,[94] 3=Merkelis *et al.*,[64] 4=Galavis *et al.*, [41]and 5=Safronova *et al.*[81])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				392.065	1 198 290–1 453 350	4–6	1.97−01	6.81−04	3.52−03	−2.565	D	LS
				393.996	1 198 290–1 452 100	2–4	1.62−01	7.53−04	1.95−03	−2.822	D	LS
				393.996	1 198 290–1 452 100	4–4	3.24−02	7.53−05	3.91−04	−3.521	E+	LS
241	$2s2p(^1P^{\circ})3s-2s^25d$	$^2P^{\circ}-^2D$		*379.84*	*1 198 290–1 461 562*	6–10	1.49−01	5.36−04	4.02−03	−2.493	D	1
				379.795	1 198 290–1 461 590	4–6	1.49−01	4.82−04	2.41−03	−2.715	D	LS
				379.896	1 198 290–1 461 520	2–4	1.24−01	5.36−04	1.34−03	−2.970	D	LS
				379.896	1 198 290–1 461 520	4–4	2.48−02	5.36−05	2.68−04	−3.669	E+	LS
242	$2s2p(^1P^{\circ})3s-$ $2s2p(^1P^{\circ})4p$	$^2P^{\circ}-^2D$		*275.03*	*1 198 290–1 561 890*	6–10	6.52+01	1.23−01	6.69−01	−0.132	B	1
				[275.03]	1 198 290–1 561 890	4–6	6.53+01	1.11−01	4.02−01	−0.353	B	LS
				[275.03]	1 198 290–1 561 890	2–4	5.42+01	1.23−01	2.23−01	−0.609	C+	LS
				[275.03]	1 198 290–1 561 890	4–4	1.08+01	1.23−02	4.45−02	−1.308	C	LS
243	$2s2p(^1P^{\circ})3s-$ $2s2p(^3P^{\circ})5p$	$^2P^{\circ}-^2P$		*263.12*	*1 198 290–1 578 350*	6–6	1.77+00	1.83−03	9.53−03	−1.959	D	1
				263.116	1 198 290–1 578 350	4–4	1.47+00	1.53−03	5.30−03	−2.213	D+	LS
				263.116	1 198 290–1 578 350	2–2	1.18+00	1.22−03	2.11−03	−2.613	D	LS
				263.116	1 198 290–1 578 350	4–2	5.90−01	3.06−04	1.06−03	−2.912	E+	LS
				263.116	1 198 290–1 578 350	2–4	2.94−01	6.11−04	1.06−03	−2.913	E+	LS
244		$^2P^{\circ}-^2D$		*259.44*	*1 198 290–1 583 740*	6–10	6.55−01	1.10−03	5.65−03	−2.180	D	1
				259.437	1 198 290–1 583 740	4–6	6.56−01	9.93−04	3.39−03	−2.401	D	LS
				259.437	1 198 290–1 583 740	2–4	5.45−01	1.10−03	1.88−03	−2.658	D	LS
				259.437	1 198 290–1 583 740	4–4	1.09−01	1.10−04	3.76−04	−3.357	E+	LS
245	$2s2p(^1P^{\circ})3p-$ $2s2p(^1P^{\circ})3d$	$^2D-^2F^{\circ}$	*2 471*	*2 472*	*1 251 874–1 292 330*	10–14	7.12−01	9.12−02	7.42+00	−0.040	B+	1
			2 479.4	2 480.2	1 252 010–1 292 330	6–8	7.04−01	8.66−02	4.24+00	−0.284	B+	LS
			2 458.7	2 459.4	1 251 670–1 292 330	4–6	6.74−01	9.17−02	2.97+00	−0.436	B+	LS
			2 479.4	2 480.2	1 252 010–1 292 330	6–6	4.70−02	4.33−03	2.12−01	−1.585	C+	LS
246		$^2D-^2D^{\circ}$		*1 935*	*1 251 874–1 303 546*	10–10	4.80−01	2.69−02	1.72+00	−0.570	B	1
				1 938.0	1 252 010–1 303 610	6–6	4.46−01	2.51−02	9.61−01	−0.822	B+	LS
				[1 931]	1 251 670–1 303 450	4–4	4.35−01	2.43−02	6.18−01	−1.012	B	LS
				[1 944]	1 252 010–1 303 450	6–4	4.71−02	1.78−03	6.84−02	−1.971	C	LS
				1 925.3	1 251 670–1 303 610	4–6	3.24−02	2.70−03	6.85−02	−1.967	C	LS
247		$^2D-^2P^{\circ}$		*1 832*	*1 251 874–1 306 470*	10–6	3.85−02	1.16−03	7.00−02	−1.936	C	1
				1 836.2	1 252 010–1 306 470	6–4	3.44−02	1.16−03	4.21−02	−2.157	C	LS
				1 824.8	1 251 670–1 306 470	4–2	3.88−02	9.69−04	2.33−02	−2.412	C	LS
				1 824.8	1 251 670–1 306 470	4–4	3.89−03	1.94−04	4.66−03	−3.110	D	LS
248		$^2P-^2D^{\circ}$	*2 003*	*2 004*	*1 253 637–1 303 546*	6–10	1.06+00	1.07−01	4.22+00	−0.192	B+	1
			2 006.2	2 006.8	1 253 780–1 303 610	4–6	1.06+00	9.59−02	2.53+00	−0.416	B+	LS
				[1 996]	1 253 350–1 303 450	2–4	8.96−01	1.07−01	1.41+00	−0.670	B+	LS
			[2 013]	[2 013]	1 253 780–1 303 450	4–4	1.74−01	1.06−02	2.81−01	−1.373	B	LS
249		$^2P-^2P^{\circ}$		*1 893*	*1 253 637–1 306 470*	6–6	1.88−01	1.01−02	3.77−01	−1.218	C+	1
				1 897.9	1 253 780–1 306 470	4–4	1.55−01	8.38−03	2.09−01	−1.475	C+	LS
				1 882.5	1 253 350–1 306 470	2–2	1.27−01	6.76−03	8.38−02	−1.869	C+	LS
				1 897.9	1 253 780–1 306 470	4–2	6.22−02	1.68−03	4.20−02	−2.173	C	LS
				1 882.5	1 253 350–1 306 470	2–4	3.18−02	3.38−03	4.19−02	−2.170	C	LS

TABLE 28. Transition probabilities of allowed lines for Na VII (references for this table are as follows: 1=Fernley *et al.*,[25] 2=Tachiev and Froese Fischer,[94] 3=Merkelis *et al.*,[64] 4=Galavis *et al.*, [41]and 5=Safronova *et al.*[81])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
250		$^2S-^2P^\circ$	*2 101*	*2 101*	*1 258 880–1 306 470*	2–6	3.83−02	7.61−03	1.05−01	−1.818	C	1
			2 100.6	2 101.3	1 258 880–1 306 470	2–4	3.83−02	5.07−03	7.01−02	−1.994	C	LS
			2 100.6	2 101.3	1 258 880–1 306 470	2–2	3.84−02	2.54−03	3.51−02	−2.294	C	LS
251	$2s2p(^1P^\circ)3p$–$2p^2(^3P)3p$	$^2D-^2D^\circ$		*1 032.6*	*1 251 874–1 348 720*	10–10	1.85−01	2.96−03	1.01−01	−1.529	C	1
				1 034.02	1 252 010–1 348 720	6–6	1.72−01	2.76−03	5.64−02	−1.781	C	LS
				1 030.40	1 251 670–1 348 720	4–4	1.68−01	2.67−03	3.62−02	−1.971	C	LS
				1 034.02	1 252 010–1 348 720	6–4	1.84−02	1.97−04	4.02−03	−2.927	D	LS
				1 030.40	1 251 670–1 348 720	4–6	1.24−02	2.97−04	4.03−03	−2.925	D	LS
252		$^2P-^2D^\circ$		*1 051.7*	*1 253 637–1 348 720*	6–10	3.68+00	1.02−01	2.11+00	−0.213	B	1
				1 053.30	1 253 780–1 348 720	4–6	3.66+00	9.14−02	1.27+00	−0.437	B+	LS
				1 048.55	1 253 350–1 348 720	2–4	3.09+00	1.02−01	7.04−01	−0.690	B	LS
				1 053.30	1 253 780–1 348 720	4–4	6.13−01	1.02−02	1.41−01	−1.389	C+	LS
253	$2s2p(^1P^\circ)3p$–$2p^2(^1D)3p$	$^2D-^2F^\circ$		*792.3*	*1 251 874–1 378 094*	10–14	8.05+00	1.06−01	2.77+00	0.025	B+	1
				791.83	1 252 010–1 378 300	6–8	8.06+00	1.01−01	1.58+00	−0.218	B+	LS
				792.71	1 251 670–1 377 820	4–6	7.50+00	1.06−01	1.11+00	−0.373	B+	LS
				794.85	1 252 010–1 377 820	6–6	5.31−01	5.03−03	7.90−02	−1.520	C	LS
254		$^2D-^2D^\circ$		*709.6*	*1 251 874–1 392 800*	10–10	5.01+00	3.78−02	8.84−01	−0.423	B	1
				710.28	1 252 010–1 392 800	6–6	4.67+00	3.53−02	4.95−01	−0.674	B	LS
				708.57	1 251 670–1 392 800	4–4	4.53+00	3.41−02	3.18−01	−0.865	B	LS
				710.28	1 252 010–1 392 800	6–4	5.00−01	2.52−03	3.54−02	−1.820	C	LS
				708.57	1 251 670–1 392 800	4–6	3.36−01	3.79−03	3.54−02	−1.819	C	LS
255		$^2P-^2D^\circ$		*718.6*	*1 253 637–1 392 800*	6–10	1.85+00	2.38−02	3.38−01	−0.845	C+	1
				719.32	1 253 780–1 392 800	4–6	1.84+00	2.14−02	2.03−01	−1.068	C+	LS
				717.10	1 253 350–1 392 800	2–4	1.55+00	2.39−02	1.13−01	−1.321	C+	LS
				719.32	1 253 780–1 392 800	4–4	3.07−01	2.38−03	2.25−02	−2.021	C	LS
256	$2s2p(^1P^\circ)3p$–$2s2p(^3P^\circ)4s$	$^2D-^2P^\circ$				10–6						1
				[553.74]	1 252 010–1 432 600	6–4	2.23+00	6.84−03	7.48−02	−1.387	C	LS
				[552.70]	1 251 670–1 432 600	4–4	2.49−01	1.14−03	8.30−03	−2.341	D+	LS
257		$^2P-^2P^\circ$				6–6						1
				[559.22]	1 253 780–1 432 600	4–4	1.90−01	8.92−04	6.57−03	−2.448	D+	LS
				[557.88]	1 253 350–1 432 600	2–4	3.84−02	3.58−04	1.32−03	−3.145	D	LS
258		$^2S-^2P^\circ$				2–6						1
				[575.6]	1 258 880–1 432 600	2–4	5.04+00	5.01−02	1.90−01	−0.999	C+	LS
259	$2s2p(^1P^\circ)3p$–$2s2p(^3P^\circ)4d$	$^2D-^2D^\circ$				10–10						1
				471.609	1 252 010–1 464 050	6–6	2.25+00	7.50−03	6.99−02	−1.347	C	LS
				470.854	1 251 670–1 464 050	4–6	1.61−01	8.05−04	4.99−03	−2.492	D	LS
260		$^2D-^2F^\circ$		*453.81*	*1 251 874–1 472 229*	10–14	7.76−01	3.36−03	5.01−02	−1.474	C	1
				453.063	1 252 010–1 472 730	6–8	7.80−01	3.20−03	2.86−02	−1.717	C	LS
				454.773	1 251 670–1 471 560	4–6	7.20−01	3.35−03	2.01−02	−1.873	C	LS

TABLE 28. Transition probabilities of allowed lines for Na VII (references for this table are as follows: 1=Fernley *et al.*,[25] 2=Tachiev and Froese Fischer,[94] 3=Merkelis *et al.*,[64] 4=Galavis *et al.*, [41]and 5=Safronova *et al.*[81])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				455.477	1 252 010–1 471 560	6–6	5.11−02	1.59−04	1.43−03	−3.020	D	LS
261		^{2}D–^{2}P°		*450.09*	*1 251 874–1 474 050*	10–6	1.19+00	2.17−03	3.22−02	−1.664	D+	1
				[450.86]	1 252 010–1 473 810	6–4	1.07+00	2.17−03	1.93−02	−1.885	C	LS
				[448.71]	1 251 670–1 474 530	4–2	1.21+00	1.82−03	1.08−02	−2.138	D+	LS
				[450.17]	1 251 670–1 473 810	4–4	1.19−01	3.62−04	2.15−03	−2.839	D	LS
262		^{2}P–^{2}D°				6–10						1
				475.579	1 253 780–1 464 050	4–6	1.75−01	8.88−04	5.56−03	−2.450	D+	LS
263		^{2}P–^{2}P°		*453.69*	*1 253 637–1 474 050*	6–6	2.19+00	6.76−03	6.06−02	−1.392	C	1
				[454.48]	1 253 780–1 473 810	4–4	1.81+00	5.62−03	3.36−02	−1.648	C	LS
				[452.12]	1 253 350–1 474 530	2–2	1.47+00	4.52−03	1.35−02	−2.044	D+	LS
				[453.00]	1 253 780–1 474 530	4–2	7.35−01	1.13−03	6.74−03	−2.345	D+	LS
				[453.60]	1 253 350–1 473 810	2–4	3.65−01	2.25−03	6.72−03	−2.347	D+	LS
264		^{2}S–^{2}P°		*464.75*	*1 258 880–1 474 050*	2–6	1.56+00	1.52−02	4.64−02	−1.517	C	1
				[465.27]	1 258 880–1 473 810	2–4	1.56+00	1.01−02	3.09−02	−1.695	C	LS
				[463.71]	1 258 880–1 474 530	2–2	1.57+00	5.07−03	1.55−02	−1.994	D+	LS
265	$2s2p(^1\mathrm{P}^\circ)3p$–$2s2p(^1\mathrm{P}^\circ)4s$	^{2}D–^{2}P°		*348.34*	*1 251 874–1 538 950*	10–6	4.47+01	4.88−02	5.60−01	−0.312	C+	1
				[348.51]	1 252 010–1 538 950	6–4	4.02+01	4.88−02	3.36−01	−0.533	B	LS
				[348.09]	1 251 670–1 538 950	4–2	4.48+01	4.07−02	1.87−01	−0.788	C+	LS
				[348.09]	1 251 670–1 538 950	4–4	4.48+00	8.14−03	3.73−02	−1.487	C	LS
266		^{2}P–^{2}P°		*350.49*	*1 253 637–1 538 950*	6–6	4.09+01	7.52−02	5.21−01	−0.346	C+	1
				[350.67]	1 253 780–1 538 950	4–4	3.40+01	6.27−02	2.90−01	−0.601	B	LS
				[350.14]	1 253 350–1 538 950	2–2	2.73+01	5.02−02	1.16−01	−0.998	C+	LS
				[350.67]	1 253 780–1 538 950	4–2	1.36+01	1.25−02	5.77−02	−1.301	C	LS
				[350.14]	1 253 350–1 538 950	2–4	6.83+00	2.51−02	5.79−02	−1.299	C	LS
267		^{2}S–^{2}P°		*357.05*	*1 258 880–1 538 950*	2–6	2.83+01	1.62−01	3.81−01	−0.489	C+	1
				[357.05]	1 258 880–1 538 950	2–4	2.83+01	1.08−01	2.54−01	−0.666	B	LS
				[357.05]	1 258 880–1 538 950	2–2	2.83+01	5.41−02	1.27−01	−0.966	C+	LS
268	$2s2p(^1\mathrm{P}^\circ)3p$–$2s2p(^1\mathrm{P}^\circ)4d$	^{2}D–^{2}F°		*306.81*	*1 251 874–1 577 810*	10–14	1.30+02	2.57−01	2.60+00	0.410	B+	1
				[306.94]	1 252 010–1 577 810	6–8	1.30+02	2.45−01	1.49+00	0.167	B+	LS
				[306.62]	1 251 670–1 577 810	4–6	1.22+02	2.57−01	1.04+00	0.012	B+	LS
				[306.94]	1 252 010–1 577 810	6–6	8.64+00	1.22−02	7.40−02	−1.135	C	LS
269	$2s2p(^1\mathrm{P}^\circ)3p$–$2s2p(^3\mathrm{P}^\circ)5d$	^{2}D–^{2}F°		*292.76*	*1 251 874–1 593 449*	10–14	6.06+00	1.09−02	1.05−01	−0.963	C	1
				292.475	1 252 010–1 593 920	6–8	6.08+00	1.04−02	6.01−02	−1.205	C	LS
				293.126	1 251 670–1 592 820	4–6	5.64+00	1.09−02	4.21−02	−1.361	C	LS
				293.419	1 252 010–1 5928 20	6–6	4.01−01	5.18−04	3.00−03	−2.508	D	LS
270	$2p^2(^3\mathrm{P})3s$ $-2p^2(^3\mathrm{P})3p$	^{4}P–^{4}D°				12–20						1
			2 132.0	2 132.7	1 291 560–1 338 450	6–8	1.83+00	1.66−01	6.99+00	−0.002	A	LS
271		^{4}P–^{4}P°				12–12						1
				1 877.2	1 291 560–1 344 830	6–6	1.85+00	9.80−02	3.63+00	−0.231	B+	LS

TABLE 28. Transition probabilities of allowed lines for Na VII (references for this table are as follows: 1=Fernley *et al.*,[25] 2=Tachiev and Froese Fischer,[94] 3=Merkelis *et al.*,[64] 4=Galavis *et al.*, [41]and 5=Safronova *et al.*[81])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				1 824.8	1 290 030–1 344 830	4–6	8.65−01	6.48−02	1.56+00	−0.586	B+	LS
272		^{4}P$-^4$S$^\circ$				12–4						1
				1 400.76	1 291 560–1 362 950	6–4	3.63+00	7.11−02	1.97+00	−0.370	B+	LS
				1 371.37	1 290 030–1 362 950	4–4	2.57+00	7.26−02	1.31+00	−0.537	B+	LS
273	$2p^2(^3\mathrm{P})3s-2s2p(^3\mathrm{P}^\circ)4s$	^{4}P$-^4$P$^\circ$				12–12						1
				761.56	1 291 560–1 422 870	6–6	1.39−01	1.21−03	1.82−02	−2.139	C	LS
				752.79	1 290 030–1 422 870	4–6	6.16−02	7.85−04	7.78−03	−2.503	D+	LS
274	$2p^2(^3\mathrm{P})3s-2s2p(^3\mathrm{P}^\circ)4d$	^{4}P$-^4$D$^\circ$				12–20						1
				582.45	1 291 560–1 463 250	6–8	1.90−02	1.29−04	1.48−03	−3.111	D	LS
				580.08	1 290 030–1 462 420	4–6	1.35−02	1.02−04	7.79−04	−3.389	E+	LS
				585.27	1 291 560–1 462 420	6–6	5.61−03	2.88−05	3.33−04	−3.762	E+	LS
				580.21	1 290 030–1 462 380	4–4	1.02−02	5.17−05	3.95−04	−3.684	E+	LS
				585.41	1 291 560–1 462 380	6–4	9.34+04	3.20−06	3.70−05	−4.717	E	LS
275	$2p^2(^3\mathrm{P})3s$ $-2p^2(^3\mathrm{P})4p$	^{4}P$-^4$D$^\circ$				12–20						1
				282.048	1 291 560–1 646 110	6–8	7.11+01	1.13−01	6.30−01	−0.169	B	LS
				280.836	1 290 030–1 646 110	4–6	5.04+01	8.94−02	3.31−01	−0.447	B	LS
				282.048	1 291 560–1 646 110	6–6	2.13+01	2.54−02	1.42−01	−0.817	C+	LS
				280.836	1 290 030–1 646 110	4–4	3.84+01	4.54−02	1.68−01	−0.741	C+	LS
				282.048	1 291 560–1 646 110	6–4	3.56+00	2.83−03	1.58−02	−1.770	D+	LS
276	$2p^2(^3\mathrm{P})3s-2s2p(^3\mathrm{P}^\circ)6d$	^{4}P$-^4$D$^\circ$				12–20						1
				273.254	1 291 560–1 657 520	6–8	5.89−01	8.79−04	4.74−03	−2.278	D	LS
				272.116	1 290 030–1 657 520	4–6	4.17−01	6.95−04	2.49−03	−2.556	D	LS
				273.254	1 291 560–1 657 520	6–6	1.77−01	1.98−04	1.07−03	−2.925	E+	LS
				272.116	1 290 030–1 657 520	4–4	3.18−01	3.53−04	1.26−03	−2.850	D	LS
				273.254	1 291 560–1 657 520	6–4	2.95−02	2.20−05	1.19−04	−3.879	E	LS
				272.116	1 290 030–1 657 520	4–2	9.94−02	5.52−05	1.98−04	−3.656	E+	LS
277	$2s2p(^1\mathrm{P}^\circ)3d-2p^2(^1\mathrm{D})3s$	^{2}F$^\circ-^2$D	*2 543*	*2 544*	*1 292 330–1 331 638*	14–10	1.56−02	1.08−03	1.27−01	−1.820	C	1
			2 521.9	2 522.7	1 292 330–1 331 970	8–6	1.52−02	1.09−03	7.24−02	−2.059	C	LS
			2 575.9	2 576.7	1 292 330–1 331 140	6–4	1.51−02	9.99−04	5.08−02	−2.222	C	LS
			2 521.9	2 522.7	1 292 330–1 331 970	6–6	7.64−04	7.29−05	3.63−03	−3.359	D	LS
278		^{2}D$^\circ-^2$D	*3 559*	*3 560*	*1 303 546–1 331 638*	10–10	1.79−04	3.41−05	3.99−03	−3.467	D	1
			3 525.1	3 526.1	1 303 610–1 331 970	6–6	1.72−04	3.21−05	2.24−03	−3.715	D	LS
			[3 610]	[3 611]	1 303 450–1 331 140	4–4	1.54−04	3.02−05	1.44−03	−3.918	D	LS
			3 631.4	3 632.4	1 303 610–1 331 140	6–4	1.69−05	2.23−06	1.60−04	−4.874	E	LS
			[3 505]	[3 506]	1 303 450–1 331 970	4–6	1.25−05	3.46−06	1.60−04	−4.859	E	LS
279		^{2}P$^\circ-^2$D	*3 972*	*3 973*	*1 306 470–1 331 638*	6–10	7.70−03	3.04−03	2.38−01	−1.739	C+	1
			3 920.5	3 921.6	1 306 470–1 331 970	4–6	8.01−03	2.77−03	1.43−01	−1.955	C+	LS
			4 052.4	4 053.5	1 306 470–1 331 140	2–4	6.05−03	2.98−03	7.95−02	−2.225	C	LS
			4 052.4	4 053.5	1 306 470–1 331 140	4–4	1.21−03	2.98−04	1.59−02	−2.924	D+	LS
280	$2s2p(^1\mathrm{P}^\circ)3d-2s^24d$	^{2}F$^\circ-^2$D	*2 299*	*2 299*	*1 292 330–1 335 822*	14–10	2.37−01	1.34−02	1.42+00	−0.727	B	1

TABLE 28. Transition probabilities of allowed lines for Na VII (references for this table are as follows: 1=Fernley *et al.*,[25] 2=Tachiev and Froese Fischer,[94] 3=Merkelis *et al.*,[64] 4=Galavis *et al.*, [41]and 5=Safronova *et al.*[81])—Continued

No.	Transition array	Mult.	$\lambda_{\rm air}$ (Å)	$\lambda_{\rm vac}$ (Å) or σ (cm^{-1})$^{\rm a}$	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
			2 298.1	2 298.9	1 292 330–1 335 830	8–6	2.26−01	1.34−02	8.11−01	−0.970	B	LS
			2 299.2	2 299.9	1 292 330–1 335 810	6–4	2.36−01	1.25−02	5.68−01	−1.125	B	LS
			2 298.1	2 298.9	1 292 330–1 335 830	6–6	1.13−02	8.92−04	4.05−02	−2.271	C	LS
281		^{2}P°−^{2}D	*3 406*	*3 407*	*1 306 470–1 335 822*	6–10	9.84−01	2.85−01	1.92+01	0.233	A	1
			3 405.0	3 406.0	1 306 470–1 335 830	4–6	9.85−01	2.57−01	1.15+01	0.012	A	LS
			3 407.3	3 408.3	1 306 470–1 335 810	2–4	8.18−01	2.85−01	6.40+00	−0.244	A	LS
			3 407.3	3 408.3	1 306 470–1 335 810	4–4	1.64−01	2.85−02	1.28+00	−0.943	B+	LS
282	$2s2p(^1$P°$)3d$–$2p^2(^3$P$)3d$	^{2}F°−^{2}F		*1 036.9*	*1 292 330–1 388 769*	14–14	7.63−01	1.23−02	5.88−01	−0.764	C+	1
				[1 034.8]	1 292 330–1 388 970	8–8	6.79−01	1.09−02	2.97−01	−1.059	B	LS
				[1 039.8]	1 292 330–1 388 500	6–6	8.08−01	1.31−02	2.69−01	−1.105	B	LS
				[1 039.8]	1 292 330–1 388 500	8–6	3.29−02	4.00−04	1.10−02	−2.495	D+	LS
				[1 034.8]	1 292 330–1 388 970	6–8	2.50−02	5.36−04	1.10−02	−2.493	D+	LS
283		^{2}D°−^{2}F		*1 173.4*	*1 303 546–1 388 769*	10–1 4	1.55−01	4.48−03	1.73−01	−1.349	C	1
				[1 171.5]	1 303 610–1 388 970	6–8	1.56−01	4.27−03	9.88−02	−1.591	C+	LS
				[1 175.8]	1 303 450–1 388 500	4–6	1.44−01	4.47−03	6.92−02	−1.748	C	LS
				[1 178.0]	1 303 610–1 388 500	6–6	1.02−02	2.13−04	4.96−03	−2.893	D	LS
284		^{2}D°−^{2}D		*1 150.7*	*1 303 546–1 390 450*	10–10	1.43−01	2.84−03	1.08−01	−1.547	C	1
				[1 151.5]	1 303 610–1 390 450	6–6	1.33−01	2.65−03	6.03−02	−1.799	C	LS
				[1 149.4]	1 303 450–1 390 450	4–4	1.29−01	2.56−03	3.87−02	−1.990	C	LS
				[1 151.5]	1 303 610–1 390 450	6–4	1.43−02	1.89−04	4.30−03	−2.945	D	LS
				[1 149.4]	1 303 450–1 390 450	4–6	9.56−03	2.84−04	4.30−03	−2.945	D	LS
285		^{2}P°−^{2}D		*1 190.8*	*1 306 470–1 390 450*	6–10	3.51−02	1.24−03	2.92−02	−2.128	D+	1
				[1 190.8]	1 306 470–1 390 450	4–6	3.51−02	1.12−03	1.76−02	−2.349	C	LS
				[1 190.8]	1 306 470–1 390 450	2–4	2.92−02	1.24−03	9.72−03	−2.606	D+	LS
				[1 190.8]	1 306 470–1 390 450	4–4	5.83−03	1.24−04	1.94−03	−3.305	D	LS
286	$2s2p(^1$P°$)3d$–$2p^2(^1$D$)3d$	^{2}F°−^{2}D		*811.0*	*1 292 330–1 415 630*	14–10	1.69−01	1.19−03	4.45−02	−1.778	C	1
				811.03	1 292 330–1 415 630	8–6	1.61−01	1.19−03	2.54−02	−2.021	C	LS
				811.03	1 292 330–1 415 630	6–4	1.69−01	1.11−03	1.78−02	−2.177	C	LS
				811.03	1 292 330–1 415 630	6–6	8.07−03	7.96−05	1.28−03	−3.321	D	LS
287		^{2}F°−^{2}F		*732.9*	*1 292 330–1 428 766*	14–14	8.08+00	6.51−02	2.20+00	−0.040	B	1
				732.76	1 292 330–1 428 800	8–8	7.14+00	5.75−02	1.11+00	−0.337	B+	LS
				733.19	1 292 330–1 428 720	6–6	8.64+00	6.96−02	1.01+00	−0.379	B+	LS
				733.19	1 292 330–1 428 720	8–6	3.52−01	2.13−03	4.11−02	−1.769	C	LS
				732.76	1 292 330–1 428 800	6–8	2.65−01	2.84−03	4.11−02	−1.769	C	LS
288		^{2}D°−^{2}D		*892.2*	*1 303 546–1 415 630*	10–10	5.61+00	6.69−02	1.97+00	−0.175	B	1
				892.70	1 303 610–1 415 630	6–6	5.22+00	6.24−02	1.10+00	−0.427	B+	LS
				[891.4]	1 303 450–1 415 630	4–4	5.06+00	6.03−02	7.08−01	−0.618	B	LS
				892.70	1 303 610–1 415 630	6–4	5.60−01	4.46−03	7.86−02	−1.573	C	LS
				[891.4]	1 303 450–1 415 630	4–6	3.75−01	6.70−03	7.86−02	−1.572	C	LS
289		^{2}D°−^{2}F		*798.6*	*1 303 546–1 428 766*	10–14	1.04+00	1.39−02	3.65−01	−0.857	C+	1
				798.79	1 303 610–1 428 800	6–8	1.03+00	1.32−02	2.08−01	−1.101	C+	LS
				[798.3]	1 303 450–1 428 720	4–6	9.70−01	1.39−02	1.46−01	−1.255	C+	LS
				799.30	1 303 610–1 428 720	6–6	6.90−02	6.61−04	1.04−02	−2.402	D+	LS

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No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})$^{\mathrm{a}}$	$E_i - E_k$ (cm^{-1})	$g_i - g_k$	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
290		^{2}D$^\circ$–^{2}P		*775.8*	*1 303 546–1 432 453*	10–6	1.31+00	7.11−03	1.81−01	−1.148	C	1
				775.19	1 303 610–1 432 610	6–4	1.18+00	7.11−03	1.09−01	−1.370	C+	LS
				[777.1]	1 303 450–1 432 140	4–2	1.31+00	5.91−03	6.05−02	−1.626	C	LS
				[774.2]	1 303 450–1 432 610	4–4	1.32−01	1.19−03	1.21−02	−2.322	D+	LS
291		^{2}P$^\circ$–^{2}D		*916.1*	1 306 470–1 415 630	6–10	1.51−01	3.17−03	5.73−02	−1.721	C	1
				916.09	1 306 470–1 415 630	4–6	1.51−01	2.85−03	3.44−02	−1.943	C	LS
				916.09	1 306 470–1 415 630	2–4	1.26−01	3.17−03	1.91−02	−2.198	C	LS
				916.09	1 306 470–1 415 630	4–4	2.52−02	3.17−04	3.82−03	−2.897	D	LS
292		^{2}P$^\circ$–^{2}P		*793.8*	*1 306 470–1 432 453*	6–6	1.33+00	1.26−02	1.97−01	−1.121	C	1
				792.77	1 306 470–1 432 610	4–4	1.11+00	1.05−02	1.10−01	−1.377	C+	LS
				795.73	1 306 470–1 432 140	2–2	8.82−01	8.37−03	4.39−02	−1.776	C	LS
				795.73	1 306 470–1 432 140	4–2	4.40−01	2.09−03	2.19−02	−2.078	C	LS
				792.77	1 306 470–1 432 610	2–4	2.23−01	4.20−03	2.19−02	−2.076	C	LS
293	$2s2p(^1\mathrm{P}^\circ)3d$–$2s2p(^3\mathrm{P}^\circ)4p$	^{2}F$^\circ$–^{2}D		*623.0*	*1 292 330–1 452 850*	14–10	5.09−02	2.12−04	6.08−03	−2.528	D	1
				621.04	1 292 330–1 453 350	8–6	4.89−02	2.12−04	3.47−03	−2.771	D	LS
				625.90	1 292 330–1 452 100	6–4	5.03−02	1.97−04	2.44−03	−2.927	D	LS
				621.04	1 292 330–1 453 350	6–6	2.46−03	1.42−05	1.74−04	−4.070	E	LS
294		^{2}D$^\circ$–^{2}P		*717.0*	*1 303 546–1 443 017*	10–6	2.08+00	9.60−03	2.27−01	−1.018	C+	1
				716.54	1 303 610–1 443 170	6–4	1.87+00	9.60−03	1.36−01	−1.240	C+	LS
				[718.1]	1 303 450–1 442 710	4–2	2.07+00	7.99−03	7.56−02	−1.495	C	LS
				[715.7]	1 303 450–1 443 170	4–4	2.08−01	1.60−03	1.51−02	−2.194	D+	LS
295		^{2}D$^\circ$–^{2}D		*669.8*	*1 303 546–1 452 850*	10–10	1.26−01	8.46−04	1.87−02	−2.073	D+	1
				667.82	1 303 610–1 453 350	6–6	1.18−01	7.92−04	1.04−02	−2.323	D+	LS
				[672.7]	1 303 450–1 452 100	4–4	1.12−01	7.58−04	6.71−03	−2.518	D+	LS
				673.45	1 303 610–1 452 100	6–4	1.24−02	5.61−05	7.46−04	−3.473	E+	LS
				[667.1]	1 303 450–1 453 350	4–6	8.49−03	8.50−05	7.47−04	−3.469	E+	LS
296		^{2}P$^\circ$–^{2}P		*732.4*	*1 306 470–1 443 017*	6–6	1.78+00	1.43−02	2.07−01	−1.067	C	1
				731.53	1 306 470–1 443 170	4–4	1.48+00	1.19−02	1.15−01	−1.322	C+	LS
				734.00	1 306 470–1 442 710	2–2	1.18+00	9.51−03	4.60−02	−1.721	C	LS
				734.00	1 306 470–1 442 710	4–2	5.89−01	2.38−03	2.30−02	−2.021	C	LS
				731.53	1 306 470–1 443 170	2–4	2.97−01	4.77−03	2.30−02	−2.020	C	LS
297		^{2}P$^\circ$–^{2}D		*683.2*	*1 306 470–1 452 850*	6–10	5.37−01	6.26−03	8.45−02	−1.425	C	1
				680.83	1 306 470–1 453 350	4–6	5.42−01	5.65−03	5.07−02	−1.646	C	LS
				686.67	1 306 470–1 452 100	2–4	4.41−01	6.23−03	2.82−02	−1.904	C	LS
				686.67	1 306 470–1 452 100	4–4	8.81−02	6.23−04	5.63−03	−2.603	D+	LS
298	$2s2p(^1\mathrm{P}^\circ)3d - 2s^25d$	^{2}F$^\circ$–^{2}D		*590.9*	*1 292 330–1 461 562*	14–10	8.24−02	3.08−04	8.40−03	−2.365	D	1
				590.81	1 292 330–1 461 590	8–6	7.85−02	3.08−04	4.79−03	−2.608	D	LS
				591.05	1 292 330–1 461 520	6–4	8.25−02	2.88−04	3.36−03	−2.762	D	LS
				590.81	1 292 330–1 461 590	6–6	3.94−03	2.06−05	2.40−04	−3.908	E+	LS
299		^{2}D$^\circ$–^{2}D		*632.8*	*1 303 546–1 461 562*	10–10	2.95−02	1.77−04	3.69−03	−2.752	D	1
				632.99	1 303 610–1 461 590	6–6	2.75−02	1.65−04	2.06−03	−3.004	D	LS
				[632.6]	1 303 450–1 461 520	4–4	2.67−02	1.60−04	1.33−03	−3.194	D	LS
				633.27	1 303 610–1 461 520	6–4	2.94−03	1.18−05	1.48−04	−4.150	E	LS

TABLE 28. Transition probabilities of allowed lines for Na VII (references for this table are as follows: 1=Fernley *et al.*,[25] 2=Tachiev and Froese Fischer,[94] 3=Merkelis *et al.*,[64] 4=Galavis *et al.*, [41]and 5=Safronova *et al.*[81])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				[632.4]	1 303 450–1 461 590	4–6	1.97−03	1.77−05	1.47−04	−4.150	E	LS
300		$^2P^\circ-^2D$		*644.8*	*1 306 470–1 461 562*	6–10	2.91+01	3.02−01	3.85+00	0.258	B+	1
				644.66	1 306 470–1 461 590	4–6	2.91+01	2.72−01	2.31+00	0.037	B+	LS
				644.95	1 306 470–1 461 520	2–4	2.42+01	3.02−01	1.28+00	−0.219	B+	LS
				644.95	1 306 470–1 461 520	4–4	4.84+00	3.02−02	2.56−01	−0.918	B	LS
301	$2s2p(^1P^\circ)3d-2s^26d$	$^2P^\circ-^2D$		*448.45*	*1 306 470–1 529 460*	6–10	1.62+01	8.14−02	7.21−01	−0.311	B	1
				448.451	1 306 470–1 529 460	4–6	1.62+01	7.33−02	4.33−01	−0.533	B	LS
				448.451	1 306 470–1 529 460	2–4	1.35+01	8.14−02	2.40−01	−0.788	C+	LS
				448.451	1 306 470–1 529 460	4–4	2.70+00	8.14−03	4.81−02	−1.487	C	LS
302	$2s2p(^1P^\circ)3d-$ $2s2p(^1P^\circ)4p$	$^2F^\circ-^2D$		*370.97*	*1 292 330–1 561 890*	14–10	1.13+01	1.66−02	2.84−01	−0.634	C+	1
				[370.98]	1 292 330–1 561 890	8–6	1.07+01	1.66−02	1.62−01	−0.877	C+	LS
				[370.98]	1 292 330–1 561 890	6–4	1.13+01	1.55−02	1.14−01	−1.032	C+	LS
				[370.98]	1 292 330–1 561 890	6–6	5.33−01	1.10−03	8.06−03	−2.180	D+	LS
303		$^2D^\circ-^2D$		*387.08*	*1 303 546–1 561 890*	10–10	2.53+00	5.69−03	7.25−02	−1.245	C	1
				[387.18]	1 303 610–1 561 890	6–6	2.36+00	5.31−03	4.06−02	−1.497	C	LS
				[386.94]	1 303 450–1 561 890	4–4	2.28+00	5.12−03	2.61−02	−1.689	C	LS
				[387.18]	1 303 610–1 561 890	6–4	2.53−01	3.79−04	2.90−03	−2.643	D	LS
				[386.94]	1 303 450–1 561 890	4–6	1.69−01	5.69−04	2.90−03	−2.643	D	LS
304		$^2P^\circ-^2D$		*391.51*	*1 306 470–1 561 890*	6–10	1.69+01	6.49−02	5.02−01	−0.410	C+	1
				[391.51]	1 306 470–1 561 890	4–6	1.69+01	5.84−02	3.01−01	−0.632	B	LS
				[391.51]	1 306 470–1 561 890	2–4	1.41+01	6.48−02	1.67−01	−0.887	C+	LS
				[391.51]	1 306 470–1 561 890	4–4	2.82+00	6.48−03	3.34−02	−1.586	C	LS
305	$2s2p(^1P^\circ)3d-2s^27d$	$^2P^\circ-^2D$		*379.35*	*1 306 470–1 570 080*	6–10	8.37+00	3.01−02	2.26−01	−0.743	D+	1
				379.348	1 306 470–1 570 080	4–6	8.37+00	2.71−02	1.35−01	−0.965	C	LS
				379.348	1 306 470–1 570 080	2–4	6.98+00	3.01−02	7.52−02	−1.220	D+	LS
				379.348	1 306 470–1 570 080	4–4	1.40+00	3.01−03	1.50−02	−1.919	E+	LS
306	$2s2p(^1P^\circ)3d-$ $2s2p(^3P^\circ)5p$	$^2F^\circ-^2D$		*343.16*	*1 292 330–1 583 740*	14–10	1.60−01	2.02−04	3.19−03	−2.549	D	1
				343.159	1 292 330–1 583 740	8–6	1.53−01	2.02−04	1.83−03	−2.792	D	LS
				343.159	1 292 330–1 583 740	6–4	1.60−01	1.88−04	1.27−03	−2.948	D	LS
				343.159	1 292 330–1 583 740	6–6	7.65−03	1.35−05	9.15−05	−4.092	E	LS
307		$^2D^\circ-^2P$		*363.90*	*1 303 546–1 578 350*	10–6	6.21−01	7.40−04	8.87−03	−2.131	D	1
				363.980	1 303 610–1 578 350	6–4	5.59−01	7.40−04	5.32−03	−2.353	D+	LS
				[363.77]	1 303 450–1 578 350	4–2	6.22−01	6.17−04	2.96−03	−2.608	D	LS
				[363.77]	1 303 450–1 578 350	4–4	6.20−02	1.23−04	5.89−04	−3.308	E+	LS
308		$^2D^\circ-^2D$		*356.90*	*1 303 546–1 583 740*	10–10	1.81−01	3.46−04	4.06−03	−2.461	D	1
				356.977	1 303 610–1 583 740	6–6	1.69−01	3.23−04	2.28−03	−2.713	D	LS
				[356.77]	1 303 450–1 583 740	4–4	1.63−01	3.11−04	1.46−03	−2.905	D	LS
				356.977	1 303 610–1 583 740	6–4	1.81−02	2.30−05	1.62−04	−3.860	E	LS
				[356.77]	1 303 450–1 583 740	4–6	1.21−02	3.46−05	1.63−04	−3.859	E	LS
309		$^2P^\circ-^2P$		*367.81*	*1 306 470–1 578 350*	6–6	9.04−01	1.83−03	1.33−02	−1.959	D	1
				367.809	1 306 470–1 578 350	4–4	7.54−01	1.53−03	7.41−03	−2.213	D+	LS
				367.809	1 306 470–1 578 350	2–2	6.02−01	1.22−03	2.95−03	−2.613	D	LS

TABLE 28. Transition probabilities of allowed lines for Na VII (references for this table are as follows: 1=Fernley *et al.*,[25] 2=Tachiev and Froese Fischer,[94] 3=Merkelis *et al.*,[64] 4=Galavis *et al.*, [41]and 5=Safronova *et al.*[81])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				367.809	1 306 470–1 578 350	4–2	3.01−01	3.05−04	1.48−03	−2.914	D	LS
				367.809	1 306 470–1 578 350	2–4	1.50−01	6.10−04	1.48−03	−2.914	D	LS
310	$2s2p(^1P^\circ)3d-2s^28d$	$^2P^\circ-^2D$		*344.91*	*1 306 470–1 596 400*	6–10	1.19+01	3.54−02	2.41−01	−0.673	D+	1
				344.911	1 306 470–1 596 400	4–6	1.19+01	3.18−02	1.44−01	−0.896	C	LS
				344.911	1 306 470–1 596 400	2–4	9.92+00	3.54−02	8.04−02	−1.150	D+	LS
				344.911	1 306 470–1 596 400	4–4	1.98+00	3.54−03	1.61−02	−1.849	E+	LS
311	$2s^24s-2s2p(^1P^\circ)3d$	$^2S-^2P^\circ$	*8 650*	*8 651*	1 294 910–*1 306 470*	2–6	6.06−02	2.04−01	1.16+01	−0.389	A	1
			8 648	8 651	1 294 910–1 306 470	2–4	6.06−02	1.36−01	7.75+00	−0.565	A	LS
			8 648	8 651	1 294 910–1 306 470	2–2	6.07−02	6.81−02	3.88+00	−0.866	B+	LS
312	$2s^24s-2s2p(^3P^\circ)4s$	$^2S-^2P^\circ$				2–6						1
				[726.3]	1 294 910–1 432 600	2–4	8.09−02	1.28−03	6.12−03	−2.592	D+	LS
313	$2s^24s-2s2p(^3P^\circ)4d$	$^2S-^2P^\circ$		*558.22*	1 294 910–*1 474 050*	2–6	8.41−01	1.18−02	4.33−02	−1.627	C	1
				[558.97]	1 294 910–1 473 810	2–4	8.37−01	7.84−03	2.89−02	−1.805	C	LS
				[556.73]	1 294 910–1 474 530	2–2	8.48−01	3.94−03	1.44−02	−2.103	D+	LS
314	$2s^24s-2s2p(^1P^\circ)4s$	$^2S-^2P^\circ$		*409.77*	1 294 910–*1 538 950*	2–6	2.54+01	1.92−01	5.18−01	−0.416	B	1
				[409.77]	1 294 910–1 538 950	2–4	2.54+01	1.28−01	3.45−01	−0.592	B	LS
				[409.77]	1 294 910–1 538 950	2–2	2.55+01	6.41−02	1.73−01	−0.892	C+	LS
315	$2p^2(^1D)3s-2p^2(^3P)3p$	$^2D-^2D^\circ$	*5 850*	*5 854*	*1 331 638–1 348 720*	10–10	1.81−02	9.30−03	1.79+00	−1.032	B	1
			5 968	5 970	1 331 970–1 348 720	6–6	1.59−02	8.51−03	1.00+00	−1.292	B+	LS
			5 687	5 688	1 331 140–1 348 720	4–4	1.77−02	8.61−03	6.45−01	−1.463	B	LS
			5 968	5 970	1 331 970–1 348 720	6–4	1.71−03	6.08−04	7.17−02	−2.438	C	LS
			5 687	5 688	1 331 140–1 348 720	4–6	1.32−03	9.57−04	7.17−02	−2.417	C	LS
316	$2p^2(^1D)3s-2p^2(^1D)3p$	$^2D-^2F^\circ$	*2 152*	*2 153*	*1 331 638–1 378 094*	10–14	1.97+00	1.92−01	1.36+01	0.283	B+	1
			2 157.8	2 158.4	1 331 970–1 378 300	6–8	1.95+00	1.82−01	7.76+00	0.038	A	LS
			2 141.6	2 142.2	1 331 140–1 377 820	4–6	1.87+00	1.93−01	5.44+00	−0.112	B+	LS
			2 180.3	2 181.0	1 331 970–1 377 820	6–6	1.26−01	9.02−03	3.89−01	−1.267	B	LS
317		$^2D-^2D^\circ$		*1 635.0*	*1 331 638–1 392 800*	10–10	3.02+00	1.21−01	6.51+00	0.083	B+	1
				1 643.93	1 331 970–1 392 800	6–6	2.76+00	1.12−01	3.64+00	−0.173	B+	LS
				1 621.80	1 331 140–1 392 800	4–4	2.79+00	1.10−01	2.35+00	−0.357	B+	LS
				1 643.93	1 331 970–1 392 800	6–4	2.97−01	8.03−03	2.61−01	−1.317	B	LS
				1 621.80	1 331 140–1 392 800	4–6	2.06−01	1.22−02	2.61−01	−1.312	B	LS
318	$2p^2(^1D)3s-2s2p(^3P^\circ)4s$	$^2D-^2P^\circ$				10–6						1
				[993.7]	1 331 970–1 432 600	6–4	2.81−01	2.77−03	5.44−02	−1.779	C	LS
				[985.6]	1 331 140–1 432 600	4–4	3.19−02	4.65−04	6.04−03	−2.730	D+	LS
319	$2p^2(^1D)3s-2s2p(^3P^\circ)4d$	$^2D-^2D^\circ$				10–10						1
				757.12	1 331 970–1 464 050	6–6	3.30−01	2.84−03	4.25−02	−1.769	C	LS
				752.39	1 331 140–1 464 050	4–6	2.40−02	3.06−04	3.03−03	−2.912	D	LS
320		$^2D-^2F^\circ$		*711.3*	*1 331 638–1 472 229*	10–14	9.81−01	1.04−02	2.44−01	−0.983	C+	1
				710.43	1 331 970–1 472 730	6–8	9.85−01	9.94−03	1.39−01	−1.224	C+	LS

TABLE 28. Transition probabilities of allowed lines for Na VII (references for this table are as follows: 1=Fernley *et al.*,[25] 2=Tachiev and Froese Fischer,[94] 3=Merkelis *et al.*,[64] 4=Galavis *et al.*, [41]and 5=Safronova *et al.*[81])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})$^{\text{a}}$	$E_i - E_k$ (cm^{-1})	$g_i - g_k$	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				712.15	1 331 140–1 471 560	4–6	9.12−01	1.04−02	9.75−02	−1.381	C+	LS
				716.38	1 331 970–1 471 560	6–6	6.41−02	4.93−04	6.98−03	−2.529	D+	LS
321		^{2}D−^{2}P$^\circ$		*702.2*	*1 331 638–1 474 050*	10–6	8.52−02	3.78−04	8.73−03	−2.423	D	1
				[705.0]	1 331 970–1 473 810	6–4	7.57−02	3.76−04	5.24−03	−2.647	D+	LS
				[697.4]	1 331 140–1 474 530	4–2	8.69−02	3.17−04	2.91−03	−2.897	D	LS
				[700.9]	1 331 140–1 473 810	4–4	8.57−03	6.31−05	5.82−04	−3.598	E+	LS
322	$2p^2(^1\text{D})3s$–$2s2p(^1\text{P}^\circ)4d$	^{2}D−^{2}F$^\circ$		*406.22*	*1 331 638–1 577 810*	10–14	6.25+00	2.17−02	2.90−01	−0.664	C+	1
				[406.77]	1 331970–1577 810	6–8	6.23+00	2.06−02	1.66−01	−0.908	C+	LS
				[405.40]	1 331 140–1 577 810	4–6	5.87+00	2.17−02	1.16−01	−1.061	C+	LS
				[406.77]	1 331 970–1 577 810	6–6	4.15−01	1.03−03	8.28−03	−2.209	D+	LS
323	$2s^24d-2p^2(^3\text{P})3p$	^{2}D−^{2}D$^\circ$	*7 750*	*7 753*	*1 335 822–1 348 720*	10–10	8.02−05	7.23−05	1.84−02	−3.141	D+	1
			7 756	7 758	1 335 830–1 348 720	6–6	7.47−05	6.74−05	1.03−02	−3.393	D+	LS
			7 744	7 746	1 335 810–1 348 720	4–4	7.24−05	6.51−05	6.64−03	−3.584	D+	LS
			7 756	7 758	1 335 830–1 348 720	6–4	8.00−06	4.81−06	7.37−04	−4.540	E+	LS
			7 744	7 746	1 335 810–1 348 720	4–6	5.36−06	7.23−06	7.37−04	−4.539	E+	LS
324	$2s^24d-2p^2(^1\text{D})3p$	^{2}D−^{2}F$^\circ$	*2 365*	*2 366*	1 335 822–1 378 094	10–14	3.16−03	3.72−04	2.90−02	−2.429	D+	1
			2 353.9	2 354.6	1 335 830–1 378 300	6–8	3.21−03	3.56−04	1.66−02	−2.670	D+	LS
			2 379.7	2 380.4	1 335 810–1 377 820	4–6	2.90−03	3.69−04	1.16−02	−2.831	D+	LS
			2 380.8	2 381.5	1 335 830–1 377 820	6–6	2.07−04	1.76−05	8.28−04	−3.976	E+	LS
325		^{2}D−^{2}D$^\circ$		*1 755.1*	*1 335 822–1 392 800*	10–10	2.37−02	1.09−03	6.32−02	−1.963	C	1
				1 755.31	1 335 830–1 392 800	6–6	2.21−02	1.02−03	3.54−02	−2.213	C	LS
				1 754.69	1 335 810–1 392 800	4–4	2.13−02	9.85−04	2.28−02	−2.405	C	LS
				1 755.31	1 335 830–1 392 800	6–4	2.37−03	7.29−05	2.53−03	−3.359	D	LS
				1 754.69	1 335 810–1 392 800	4–6	1.57−03	1.09−04	2.52−03	−3.361	D	LS
326	$2s^24d-2s2p(^3\text{P}^\circ)4s$	^{2}D−^{2}P$^\circ$				10–6						1
				[1 033.4]	1 335 830–1 432 600	6–4	5.21−01	5.56−03	1.13−01	−1.477	C+	LS
				[1 033.2]	1 335 810–1 432 600	4–4	5.79−02	9.26−04	1.26−02	−2.431	D+	LS
327	$2s^24d-2s2p(^3\text{P}^\circ)4d$	^{2}D−^{2}F$^\circ$		*733.1*	*1 335 822–1 472 229*	10–14	4.42+00	4.98−02	1.20+00	−0.303	B	1
				730.46	1 335 830–1 472 730	6–8	4.46+00	4.76−02	6.87−01	−0.544	B	LS
				736.65	1 335 810–1 471 560	4–6	4.06+00	4.96−02	4.81−01	−0.702	B	LS
				736.76	1 335 830–1 471 560	6–6	2.90−01	2.36−03	3.43−02	−1.849	C	LS
328	$2s^24d-2s2p(^1\text{P}^\circ)4s$	^{2}D−^{2}P$^\circ$		*492.30*	*1 335 822–1 538 950*	10–6	1.91−01	4.16−04	6.74−03	−2.381	D	1
				[492.32]	1 335 830–1 538 950	6–4	1.72−01	4.16−04	4.05−03	−2.603	D	LS
				[492.27]	1 335 810–1 538 950	4–2	1.91−01	3.47−04	2.25−03	−2.858	D	LS
				[492.27]	1 335 810–1 538 950	4–4	1.91−02	6.93−05	4.49−04	−3.557	E+	LS
329	$2s^24d-2s2p(^1\text{P}^\circ)4d$	^{2}D−^{2}F$^\circ$		*413.24*	*1 335 822–1 577 810*	10–14	4.93+01	1.77−01	2.40+00	0.248	B+	1
				[413.26]	1 335 830–1 577 810	6–8	4.92+01	1.68−01	1.37+00	0.003	B+	LS
				[413.22]	1 335 810–1 577 810	4–6	4.61+01	1.77−01	9.63−01	−0.150	B+	LS
				[413.26]	1 335 830–1 577 810	6–6	3.29+00	8.42−03	6.87−02	−1.297	C	LS
330	$2s^24d-2s2p(^3\text{P}^\circ)5d$	^{2}D−^{2}F$^\circ$		*388.16*	*1 335 822–1 593 449*	10–14	4.15−01	1.31−03	1.68−02	−1.883	D+	1
				387.462	1 335 830–1 593 920	6–8	4.17−01	1.25−03	9.57−03	−2.125	D+	LS
				389.090	1 335 810–1 592 820	4–6	3.85−01	1.31−03	6.71−03	−2.281	D+	LS
				389.120	1 335 830–1 592 820	6–6	2.74−02	6.22−05	4.78−04	−3.428	E+	LS

TABLE 28. Transition probabilities of allowed lines for Na VII (references for this table are as follows: 1=Fernley *et al.*,[25] 2=Tachiev and Froese Fischer,[94] 3=Merkelis *et al.*,[64] 4=Galavis *et al.*, [41]and 5=Safronova *et al.*[81])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
331	$2p^2(^3P)3p$ $-2p^2(^3P)3d$	$^4P^{\circ}-^4P$				12–12						1
				1 844.3	1 344 830–1 399 050	6–6	1.02+00	5.22−02	1.90+00	−0.504	B+	LS
				1 826.5	1 344 830–1 399 580	6–4	6.78−01	2.26−02	8.15−01	−0.868	B	LS
332		$^2D^{\circ}-^2F$	*2 496*	*2 497*	*1 348 720–1 388 769*	10–14	9.16−01	1.20−01	9.86+00	0.079	B+	1
			[2 484]	[2 484]	1 348 720–1 388 970	6–8	9.32−01	1.15−01	5.64+00	−0.161	B+	LS
			[2 513]	[2 514]	1 348 720–1 388 500	4–6	8.37−01	1.19−01	3.94+00	−0.322	B+	LS
			[2 513]	[2 514]	1 348 720–1 388 500	6–6	6.00−02	5.68−03	2.82−01	−1.468	B	LS
333		$^2D^{\circ}-^2D$	*2 396*	*2 396*	*1 348 720–1 390 450*	10–10	1.86−01	1.60−02	1.26+00	−0.796	B	1
			[2 396]	[2 396]	1 348 720–1 390 450	6–6	1.73−01	1.49−02	7.05−01	−1.049	B	LS
			[2 396]	[2 396]	1 348 720–1 390 450	4–4	1.67−01	1.44−02	4.54−01	−1.240	B	LS
			[2 396]	[2 396]	1 348 720–1 390 450	6–4	1.85−02	1.06−03	5.02−02	−2.197	C	LS
			[2 396]	[2 396]	1 348 720–1 390 450	4–6	1.24−02	1.60−03	5.05−02	−2.194	C	LS
334		$^4S^{\circ}-^4P$	*2 745*	*2 746*	1 362 950–*1 399 363*	4–12	3.86−01	1.31−01	4.73+00	−0.281	B+	1
			2 769.3	2 770.1	1 362 950–1 399 050	4–6	3.76−01	6.49−02	2.37+00	−0.586	B+	LS
			2 729.2	2 730.0	1 362 950–1 399 580	4–4	3.93−01	4.39−02	1.58+00	−0.755	B+	LS
			2 707.8	2 708.6	1 362 950–1 399 870	4–2	4.02−01	2.21−02	7.88−01	−1.054	B	LS
335	$2p^2(^3P)3p$ $-2p^2(^1D)3d$	$^2D^{\circ}-^2D$		*1 494.5*	*1 348 720–1 415 630*	10–10	9.22−01	3.09−02	1.52+00	−0.510	B	1
				1 494.54	1 348 720–1 415 630	6–6	8.60−01	2.88−02	8.50−01	−0.762	B	LS
				1 494.54	1 348 720–1 415 630	4–4	8.30−01	2.78−02	5.47−01	−0.954	B	LS
				1 494.54	1 348 720–1 415 630	6–4	9.23−02	2.06−03	6.08−02	−1.908	C	LS
				1 494.54	1 348 720–1 415 630	4–6	6.15−02	3.09−03	6.08−02	−1.908	C	LS
336		$^2D^{\circ}-^2F$		*1 249.3*	*1 348 720–1 428 766*	10–14	3.64−02	1.19−03	4.91−02	−1.924	C	1
				1 248.75	1 348 720–1 428 800	6–8	3.66−02	1.14−03	2.81−02	−2.165	C	LS
				1 250.00	1 348 720–1 428 720	4–6	3.39−02	1.19−03	1.96−02	−2.322	C	LS
				1 250.00	1 348 720–1 428 720	6–6	2.43−03	5.69−05	1.40−03	−3.467	D	LS
337		$^2D^{\circ}-^2P$		*1 194.3*	*1 348 720–1 432 453*	10–6	5.85−01	7.50−03	2.95−01	−1.125	C+	1
				1 192.04	1 348 720–1 432 610	6–4	5.30−01	7.52−03	1.77−01	−1.346	C+	LS
				1 198.75	1 348 720–1 432 140	4–2	5.78−01	6.23−03	9.83−02	−1.603	C+	LS
				1 192.04	1 348 720–1 432 610	4–4	5.87−02	1.25−03	1.96−02	−2.301	C	LS
338	$2p^2(^3P)3p-$ $2s2p(^3P^{\circ})4p$	$^2D^{\circ}-^2P$		*1 060.5*	*1 348 720–1 443 017*	10–6	1.45+00	1.47−02	5.13−01	−0.833	C+	1
				1 058.76	1 348 720–1 443 170	6–4	1.31+00	1.47−02	3.07−01	−1.055	B	LS
				1 063.94	1 348 720–1 442 710	4–2	1.44+00	1.22−02	1.71−01	−1.312	C+	LS
				1 058.76	1 348 720–1 443 170	4–4	1.46−01	2.45−03	3.42−02	−2.009	C	LS
339		$^2D^{\circ}-^2D$		*960.3*	*1 348 720–1 452 850*	10–10	8.93−02	1.23−03	3.90−02	−1.910	D+	1
				955.75	1 348 720–1 453 350	6–6	8.47−02	1.16−03	2.19−02	−2.157	C	LS
				967.31	1 348 720–1 452 100	4–4	7.84−02	1.10−03	1.40−02	−2.357	D+	LS
				967.31	1 348 720–1 452 100	6–4	8.73−03	8.16−05	1.56−03	−3.310	D	LS
				955.75	1 348 720–1 453 350	4–6	6.04−03	1.24−04	1.56−03	−3.305	D	LS
340	$2p^2(^3P)3p-$ $2s2p(^3P^{\circ})5p$	$^2D^{\circ}-^2P$		*435.48*	*1 348 720–1 578 350*	10–6	1.34+00	2.28−03	3.27−02	−1.642	D+	1
				435.483	1 348 720–1 578 350	6–4	1.20+00	2.28−03	1.96−02	−1.864	C	LS

TABLE 28. Transition probabilities of allowed lines for Na VII (references for this table are as follows: 1=Fernley *et al.*,[25] 2=Tachiev and Froese Fischer,[94] 3=Merkelis *et al.*,[64] 4=Galavis *et al.*, [41]and 5=Safronova *et al.*[81])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				435.483	1 348 720–1 578 350	4–2	1.34+00	1.90−03	1.09−02	−2.119	D+	LS
				435.483	1 348 720–1 578 350	4–4	1.34−01	3.80−04	2.18−03	−2.818	D	LS
341	$2p^2(^3P)3p$ $-2p^2(^3P)4d$	$^4D^\circ-^4P$				20–12						1
				303.150	1 338 450–1 668 320	8–6	2.54+00	2.62−03	2.09−02	−1.679	C	LS
342		$^4P^\circ-^4P$				12–12						1
				309.129	1 344 830–1 668 320	6–6	4.43+01	6.35−02	3.88−01	−0.419	B	LS
				308.556	1 344 830–1 668 920	6–4	2.87+01	2.73−02	1.66−01	−0.786	C+	LS
343		$^4S^\circ-^4P$				4–12						1
				327.472	1 362 950–1 668 320	4–6	8.87+01	2.14−01	9.23−01	−0.068	B+	LS
				326.829	1 362 950–1 668 920	4–4	8.93+01	1.43−01	6.15−01	−0.243	B	LS
344	$2p^2(^1D)3p$ $-2p^2(^3P)3d$	$^2F^\circ-^2F$	*9 370*	*9 368*	*1 378 094–1 388 769*	14–14	1.80−03	2.38−03	1.03+00	−1.477	B	1
			[9 370]	[9 372]	1 378 300–1 388 970	8–8	1.59−03	2.10−03	5.18−01	−1.775	B	LS
			[9 361]	[9 363]	1 377 820–1 388 500	6–6	1.93−03	2.54−03	4.70−01	−1.817	B	LS
			[9 801]	[9 804]	1 378 300–1 388 500	8–6	6.87−05	7.42−05	1.92−02	−3.227	C	LS
			[8 966]	[8 969]	1 377 820–1 388 970	6–8	6.72−05	1.08−04	1.91−02	−3.188	C	LS
345		$^2F^\circ-^2D$	*8 090*	*8 093*	*1 378 094–1 390 450*	14–10	8.91−04	6.25−04	2.33−01	−2.058	C+	1
			[8 228]	[8 230]	1 378 300–1 390 450	8–6	8.06−04	6.14−04	1.33−01	−2.309	C+	LS
			[7 915]	[7 918]	1 377 820–1 390 450	6–4	9.51−04	5.96−04	9.32−02	−2.447	C+	LS
			[7 915]	[7 918]	1 377 820–1 390 450	6–6	4.53−05	4.26−05	6.66−03	−3.592	D+	LS
346	$2p^2(^1D)3p$ $-2p^2(^1D)3d$	$^2F^\circ-^2D$	*2 663*	*2 664*	*1 378 094–1 415 630*	14–10	1.34−01	1.02−02	1.25+00	−0.845	B	1
			2 678.0	2 678.8	1 378 300–1 415 630	8–6	1.25−01	1.01−02	7.13−01	−1.093	B	LS
			2 644.0	2 644.8	1 377 820–1 415 630	6–4	1.37−01	9.56−03	4.99−01	−1.241	B	LS
			2 644.0	2 644.8	1 377 820–1 415 630	6–6	6.51−03	6.83−04	3.57−02	−2.387	C	LS
347		$^2F^\circ-^2F$		*1 973*	*1 378 094–1 428 766*	14–14	5.65−01	3.30−02	3.00+00	−0.335	B+	1
				1 980.2	1 378 300–1 428 800	8–8	4.95−01	2.91−02	1.52+00	−0.633	B+	LS
				1 964.6	1 377 820–1 428 720	6–6	6.12−01	3.54−02	1.37+00	−0.673	B+	LS
				1 983.3	1 378 300–1 428 720	8–6	2.42−02	1.07−03	5.59−02	−2.068	C	LS
				1 961.6	1 377 820–1 428 800	6–8	1.89−02	1.45−03	5.62−02	−2.060	C	LS
348		$^2D^\circ-^2D$	*4 379*	*4 380*	*1 392 800–1 415 630*	10–10	4.69−02	1.35−02	1.94+00	−0.870	B	1
			4 379.0	4 380.2	1 392 800–1 415 630	6–6	4.38−02	1.26−02	1.09+00	−1.121	B+	LS
			4 379.0	4 380.2	1 392 800–1 415 630	4–4	4.21−02	1.21−02	6.98−01	−1.315	B	LS
			4 379.0	4 380.2	1 392 800–1 415 630	6–4	4.68−03	8.98−04	7.77−02	−2.269	C	LS
			4 379.0	4 380.2	1 392 800–1 415 630	4–6	3.13−03	1.35−03	7.79−02	−2.268	C	LS
349		$^2D^\circ-^2F$	*2 780*	*2 780*	*1 392 800–1 428 766*	10–14	5.91−01	9.59−02	8.78+00	−0.018	B+	1
			2 777.0	2 777.8	1 392 800–1 428 800	6–8	5.93−01	9.14−02	5.01+00	−0.261	B+	LS
			2 783.1	2 784.0	1 392 800–1 428 720	4–6	5.50−01	9.58−02	3.51+00	−0.417	B+	LS
			2 783.1	2 784.0	1 392 800–1 428 720	6–6	3.92−02	4.56−03	2.51−01	−1.563	B	LS
350		$^2D^\circ-^2P$	*2 521*	*2 522*	*1 392 800–1 432 453*	10–6	1.77−01	1.02−02	8.43−01	−0.991	B	1
			2 511.2	2 511.9	1 392 800–1 432 610	6–4	1.62−01	1.02−02	5.06−01	−1.213	B	LS
			2 541.2	2 541.9	1 392 800–1 432 140	4–2	1.73−01	8.38−03	2.81−01	−1.475	B	LS
			2 511.2	2 511.9	1 392 800–1 432 610	4–4	1.80−02	1.70−03	5.62−02	−2.167	C	LS

TABLE 28. Transition probabilities of allowed lines for Na VII (references for this table are as follows: 1=Fernley *et al.*,[25] 2=Tachiev and Froese Fischer,[94] 3=Merkelis *et al.*,[64] 4=Galavis *et al.*, [41]and 5=Safronova *et al.*[81])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} ($10^8\ s^{-1}$)	f_{ik}	S (a.u.)	log gf	Acc.	Source
351	$2p^2(^1D)3p-2s2p(^3P^\circ)4p$	$^2F^\circ-^2D$		*1 337.7*	*1 378 094–1 452 850*	14–10	9.73−02	1.86−03	1.15−01	−1.584	C	1
				1 332.45	1 378 300–1 453 350	8–6	9.37−02	1.87−03	6.56−02	−1.825	C	LS
				1 346.26	1 377 820–1 452 100	6–4	9.55−02	1.73−03	4.60−02	−1.984	C	LS
				1 323.98	1 377 820–1 453 350	6–6	4.79−03	1.26−04	3.30−03	−3.121	D	LS
352		$^2D^\circ-^2P$		*1 991*	*1 392 800–1 443 017*	10–6	5.06−02	1.81−03	1.18−01	−1.742	C	1
				1 985.3	1 392 800–1 443 170	6–4	4.59−02	1.81−03	7.10−02	−1.964	C	LS
			2 003.0	2 003.6	1 392 800–1 442 710	4–2	4.98−02	1.50−03	3.96−02	−2.222	C	LS
				1 985.3	1 392 800–1 443 170	4–4	5.11−03	3.02−04	7.90−03	−2.918	D+	LS
353		$^2D^\circ-^2D$		*1 665.3*	*1 392 800–1 452 850*	10–10	2.40−02	9.98−04	5.47−02	−2.001	C	1
				1 651.53	1 392 800–1 453 350	6–6	2.30−02	9.39−04	3.06−02	−2.249	C	LS
				1 686.34	1 392 800–1 452 100	4–4	2.08−02	8.87−04	1.97−02	−2.450	C	LS
				1 686.34	1 392 800–1 452 100	6–4	2.31−03	6.57−05	2.19−03	−3.404	D	LS
				1 651.53	1 392 800–1 453 350	4–6	1.65−03	1.01−04	2.20−03	−3.394	D	LS
354	$2p^2(^1D)3p-2s^25d$	$^2F^\circ-^2D$		*1 198.1*	*1 378 094–1 461 562*	14–10	4.51−02	6.93−04	3.83−02	−2.013	C	1
				1 200.62	1 378 300–1 461 590	8–6	4.27−02	6.92−04	2.19−02	−2.257	C	LS
				1 194.74	1 377 820–1 461 520	6–4	4.55−02	6.49−04	1.53−02	−2.410	D+	LS
				1 193.74	1 377 820–1 461 590	6–6	2.17−03	4.64−05	1.09−03	−3.555	E+	LS
355	$2p^2(^1D)3p-2s2p(^3P^\circ)5p$	$^2F^\circ-^2D$		*486.27*	*1 378 094–1 583 740*	14–10	2.25−01	5.69−04	1.27−02	−2.099	D+	1
				486.760	1 378 300–1 583 740	8–6	2.13−01	5.68−04	7.28−03	−2.343	D+	LS
				485.625	1 377 820–1 583 740	6–4	2.26−01	5.32−04	5.10−03	−2.496	D+	LS
				485.625	1 377 820–1 583 740	6–6	1.07−02	3.80−05	3.65−04	−3.642	E+	LS
356		$^2D^\circ-^2P$		*538.94*	*1 392 800–1 578 350*	10–6	6.51−01	1.70−03	3.02−02	−1.770	D+	1
				538.938	1 392 800–1 578 350	6–4	5.86−01	1.70−03	1.81−02	−1.991	C	LS
				538.938	1 392 800–1 578 350	4–2	6.52−01	1.42−03	1.01−02	−2.246	D+	LS
				538.938	1 392 800–1 578 350	4–4	6.50−02	2.83−04	2.01−03	−2.946	D	LS
357		$^2D^\circ-^2D$		*523.72*	*1 392 800–1 583 740*	10–10	2.31−01	9.51−04	1.64−02	−2.022	D+	1
				523.725	1 392 800–1 583 740	6–6	2.16−01	8.87−04	9.18−03	−2.274	D+	LS
				523.725	1 392 800–1 583 740	4–4	2.08−01	8.56−04	5.90−03	−2.465	D+	LS
				523.725	1 392 800–1 583 740	6–4	2.31−02	6.34−05	6.56−04	−3.420	E+	LS
				523.725	1 392 800–1 583 740	4–6	1.54−02	9.51−05	6.56−04	−3.420	E+	LS
358	$2p^2(^3P)3d-2p^2(^1D)3p$	$^2F-^2D^\circ$		*4 031* cm^{-1}	*1 388 769–1 392 800*	14–10	1.03−05	6.76−05	7.72−02	−3.024	C	1
				[3 830] *cm*$^{-1}$	1 388 970–1 392 800	8–6	8.36−06	6.41−05	4.41−02	−3.290	C	LS
				[4 300] cm^{-1}	1 388 500–1 392 800	6–4	1.24−05	6.72−05	3.09−02	−3.394	C	LS
				[4 300] cm^{-1}	1 388 500–1 392 800	6–6	5.92+01	4.80−06	2.20−03	−4.541	D	LS
359		$^2D-^2D^\circ$		*2 350* cm^{-1}	*1 390 450–1 392 800*	10–10	2.15−05	5.84−04	8.18−01	−2.234	B	1
				[2 350] cm^{-1}	1 390 450–1 392 800	6–6	2.01−05	5.45−04	4.58−01	−2.485	B	LS
				[2 350] cm^{-1}	1 390 450–1 392 800	4–4	1.94−05	5.26−04	2.95−01	−2.677	B	LS
				[2 350] cm^{-1}	1 390 450–1 392 800	6–4	2.15−06	3.89−05	3.27−02	−3.632	C	LS
				[2 350] cm^{-1}	1 390 450–1 392 800	4–6	1.43−06	5.84−05	3.27−02	−3.632	C	LS
360	$2p^2(^3P)3d-2s2p(^3P^\circ)4s$	$^2D-^2P^\circ$				10–6						1

TABLE 28. Transition probabilities of allowed lines for Na VII (references for this table are as follows: 1=Fernley *et al.*,[25] 2=Tachiev and Froese Fischer,[94] 3=Merkelis *et al.*,[64] 4=Galavis *et al.*, [41]and 5=Safronova *et al.*[81])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
			[2 372]	[2 372]	1 390 450–1 432 600	6–4	1.64−02	9.25−04	4.33−02	−2.256	C	LS
			[2 372]	[2 372]	1 390 450–1 432 600	4–4	1.82−03	1.54−04	4.81−03	−3.210	D	LS
361		^{4}P−^{4}P$^\circ$				12–12						1
			4 197.0	4 198.2	1 399 050–1 422 870	6–6	2.26−03	5.96−04	4.94−02	−2.447	C	LS
			4 292.5	4 293.7	1 399 580–1 422 870	4–6	9.05−04	3.75−04	2.12−02	−2.824	C	LS
362	$2p^2(^3\mathrm{P})3d$– $2s2p(^3\mathrm{P}^\circ)4d$	^{2}F−^{2}D$^\circ$				14–10						1
				[1 331.9]	1 388 970–1 464 050	8–6	2.44−01	4.87−03	1.71−01	−1.409	C+	LS
				[1 323.6]	1 388 500–1 464 050	6–6	1.24−02	3.27−04	8.55−03	−2.707	D+	LS
363		^{2}F−^{2}F$^\circ$		*1 198.2*	*1 388 769–1 472 229*	14–14	5.34−02	1.15−03	6.35−02	−1.793	C	1
				[1 193.9]	1 388 970–1 472 730	8–8	4.77−02	1.02−03	3.21−02	−2.088	C	LS
				[1 204.0]	1 388 500–1 471 560	6–6	5.61−02	1.22−03	2.90−02	−2.135	C	LS
				[1 210.8]	1 388 970–1 471 560	8–6	2.26−03	3.72−05	1.19−03	−3.526	D	LS
				[1 187.2]	1 388 500–1 472 730	6–8	1.79−03	5.05−05	1.18−03	−3.519	D	LS
364		^{2}D−^{2}D$^\circ$				10–10						1
				[1 358.7]	1 390 450–1 464 050	6–6	4.19−02	1.16−03	3.11−02	−2.157	C	LS
				[1 358.7]	1 390 450–1 464 050	4–6	2.99−03	1.24−04	2.22−03	−3.305	D	LS
365		^{2}D−^{2}F$^\circ$		*1 222.8*	*1 390 450–1 472 229*	10–14	1.16+00	3.63−02	1.46+00	−0.440	B	1
				[1 215.4]	1 390 450–1 472 730	6–8	1.18+00	3.48−02	8.35−01	−0.680	B	LS
				[1 232.9]	1 390 450–1 471 560	4–6	1.05+00	3.60−02	5.84−01	−0.842	B	LS
				[1 232.9]	1 390 450–1 471 560	6–6	7.50−02	1.71−03	4.16−02	−1.989	C	LS
366		^{2}D−^{2}P$^\circ$		*1 196.2*	*1 390 450–1 474 050*	10–6	1.21+00	1.55−02	6.12−01	−0.810	B	1
				[1 199.6]	1 390 450–1 473 810	6–4	1.08+00	1.55−02	3.67−01	−1.032	B	LS
				[1 189.3]	1 390 450–1 474 530	4–2	1.23+00	1.30−02	2.04−01	−1.284	C+	LS
				[1 199.6]	1 390 450–1 473 810	4–4	1.20−01	2.59−03	4.09−02	−1.985	C	LS
367		^{4}P−^{4}D$^\circ$				12–20						1
				1 557.63	1 399 050–1 463 250	6–8	1.52−01	7.35−03	2.26−01	−1.356	C+	LS
				1 591.34	1 399 580–1 462 420	4–6	9.94−02	5.66−03	1.19−01	−1.645	C+	LS
				1 599.74	1 399 870–1 462 380	2–4	5.83−02	4.47−03	4.71−02	−2.049	C	LS
				1 578.03	1 399 050–1 462 420	6–6	4.37−02	1.63−03	5.08−02	−2.010	C	LS
				1 592.36	1 399 580–1 462 380	4–4	7.58−02	2.88−03	6.04−02	−1.939	C	LS
				1 579.03	1 399 050–1 462 380	6–4	7.26−03	1.81−04	5.65−03	−2.964	D+	LS
368		^{4}P−^{4}P$^\circ$				12–12						1
				1 519.76	1 399 050–1 464 850	6–6	4.04−02	1.40−03	4.20−02	−2.076	C	LS
				1 532.10	1 399 580–1 464 850	4–6	1.69−02	8.91−04	1.80−02	−2.448	C	LS
369	$2p^2(^3\mathrm{P})3d$– $2s2p(^1\mathrm{P}^\circ)4d$	^{2}D−^{2}F$^\circ$		*533.73*	*1 390 450–1 577 810*	10–14	3.37−02	2.01−04	3.54−03	−2.697	D	1
				[533.73]	1 390 450–1 577 810	6–8	3.37−02	1.92−04	2.02−03	−2.939	D	LS
				[533.73]	1 390 450–1 577 810	4–6	3.14−02	2.01−04	1.41−03	−3.095	D	LS
				[533.73]	1 390 450–1 577 810	6–6	2.25−03	9.59−06	1.01−04	−4.240	E	LS
370	$2p^2(^3\mathrm{P})3d$– $2s2p(^3\mathrm{P}^\circ)5d$	^{2}D−^{2}F$^\circ$		*492.61*	*1 390 450–1 593 449*	10–14	8.96−02	4.57−04	7.41−03	−2.340	D	1
				[491.47]	1 390 450–1 593 920	6–8	9.03−02	4.36−04	4.23−03	−2.582	D	LS
				[494.14]	1 390 450–1 592 820	4–6	8.29−02	4.55−04	2.96−03	−2.740	D	LS

TABLE 28. Transition probabilities of allowed lines for Na VII (references for this table are as follows: 1=Fernley *et al.*,[25] 2=Tachiev and Froese Fischer,[94] 3=Merkelis *et al.*,[64] 4=Galavis *et al.*, [41]and 5=Safronova *et al.*[81])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})$^{\text{a}}$	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				[494.14]	1 390 450–1 592 820	6–6	5.93−03	2.17−05	2.12−04	−3.885	E+	LS
371		^{4}P−^{4}D$^\circ$		*526.57*	*1 399 363–1 589 270*	12–20	6.19−02	4.29−04	8.93−03	−2.288	D	1
				525.707	1 399 050–1 589 270	6–8	6.23−02	3.44−04	3.57−03	−2.685	D	LS
				527.176	1 399 580–1 589 270	4–6	4.32−02	2.70−04	1.87−03	−2.967	D	LS
				527.983	1 399 870–1 589 270	2–4	2.56−02	2.14−04	7.44−04	−3.369	E+	LS
				525.707	1 399 050–1 589 270	6–6	1.87−02	7.74−05	8.04−04	−3.333	E+	LS
				527.176	1 399 580–1 589 270	4–4	3.29−02	1.37−04	9.51−04	−3.261	E+	LS
				527.983	1 399 870–1 589 270	2–2	5.12−02	2.14−04	7.44−04	−3.369	E+	LS
				525.707	1 399 050–1 589 270	6–4	3.11−03	8.60−06	8.93−05	−4.287	E	LS
				527.176	1 399 580–1 589 270	4–2	1.03−02	2.14−05	1.49−04	−4.068	E	LS
372		^{4}P−^{4}P$^\circ$		*524.42*	*1 399 363–1 590 050*	12–12	4.50−02	1.86−04	3.84−03	−2.651	E+	1
				523.560	1 399 050–1 590 050	6–6	3.16−02	1.30−04	1.34−03	−3.108	D	LS
				525.017	1 399 580–1 590 050	4–4	5.98−03	2.47−05	1.71−04	−4.005	E	LS
				525.818	1 399 870–1 590 050	2–2	7.45−03	3.09−05	1.07−04	−4.209	E	LS
				523.560	1 399 050–1 590 050	6–4	2.04−02	5.58−05	5.77−04	−3.475	E+	LS
				525.017	1 399 580–1 590 050	4–2	3.74−02	7.73−05	5.34−04	−3.510	E+	LS
				525.017	1 399 580–1 590 050	4–6	1.35−02	8.35−05	5.77−04	−3.476	E+	LS
				525.818	1 399 870–1 590 050	2–4	1.86−02	1.54−04	5.33−04	−3.511	E+	LS
373	$2p^2(^3\text{P})3d$ $-2p^2(^3\text{P})4p$	^{4}P−^{4}D$^\circ$				12–20						1
				404.760	1 399 050–1 646 110	6–8	9.59−01	3.14−03	2.51−02	−1.725	C	LS
				405.630	1 399 580–1 646 110	4–6	6.68−01	2.47−03	1.32−02	−2.005	D+	LS
				406.108	1 399 870–1 646 110	2–4	3.96−01	1.96−03	5.24−03	−2.407	D+	LS
				404.760	1 399 050–1 646 110	6–6	2.88−01	7.07−04	5.65−03	−2.372	D+	LS
				405.630	1 399 580–1 646 110	4–4	5.07−01	1.25−03	6.68−03	−2.301	D+	LS
				404.760	1 399 050–1 646 110	6–4	4.79−02	7.85−05	6.28−04	−3.327	E+	LS
374	$2p^2(^3\text{P})3d$– $2s2p(^3\text{P}^\circ)6d$	^{4}P−^{4}D$^\circ$		*387.36*	*1 399 363–1 657 520*	12–20	2.17−01	8.14−04	1.25−02	−2.010	D	1
				386.892	1 399 050–1 657 520	6–8	2.18−01	6.52−04	4.98−03	−2.408	D	LS
				387.687	1 399 580–1 657 520	4–6	1.52−01	5.13−04	2.62−03	−2.688	D	LS
				388.123	1 399 870–1 657 520	2–4	8.99−02	4.06−04	1.04−03	−3.090	E+	LS
				386.892	1 399 050–1 657 520	6–6	6.55−02	1.47−04	1.12−03	−3.055	D	LS
				387.687	1 399 580–1 657 520	4–4	1.15−01	2.60−04	1.33−03	−2.983	D	LS
				388.123	1 399 870–1 657 520	2–2	1.80−01	4.06−04	1.04−03	−3.090	E+	LS
				386.892	1 399 050–1 657 520	6–4	1.09−02	1.63−05	1.25−04	−4.010	E	LS
				387.687	1 399 580–1 657 520	4–2	3.61−02	4.07−05	2.08−04	−3.788	E+	LS
375	$2p^2(^1\text{D})3d$– $2s2p(^3\text{P}^\circ)4s$	^{2}D−^{2}P$^\circ$				10–6						1
			[5 891]	[5 893]	1 415 630–1 432 600	6–4	2.79−04	9.67−05	1.13−02	−3.236	D+	LS
			[5 891]	[5 893]	1 415 630–1 432 600	4–4	3.09−05	1.61−05	1.25−03	−4.191	D	LS
376		^{2}P−^{2}P$^\circ$				6–6						1
				[460]	1 432 140–1 432 600	2–4	4.18−07	5.92−04	8.47−01	−2.927	B	LS
377	$2p^2(^1\text{D})3d$– $2s2p(^3\text{P}^\circ)4d$	^{2}D−^{2}D$^\circ$				10–10						1
			2 064.6	2 065.3	1 415 630–1 464 050	6–6	2.55−03	1.63−04	6.65−03	−3.010	D+	LS
			2 064.6	2 065.3	1 415 630–1 464 050	4–6	1.81−04	1.74−05	4.73−04	−4.157	E+	LS
378		^{2}D−^{2}F$^\circ$		*1 766.8*	*1 415 630–1 472 229*	10–14	1.14−01	7.46−03	4.34−01	−1.127	C+	1

TABLE 28. Transition probabilities of allowed lines for Na VII (references for this table are as follows: 1=Fernley *et al.*,[25] 2=Tachiev and Froese Fischer,[94] 3=Merkelis *et al.*,[64] 4=Galavis *et al.*, [41]and 5=Safronova *et al.*[81])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^{a}	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				1 751.31	1 415 630–1 472 730	6–8	1.17−01	7.17−03	2.48−01	−1.366	B	LS
				1 787.9	1 415 630–1 471 560	4–6	1.03−01	7.37−03	1.74−01	−1.530	C+	LS
				1 787.9	1 415 630–1 471 560	6–6	7.32−03	3.51−04	1.24−02	−2.677	D+	LS
379		^{2}D−^{2}P$^\circ$		*1 711.7*	*1 415 630–1 474 050*	10–6	3.82−02	1.01−03	5.67−02	−1.996	C	1
				[1 718.8]	1 415 630–1 473 810	6–4	3.39−02	1.00−03	3.40−02	−2.222	C	LS
				[1 697.8]	1 415 630–1 474 530	4–2	3.92−02	8.47−04	1.89−02	−2.470	C	LS
				[1 718.8]	1 415 630–1 473 810	4–4	3.77−03	1.67−04	3.78−03	−3.175	D	LS
380		^{2}F−^{2}D$^\circ$				14–10						1
			2 836.0	2 836.9	1 428 800–1 464 050	8–6	5.79−02	5.24−03	3.92−01	−1.378	B	LS
			2 829.6	2 830.5	1 428 720–1 464 050	6–6	2.91−03	3.50−04	1.96−02	−2.678	C	LS
381		^{2}F−^{2}F$^\circ$	*2 300*	*2 301*	*1 428 766–1 472 229*	14–14	1.35−02	1.07−03	1.14−01	−1.824	C	1
			2 275.6	2 276.3	1 428 800–1 472 730	8–8	1.23−02	9.58−04	5.74−02	−2.116	C	LS
			2 333.6	2 334.3	1 428 720–1 471 560	6–6	1.38−02	1.13−03	5.21−02	−2.169	C	LS
			2 337.9	2 338.6	1 428 800–1 471 560	8–6	5.61−04	3.45−05	2.12−03	−3.559	D	LS
			2 271.5	2 272.2	1 428 720–1 472 730	6–8	4.59−04	4.74−05	2.13−03	−3.546	D	LS
382		^{2}P−^{2}D$^\circ$				6–10						1
			3 179.7	3 180.7	1 432 610–1 464 050	4–6	5.32−01	1.21−01	5.07+00	−0.315	B+	LS
383		^{2}P−^{2}P$^\circ$	*2 403*	*2 404*	*1 432 453–1 474 050*	6–6	5.89−01	5.10−02	2.42+00	−0.514	B	1
			[2 426]	[2 427]	1 432 610–1 473 810	4–4	4.77−01	4.21−02	1.35+00	−0.774	B+	LS
			[2 358]	[2 359]	1 432 140–1 474 530	2–2	4.16−01	3.47−02	5.39−01	−1.159	B	LS
			[2 385]	[2 385]	1 432 610–1 474 530	4–2	2.01−01	8.58−03	2.70−01	−1.464	B	LS
			[2 399]	[2 400]	1 432 140–1 473 810	2–4	9.84−02	1.70−02	2.69−01	−1.469	B	LS
384	$2p^2(^1\text{D})3d$– $2s2p(^1\text{P}^\circ)4s$	^{2}D−^{2}P$^\circ$		*810.9*	*1 415 630–1 538 950*	10–6	6.35−02	3.76−04	1.00−02	−2.425	D	1
				[810.9]	1 415 630–1 538 950	6–4	5.72−02	3.76−04	6.02−03	−2.647	D+	LS
				[810.9]	1 415 630–1 538 950	4–2	6.35−02	3.13−04	3.34−03	−2.902	D	LS
				[810.9]	1 415 630–1 538 950	4–4	6.36−03	6.27−05	6.70−04	−3.601	E+	LS
385		^{2}P−^{2}P$^\circ$		*939.0*	*1 432 453–1 538 950*	6–6	1.68−01	2.22−03	4.12−02	−1.875	D+	1
				[940.4]	1 432 610–1 538 950	4–4	1.40−01	1.85−03	2.29−02	−2.131	C	LS
				[936.2]	1 432 140–1 538 950	2–2	1.13−01	1.48−03	9.12−03	−2.529	D+	LS
				[940.4]	1 432 610–1 538 950	4–2	5.57−02	3.69−04	4.57−03	−2.831	D	LS
				[936.2]	1 432 140–1 538 950	2–4	2.82−02	7.42−04	4.57−03	−2.829	D	LS
386	$2p^2(^1\text{D})3d$– $2s2p(^1\text{P}^\circ)4d$	^{2}D−^{2}F$^\circ$		*616.6*	*1 415 630–1 577 810*	10–14	6.74−01	5.38−03	1.09−01	−1.269	C	1
				[616.6]	1 415 630–1 577 810	6–8	6.74−01	5.12−03	6.24−02	−1.513	C	LS
				[616.6]	1 415 630–1 577 810	4–6	6.29−01	5.38−03	4.37−02	−1.667	C	LS
				[616.6]	1 415 630–1 577 810	6–6	4.49−02	2.56−04	3.12−03	−2.814	D	LS
387		^{2}F−^{2}F$^\circ$		*670.9*	*1 428 766–1 577 810*	14–14	5.24−02	3.54−04	1.09−02	−2.305	D	1
				[671.1]	1 428 800–1 577 810	8–8	4.62−02	3.12−04	5.51−03	−2.603	D+	LS
				[670.7]	1 428 720–1 577 810	6–6	5.60−02	3.78−04	5.01−03	−2.644	D	LS
				[671.1]	1 428 800–1 577 810	8–6	2.29−03	1.16−05	2.05−04	−4.032	E+	LS
				[670.7]	1 428 720–1 577 810	6–8	1.71−03	1.54−05	2.04−04	−4.034	E+	LS
388	$2p^2(^1\text{D})3d$– $2s2p(^3\text{P}^\circ)5d$	^{2}D−^{2}F$^\circ$		*562.4*	*1 415 630–1 593 449*	10–14	2.30−01	1.53−03	2.83−02	−1.815	D+	1

TABLE 28. Transition probabilities of allowed lines for Na VII (references for this table are as follows: 1=Fernley *et al.*,[25] 2=Tachiev and Froese Fischer,[94] 3=Merkelis *et al.*,[64] 4=Galavis *et al.*, [41]and 5=Safronova *et al.*[81])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^{a}	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				560.884	1 415 630–1 593 920	6–8	2.32−01	1.46−03	1.62−02	−2.057	D+	LS
				564.37	1 415 630–1 592 820	4–6	2.12−01	1.52−03	1.13−02	−2.216	D+	LS
				564.37	1 415 630–1 592 820	6–6	1.52−02	7.25−05	8.08−04	−3.362	E+	LS
389	$2s2p(^3P^\circ)4s$– $2s2p(^3P^\circ)4p$	$^2P^\circ-^2P$				6–6						1
			[9 458]	[9 461]	1 432 600–1 443 170	4–4	2.84−02	3.81−02	4.75+00	−0.817	B+	LS
			[9 888]	[9 891]	1 432 600–1 442 710	4–2	9.95−03	7.30−03	9.51−01	−1.535	B+	LS
390		$^2P^\circ-^2D$				6–10						1
			[4 818]	[4 819]	1 432 600–1 453 350	4–6	4.75−01	2.48−01	1.57+01	−0.003	A	LS
			[5 127]	[5 128]	1 432 600–1 452 100	4–4	6.57−02	2.59−02	1.75+00	−0.985	B+	LS
391	$2s2p(^3P^\circ)4s-2s^25d$	$^2P^\circ-^2D$				6–10						1
			[3 449]	[3 449]	1 432 600–1 461 590	4–6	1.34−01	3.59−02	1.63+00	−0.843	B+	LS
			[3 457]	[3 458]	1 432 600–1 461 520	4–4	2.22−02	3.98−03	1.81−01	−1.798	C+	LS
392	$2s2p(^3P^\circ)4s-2s^26d$	$^2P^\circ-^2D$				6–10						1
				[1 032.4]	1 432 600–1 529 460	4–6	1.83−02	4.39−04	5.97−03	−2.755	D+	LS
				[1 032.4]	1 432 600–1 529 460	4–4	3.05−03	4.87−05	6.62−04	−3.710	E+	LS
393	$2s2p(^3P^\circ)4s$– $2s2p(^1P^\circ)4p$	$^2P^\circ-^2D$				6–10						1
				[773.5]	1 432 600–1 561 890	4–6	1.43+00	1.93−02	1.97−01	−1.112	C+	LS
				[773.5]	1 432 600–1 561 890	4–4	2.39−01	2.14−03	2.18−02	−2.068	C	LS
394	$2s2p(^3P^\circ)4s$– $2s2p(^3P^\circ)5p$	$^2P^\circ-^2P$				6–6						1
				[686.1]	1 432 600–1 578 350	4–4	1.42+01	1.00−01	9.03−01	−0.398	B	LS
				[686.1]	1 432 600–1 578 350	4–2	5.67+00	2.00−02	1.81−01	−1.097	C+	LS
395		$^2P^\circ-^2D$				6–10						1
				[661.6]	1 432 600–1 583 740	4–6	9.19+00	9.05−02	7.89−01	−0.441	B	LS
				[661.6]	1 432 600–1 583 740	4–4	1.54+00	1.01−02	8.80−02	−1.394	C+	LS
396	$2s2p(^3P^\circ)4s$– $2p^2(^3P)4d$	$^4P^\circ-^4P$				12–12						1
				407.415	1 422 870–1 668 320	6–6	3.01−01	7.49−04	6.03−03	−2.347	D+	LS
				406.421	1 422 870–1 668 920	6–4	1.95−01	3.22−04	2.58−03	−2.714	D	LS
397	$2s2p(^3P^\circ)4p$– $2s2p(^3P^\circ)4d$	$^2P-^2D^\circ$				6–10						1
			4 787.9	4 789.3	1 443 170–1 464 050	4–6	2.89−01	1.49−01	9.40+00	−0.225	A	LS
398		$^2P-^2P^\circ$	*3 221*	*3 222*	*1 443 017–1 474 050*	6–6	5.00−01	7.78−02	4.95+00	−0.331	B+	1
			[3 263]	[3 264]	1 443 170–1 473 810	4–4	4.01−01	6.40−02	2.75+00	−0.592	B+	LS
			[3 142]	[3 143]	1 442 710–1 474 530	2–2	3.59−01	5.31−02	1.10+00	−0.974	B+	LS
			[3 188]	[3 189]	1 443 170–1 474 530	4–2	1.72−01	1.31−02	5.50−01	−1.281	B	LS
			[3 215]	[3 215]	1 442 710–1 473 810	2–4	8.39−02	2.60−02	5.50−01	−1.284	B	LS
399		$^2D-^2D^\circ$				10–10						1
			9 343	9 346	1 453 350–1 464 050	6–6	1.92−02	2.51−02	4.63+00	−0.822	B+	LS
			8 366	8 368	1 452 100–1 464 050	4–6	1.91−03	3.00−03	3.31−01	−1.921	B	LS

TABLE 28. Transition probabilities of allowed lines for Na VII (references for this table are as follows: 1=Fernley *et al.*,[25] 2=Tachiev and Froese Fischer,[94] 3=Merkelis *et al.*,[64] 4=Galavis *et al.*, [41]and 5=Safronova *et al.*[81])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^{a}	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
400		$^{2}\mathrm{D}-^{2}\mathrm{F}^{\circ}$	*5 159*	*5 160*	*1 452 850–1 472 229*	10–14	4.38−01	2.45−01	4.17+01	0.389	A	1
			5 158.5	5 160.0	1 453 350–1 472 730	6–8	4.40−01	2.34−01	2.39+01	0.147	A	LS
			5 137.3	5 138.7	1 452 100–1 471 560	4–6	4.14−01	2.46−01	1.66+01	−0.007	A	LS
			5 490.0	5 491.5	1 453 350–1 471 560	6–6	2.43−02	1.10−02	1.19+00	−1.180	B+	LS
401		$^{2}\mathrm{D}-^{2}\mathrm{P}^{\circ}$	*4 716*	*4 717*	*1 452 850–1 474 050*	10–6	1.55−02	3.11−03	4.83−01	−1.507	C+	1
			[4 886]	[4 888]	1 453 350–1 473 810	6–4	1.26−02	3.00−03	2.90−01	−1.745	B	LS
			[4 457]	[4 458]	1 452 100–1 474 530	4–2	1.84−02	2.74−03	1.61−01	−1.960	C+	LS
			[4 605]	[4 606]	1 452 100–1 473 810	4–4	1.67−03	5.31−04	3.22−02	−2.673	C	LS
402	$2s2p(^{3}\mathrm{P}^{\circ})4p-$ $2s2p(^{1}\mathrm{P}^{\circ})4s$	$^{2}\mathrm{P}-^{2}\mathrm{P}^{\circ}$		*1 042.4*	*1 443 017–1 538 950*	6–6	9.32−03	1.52−04	3.13−03	−3.040	E+	1
				[1 044.1]	1 443 170–1 538 950	4–4	7.71−03	1.26−04	1.73−03	−3.298	D	LS
				[1 039.1]	1 442 710–1 538 950	2–2	6.30−03	1.02−04	6.98−04	−3.690	E+	LS
				[1 044.1]	1 443 170–1 538 950	4–2	3.10−03	2.53−05	3.48−04	−3.995	E+	LS
				[1 039.1]	1 442 710–1 538 950	2–4	1.57−03	5.08−05	3.48−04	−3.993	E+	LS
403		$^{2}\mathrm{D}-^{2}\mathrm{P}^{\circ}$		*1 161.4*	*1 452 850–1 538 950*	10–6	1.80−01	2.18−03	8.35−02	−1.662	C	1
				[1 168.2]	1 453 350–1 538 950	6–4	1.59−01	2.17−03	5.01−02	−1.885	C	LS
				[1 151.4]	1 452 100–1 538 950	4–2	1.85−01	1.84−03	2.79−02	−2.133	C	LS
				[1 151.4]	1 452 100–1 538 950	4–4	1.85−02	3.67−04	5.56−03	−2.833	D+	LS
404	$2s2p(^{3}\mathrm{P}^{\circ})4p-$ $2s2p(^{1}\mathrm{P}^{\circ})4d$	$^{2}\mathrm{D}-^{2}\mathrm{F}^{\circ}$		*800.3*	*1 452 850–1 577 810*	10–14	5.31−01	7.14−03	1.88−01	−1.146	C+	1
				[803.5]	1 453 350–1 577 810	6–8	5.25−01	6.77−03	1.07−01	−1.391	C+	LS
				[795.5]	1 452 100–1 577 810	4–6	5.05−01	7.18−03	7.52−02	−1.542	C	LS
				[803.5]	1 453 350–1 577 810	6–6	3.50−02	3.39−04	5.38−03	−2.692	D+	LS
405	$2s2p(^{3}\mathrm{P}^{\circ})4p-$ $2s2p(^{3}\mathrm{P}^{\circ})5d$	$^{2}\mathrm{D}-^{2}\mathrm{F}^{\circ}$		*711.2*	*1 452 850–1 593 449*	10–14	2.59+01	2.75−01	6.45+00	0.439	B+	1
				711.39	1 453 350–1 593 920	6–8	2.59+01	2.62−01	3.68+00	0.196	B+	LS
				710.63	1 452 100–1 592 820	4–6	2.43+01	2.76−01	2.58+00	0.043	B+	LS
				717.00	1 453 350–1 592 820	6–6	1.69+00	1.30−02	1.84−01	−1.108	C+	LS
406	$2s^{2}5d-2s2p(^{3}\mathrm{P}^{\circ})4d$	$^{2}\mathrm{D}-^{2}\mathrm{D}^{\circ}$				10–10						1
				2 460 cm^{-1}	1 461 590–1 464 050	6–6	1.19−06	2.96−05	2.38−02	−3.751	C	LS
				2 530 cm^{-1}	1 461 520–1 464 050	4–6	9.31−08	3.27−06	1.70−03	−4.883	D	LS
407		$^{2}\mathrm{D}-^{2}\mathrm{F}^{\circ}$	*9 370*	*9 375*	*1 461 562–1 472 229*	10–14	1.85−02	3.42−02	1.06+01	−0.466	B+	1
			8 974	8 977	1 461 590–1 472 730	6–8	2.11−02	3.40−02	6.03+00	−0.690	A	LS
			9 957	9 960	1 461 520–1 471 560	4–6	1.44−02	3.22−02	4.22+00	−0.890	B+	LS
			10 027	10 030	1 461 590–1 471 560	6–6	1.01−03	1.52−03	3.01−01	−2.040	B	LS
408		$^{2}\mathrm{D}-^{2}\mathrm{P}^{\circ}$	*8 010*	*8 008*	*1 461 562–1 474 050*	10–6	4.02−04	2.32−04	6.11−02	−2.635	C	1
			[8 181]	[8 183]	1 461 590–1 473 810	6–4	3.39−04	2.27−04	3.67−02	−2.866	C	LS
			[7 684]	[7 686]	1 461 520–1 474 530	4–2	4.54−04	2.01−04	2.03−02	−3.095	C	LS
			[8 134]	[8 137]	1 461 520–1 473 810	4–4	3.83−05	3.80−05	4.07−03	−3.818	D	LS
409	$2s^{2}5d-2s2p(^{1}\mathrm{P}^{\circ})4d$	$^{2}\mathrm{D}-^{2}\mathrm{F}^{\circ}$		*860.2*	*1 461 562–1 577 810*	10–14	5.71−01	8.87−03	2.51−01	−1.052	C+	1
				[860.4]	1 461 590–1 577 810	6–8	5.70−01	8.44−03	1.43−01	−1.296	C+	LS
				[859.9]	1 461 520–1 577 810	4–6	5.33−01	8.87−03	1.00−01	−1.450	C+	LS
				[860.4]	1 461 590–1 577 810	6–6	3.80−02	4.22−04	7.17−03	−2.597	D+	LS
410	$2s^{2}5d-2s2p(^{3}\mathrm{P}^{\circ})5d$	$^{2}\mathrm{D}-^{2}\mathrm{F}^{\circ}$		*758.2*	*1 461 562–1 593 449*	10–14	1.52−02	1.83−04	4.57−03	−2.738	D	1

TABLE 28. Transition probabilities of allowed lines for Na VII (references for this table are as follows: 1=Fernley *et al.*,[25] 2=Tachiev and Froese Fischer,[94] 3=Merkelis *et al.*,[64] 4=Galavis *et al.*, [41]and 5=Safronova *et al.*[81])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				755.69	1 461 590–1 593 920	6–8	1.53−02	1.75−04	2.61−03	−2.979	D	LS
				761.61	1 461 520–1 592 820	4–6	1.40−02	1.82−04	1.83−03	−3.138	D	LS
				762.02	1 461 590–1 592 820	6–6	9.97−04	8.68−06	1.31−04	−4.283	E	LS
411	$2s2p(^{3}\mathrm{P}^{\circ})4d-2s^{2}6d$	$^{2}\mathrm{F}^{\circ}-{}^{2}\mathrm{D}$		*1 747.3*	*1 472 229–1 529 460*	14–10	1.38−01	4.51−03	3.63−01	−1.200	C+	1
				1 762.74	1 472 730–1 529 460	8–6	1.28−01	4.47−03	2.08−01	−1.447	C+	LS
				1 727.12	1 471 560–1 529 460	6–4	1.43−01	4.26−03	1.45−01	−1.592	C+	LS
				1 727.12	1 471 560–1 529 460	6–6	6.80−03	3.04−04	1.04−02	−2.739	D+	LS
412		$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{D}$		*1 805*	*1 474 050–1 529 460*	6–10	1.03−02	8.38−04	2.99−02	−2.299	D+	1
				[1 797]	1 473 810–1 529 460	4–6	1.04−02	7.58−04	1.79−02	−2.518	C	LS
				[1 821]	1 474 530–1 529 460	2–4	8.36−03	8.31−04	9.96−03	−2.779	D+	LS
				[1 797]	1 473 810–1 529 460	4–4	1.74−03	8.42−05	1.99−03	−3.473	D	LS
413	$2s2p(^{3}\mathrm{P}^{\circ})4d-$ $2s2p(^{1}\mathrm{P}^{\circ})4p$	$^{2}\mathrm{D}^{\circ}-{}^{2}\mathrm{D}$				10–10						1
				[1 022.1]	1 464 050–1 561 890	6–6	1.46−01	2.29−03	4.62−02	−1.862	C	LS
				[1 022.1]	1 464 050–1 561 890	6–4	1.57−02	1.64−04	3.31−03	−3.007	D	LS
414		$^{2}\mathrm{F}^{\circ}-{}^{2}\mathrm{D}$		*1 115.3*	*1 472 229–1 561 890*	14–10	6.64−02	8.85−04	4.55−02	−1.907	C	1
				[1 121.6]	1 472 730–1 561 890	8–6	6.22−02	8.80−04	2.60−02	−2.152	C	LS
				[1 107.1]	1 471 560–1 561 890	6–4	6.79−02	8.32−04	1.82−02	−2.302	C	LS
				[1 107.1]	1 471 560–1 561 890	6–6	3.23−03	5.94−05	1.30−03	−3.448	D	LS
415		$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{D}$		*1 138.4*	*1 474 050–1 561 890*	6–10	6.30−03	2.04−04	4.59−03	−2.912	D	1
				[1 135.3]	1 473 810–1 561 890	4–6	6.35−03	1.84−04	2.75−03	−3.133	D	LS
				[1 144.7]	1 474 530–1 561 890	2–4	5.17−03	2.03−04	1.53−03	−3.391	D	LS
				[1 135.3]	1 473 810–1 561 890	4–4	1.06−03	2.04−05	3.05−04	−4.088	E+	LS
416	$2s2p(^{3}\mathrm{P}^{\circ})4d-2s^{2}7d$	$^{2}\mathrm{F}^{\circ}-{}^{2}\mathrm{D}$		*1 022.0*	*1 472 229–1 570 080*	14–10	6.01−02	6.73−04	3.17−02	−2.026	E+	1
				1 027.22	1 472 730–1 570 080	8–6	5.64−02	6.69−04	1.81−02	−2.271	D	LS
				1 015.02	1 471 560–1 570 080	6–4	6.14−02	6.32−04	1.27−02	−2.421	E+	LS
				1 015.02	1 471 560–1 570 080	6–6	2.93−03	4.52−05	9.06−04	−3.567	E	LS
417	$2s2p(^{3}\mathrm{P}^{\circ})4d-$ $2s2p(^{3}\mathrm{P}^{\circ})5p$	$^{2}\mathrm{D}^{\circ}-{}^{2}\mathrm{P}$				10–6						1
				874.89	1 464 050–1 578 350	6–4	7.83+00	5.99−02	1.04+00	−0.444	B+	LS
418		$^{2}\mathrm{D}^{\circ}-{}^{2}\mathrm{D}$				10–10						1
				835.49	1 464 050–1 583 740	6–6	9.29−01	9.72−03	1.60−01	−1.234	C+	LS
				835.49	1 464 050–1 583 740	6–4	9.96−02	6.95−04	1.15−02	−2.380	D+	LS
419		$^{2}\mathrm{F}^{\circ}-{}^{2}\mathrm{D}$		*896.8*	*1 472 229–1 583 740*	14–10	8.93+00	7.69−02	3.18+00	0.032	B+	1
				900.82	1 472 730–1 583 740	8–6	8.40+00	7.66−02	1.82+00	−0.213	B+	LS
				891.42	1 471 560–1 583 740	6–4	9.09+00	7.22−02	1.27+00	−0.363	B+	LS
				891.42	1 471 560–1 583 740	6–6	4.33−01	5.16−03	9.09−02	−1.509	C+	LS
420		$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{P}$		*958.8*	*1 474 050–1 578 350*	6–6	2.62+00	3.62−02	6.85−01	−0.663	C+	1
				[956.6]	1 473 810–1 578 350	4–4	2.20+00	3.02−02	3.80−01	−0.918	B	LS
				[963.2]	1 474 530–1 578 350	2–2	1.73+00	2.40−02	1.52−01	−1.319	C+	LS
				[956.6]	1 473 810–1 578 350	4–2	8.81−01	6.04−03	7.61−02	−1.617	C	LS
				[963.2]	1 474 530–1 578 350	2–4	4.31−01	1.20−02	7.61−02	−1.620	C	LS
421		$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{D}$		*911.7*	*1 474 050–1 583 740*	6–10	4.87−01	1.01−02	1.82−01	−1.218	C	1

TABLE 28. Transition probabilities of allowed lines for Na VII (references for this table are as follows: 1=Fernley *et al.*,[25] 2=Tachiev and Froese Fischer,[94] 3=Merkelis *et al.*,[64] 4=Galavis *et al.*, [41]and 5=Safronova *et al.*[81])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})$^{\mathrm{a}}$	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				[909.7]	1 473 810–1 583 740	4–6	4.90−01	9.12−03	1.09−01	−1.438	C+	LS
				[915.7]	1 474 530–1 583 740	2–4	4.02−01	1.01−02	6.09−02	−1.695	C	LS
				[909.7]	1 473 810–1 583 740	4–4	8.14−02	1.01−03	1.21−02	−2.394	D+	LS
422	$2s2p(^3\mathrm{P}^{\circ})4d-2s^28d$	$^2\mathrm{P}^{\circ}-{}^2\mathrm{D}$		*817.3*	*1 474 050–1 596 400*	6–10	2.78−01	4.63−03	7.48−02	−1.556	D	1
				[815.7]	1 473 810–1 596 400	4–6	2.79−01	4.18−03	4.49−02	−1.777	D	LS
				[820.5]	1 474 530–1 596 400	2–4	2.28−01	4.61−03	2.49−02	−2.035	D	LS
				[815.7]	1 473 810–1 596 400	4–4	4.65−02	4.64−04	4.98−03	−2.731	E	LS
423	$2s2p(^3\mathrm{P}^{\circ})4d-2p^2(^3\mathrm{P})4d$	$^4\mathrm{D}^{\circ}-{}^4\mathrm{P}$				20–12						1
				487.638	1 463 250–1 668 320	8–6	2.25+01	6.02−02	7.73−01	−0.317	B	LS
				484.262	1 462 420–1 668 920	6–4	1.81+01	4.24−02	4.06−01	−0.594	B	LS
				485.673	1 462 420–1 668 320	6–6	5.12+00	1.81−02	1.74−01	−0.964	C+	LS
				484.168	1 462 380–1 668 920	4–4	9.19+00	3.23−02	2.06−01	−0.889	C+	LS
				485.578	1 462 380–1 668 320	4–6	5.70−01	3.02−03	1.93−02	−1.918	C	LS
424		$^4\mathrm{P}^{\circ}-{}^4\mathrm{P}$				12–12						1
				491.473	1 464 850–1 668 320	6–6	7.26+00	2.63−02	2.55−01	−0.802	B	LS
				490.028	1 464 850–1 668 920	6–4	4.71+00	1.13−02	1.09−01	−1.169	C+	LS
425	$2s^26d-2s2p(^1\mathrm{P}^{\circ})4s$	$^2\mathrm{D}-{}^2\mathrm{P}^{\circ}$	*10 530*	*10 537*	*1 529 460–1 538 950*	10–6	7.76−03	7.75−03	2.69+00	−1.111	B+	1
			[10 535]	[10 537]	1 529 460–1 538 950	6–4	6.98−03	7.75−03	1.61+00	−1.333	B+	LS
			[10 535]	[10 537]	1 529 460–1 538 950	4–2	7.76−03	6.46−03	8.96−01	−1.588	B	LS
			[10 535]	[10 537]	1 529 460–1 538 950	4–4	7.75−04	1.29−03	1.79−01	−2.287	C+	LS
426	$2s^26d-2s2p(^1\mathrm{P}^{\circ})4d$	$^2\mathrm{D}-{}^2\mathrm{F}^{\circ}$	*2 068*	*2 068*	*1 529 460–1 577 810*	10–14	1.59−01	1.43−02	9.73−01	−0.845	B	1
			[2 068]	[2 068]	1 529 460–1 577 810	6–8	1.59−01	1.36−02	5.56−01	−1.088	B	LS
			[2 068]	[2 068]	1 529 460–1 577 810	4–6	1.49−01	1.43−02	3.89−01	−1.243	B	LS
			[2 068]	[2 068]	1 529 460–1 577 810	6–6	1.06−02	6.80−04	2.78−02	−2.389	C	LS
427	$2s^26d-2s2p(^3\mathrm{P}^{\circ})5d$	$^2\mathrm{D}-{}^2\mathrm{F}^{\circ}$		*1 562.8*	*1 529 460–1 593 449*	10–14	7.97−02	4.09−03	2.10−01	−1.388	C+	1
				1 551.35	1 529 460–1 593 920	6–8	8.15−02	3.92−03	1.20−01	−1.629	C+	LS
				1 578.28	1 529 460–1 592 820	4–6	7.23−02	4.05−03	8.42−02	−1.790	C+	LS
				1 578.28	1 529 460–1 592 820	6–6	5.17−03	1.93−04	6.02−03	−2.936	D+	LS
428	$2s2p(^1\mathrm{P}^{\circ})4s-2s2p(^1\mathrm{P}^{\circ})4p$	$^2\mathrm{P}^{\circ}-{}^2\mathrm{D}$	*4 358*	*4 359*	*1 538 950–1 561 890*	6–10	6.57−01	3.12−01	2.69+01	0.272	A	1
			[4 358]	[4 359]	1 538 950–1 561 890	4–6	6.58−01	2.81−01	1.61+01	0.051	A	LS
			[4 358]	[4 359]	1 538 950–1 561 890	2–4	5.48−01	3.12−01	8.96+00	−0.205	A	LS
			[4 358]	[4 359]	1 538 950–1 561 890	4–4	1.10−01	3.12−02	1.79+00	−0.904	B+	LS
429	$2s2p(^1\mathrm{P}^{\circ})4s-2s^27d$	$^2\mathrm{P}^{\circ}-{}^2\mathrm{D}$	*3 211*	*3 212*	*1 538 950–1 570 080*	6–10	8.78−02	2.26−02	1.44+00	−0.868	C+	1
			[3 211]	[3 212]	1 538 950–1 570 080	4–6	8.79−02	2.04−02	8.63−01	−1.088	C+	LS
			[3 211]	[3 212]	1 538 950–1 570 080	2–4	7.30−02	2.26−02	4.78−01	−1.345	C	LS
			[3 211]	[3 212]	1 538 950–1 570 080	4–4	1.46−02	2.26−03	9.56−02	−2.044	D+	LS
430	$2s2p(^1\mathrm{P}^{\circ})4s-2s2p(^3\mathrm{P}^{\circ})5p$	$^2\mathrm{P}^{\circ}-{}^2\mathrm{P}$	*2 537*	*2 538*	*1 538 950–1 578 350*	6–6	6.34−02	6.12−03	3.07−01	−1.435	C+	1
			[2 537]	[2 538]	1 538 950–1 578 350	4–4	5.28−02	5.10−03	1.70−01	−1.690	C+	LS
			[2 537]	[2 538]	1 538 950–1 578 350	2–2	4.22−02	4.08−03	6.82−02	−2.088	C	LS
			[2 537]	[2 538]	1 538 950–1 578 350	4–2	2.11−02	1.02−03	3.41−02	−2.389	C	LS
			[2 537]	[2 538]	1 538 950–1 578 350	2–4	1.06−02	2.04−03	3.41−02	−2.389	C	LS

TABLE 28. Transition probabilities of allowed lines for Na VII (references for this table are as follows: 1=Fernley *et al.*,[25] 2=Tachiev and Froese Fischer,[94] 3=Merkelis *et al.*,[64] 4=Galavis *et al.*, [41]and 5=Safronova *et al.*[81])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
431		$^2P^\circ-^2D$	*2 232*	*2 233*	*1 538 950–1 583 740*	6–10	1.87−01	2.33−02	1.03+00	−0.854	B	1
			[2 232]	[2 233]	1 538 950–1 583 740	4–6	1.86−01	2.09−02	6.14−01	−1.078	B	LS
			[2 232]	[2 233]	1 538 950–1 583 740	2–4	1.56−01	2.33−02	3.43−01	−1.332	B	LS
			[2 232]	[2 233]	1 538 950–1 583 740	4–4	3.12−02	2.33−03	6.85−02	−2.031	C	LS
432	$2s2p(^1P^\circ)4s-2s^28d$	$^2P^\circ-^2D$		*1 740.6*	*1 538 950–1 596 400*	6–10	5.77−02	4.37−03	1.50−01	−1.581	D+	1
				[1 740.6]	1 538 950–1 596 400	4–6	5.77−02	3.93−03	9.01−02	−1.804	D+	LS
				[1 740.6]	1 538 950–1 596 400	2–4	4.81−02	4.37−03	5.01−02	−2.058	D	LS
				[1 740.6]	1 538 950–1 596 400	4–4	9.62−03	4.37−04	1.00−02	−2.757	E+	LS
433	$2s2p(^1P^\circ)4p-$ $2s2p(^1P^\circ)4d$	$^2D-^2F^\circ$	*6 280*	*6 281*	*1 561 890–1 577 810*	10–14	2.47−01	2.05−01	4.24+01	0.312	A	1
			[6 280]	[6 281]	1 561 890–1 577 810	6–8	2.47−01	1.95−01	2.42+01	0.068	A	LS
			[6 280]	[6 281]	1 561 890–1 577 810	4–6	2.31−01	2.05−01	1.70+01	−0.086	A	LS
			[6 280]	[6 281]	1 561 890–1 577 810	6–6	1.65−02	9.76−03	1.21+00	−1.232	B+	LS
434	$2s2p(^1P^\circ)4p-$ $2s2p(^3P^\circ)5d$	$^2D-^2F^\circ$	*3 168*	*3 169*	*1 561 890–1 593 449*	10–14	1.08−02	2.27−03	2.37−01	−1.644	C+	1
			[3 121]	[3 122]	1 561 890–1 593 920	6–8	1.13−02	2.20−03	1.36−01	−1.879	C+	LS
			[3 232]	[3 233]	1 561 890–1 592 820	4–6	9.49−03	2.23−03	9.49−02	−2.050	C+	LS
			[3 232]	[3 233]	1 561 890–1 592 820	6–6	6.76−04	1.06−04	6.77−03	−3.197	D+	LS
435	$2s^27d-2s2p(^1P^\circ)4d$	$^2D-^2F^\circ$	*12 930*	*12 937*	*1 570 080–1 577 810*	10–14	5.64−02	1.98−01	8.44+01	0.297	B+	1
			[12 933]	[12 937]	1 570 080–1 577 810	6–8	5.65−02	1.89−01	4.83+01	0.055	B+	LS
			[12 933]	[12 937]	1 570 080–1 577 810	4–6	5.26−02	1.98−01	3.37+01	−0.101	B+	LS
			[12 933]	[12 937]	1 570 080–1 577 810	6–6	3.76−03	9.44−03	2.41+00	−1.247	B	LS
436	$2s^27d-2s2p(^3P^\circ)5d$	$^2D-^2F^\circ$	*4 278*	*4 279*	*1 570 080–1 593 449*	10–14	1.01−01	3.87−02	5.45+00	−0.412	B	1
			4 193.4	4 194.6	1 570 080–1 593 920	6–8	1.07−01	3.76−02	3.12+00	−0.647	B	LS
			4 396.3	4 397.5	1 570 080–1 592 820	4–6	8.67−02	3.77−02	2.18+00	−0.822	B	LS
			4 396.3	4 397.5	1 570 080–1 592 820	6–6	6.17−03	1.79−03	1.55−01	−1.969	C	LS
437	$2s2p(^1P^\circ)4d-$ $2s2p(^3P^\circ)5p$	$^2F^\circ-^2D$	*16 860*	*16 863*	*1 577 810–1 583 740*	14–10	2.95−04	8.97−04	6.97−01	−1.901	B	1
			[16 859]	[16 863]	1 577 810–1 583 740	8–6	2.81−04	8.97−04	3.98−01	−2.144	B	LS
			[16 859]	[16 863]	1 577 810–1 583 740	6–4	2.95−04	8.38−04	2.79−01	−2.299	B	LS
			[16 859]	[16 863]	1 577 810–1 583 740	6–6	1.40−05	5.98−05	1.99−02	−3.445	C	LS
438	$2s2p(^1P^\circ)4d-2s^28d$	$^2F^\circ-^2D$	*5 378*	*5 379*	*1 577 810–1 596 400*	14–10	2.04−01	6.33−02	1.57+01	−0.052	B+	1
			[5 378]	[5 379]	1 577 810–1 596 400	8–6	1.95−01	6.33−02	8.97+00	−0.296	B+	LS
			[5 378]	[5 379]	1 577 810–1 596 400	6–4	2.04−01	5.91−02	6.28+00	−0.450	B+	LS
			[5 378]	[5 379]	1 577 810–1 596 400	6–6	9.73−03	4.22−03	4.48−01	−1.597	C	LS
439	$2s2p(^3P^\circ)5p-$ $2s2p(^3P^\circ)5d$	$^2D-^2F^\circ$	*10 300*	*10 300*	*1 583 740–1 593 449*	10–14	1.71−01	3.81−01	1.29−06	0.581	A	1
			9 820	9 823	1 583 740–1 593 920	6–8	1.98−01	3.81−01	7.39+01	0.359	A	LS
			11 010	11 013	1 583 740–1 592 820	4–6	1.31−01	3.57−01	5.18+01	0.155	A	LS
			11 010	11 013	1 583 740–1 592 820	6–6	9.35−03	1.70−02	3.70+00	−0.991	B+	LS
440	$2s2p(^3P^\circ)5d-2s^28d$	$^2F^\circ-^2D$		*2 951 cm*$^{-1}$	*1593 449–1 596 400*	14–10	8.13−04	9.94−03	1.55+01	−0.856	B+	1
				2 480 cm^{-1}	1 593 920–1 596 400	8–6	4.56−04	8.34−03	8.86+00	−1.176	B+	LS
				3 580 cm^{-1}	1 592 820–1 596 400	6–4	1.44−03	1.12−02	6.18+00	−1.173	B+	LS
				3 580 cm^{-1}	1 592 820–1 596 400	6–6	6.86−05	8.03−04	4.43−01	−2.317	C	LS

TABLE 28. Transition probabilities of allowed lines for Na VII (references for this table are as follows: 1=Fernley *et al.*,[25] 2=Tachiev and Froese Fischer,[94] 3=Merkelis *et al.*,[64] 4=Galavis *et al.*, [41]and 5=Safronova *et al.*[81])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
441	$2p^2(^3P)4p$ $-2p^2(^3P)4d$	$^4D^\circ-^4P$				20–12						1
			4 501.2	4 502.5	1 646 110–1 668 320	8–6	3.01−03	6.87−04	8.15−02	−2.260	C+	LS
			4 382.8	4 384.0	1 646 110–1 668 920	6–4	2.57−03	4.94−04	4.28−02	−2.528	C	LS
			4 501.2	4 502.5	1 646 110–1 668 320	6–6	6.78−04	2.06−04	1.83−02	−2.908	C	LS
			4 382.8	4 384.0	1 646 110–1 668 920	4–4	1.30−03	3.76−04	2.17−02	−2.823	C	LS
			4 501.2	4 502.5	1 646 110–1 668 320	4–6	7.52−05	3.43−05	2.03−03	−3.863	D	LS
442	$2s2p(^3P^\circ)6d-$ $2p^2(^3P)4d$	$^4D^\circ-^4P$				20–12						1
			9 257	9 259	1 657 520–1 668 320	8–6	6.58−03	6.34−03	1.55+00	−1.295	B+	LS
			8 770	8 772	1 657 520–1 668 920	6–4	6.09−03	4.68−03	8.11−01	−1.552	B	LS
			9 257	9 259	1 657 520–1 668 320	6–6	1.48−03	1.90−03	3.48−01	−1.943	B	LS
			8 770	8 772	1 657 520–1 668 920	4–4	3.09−03	3.57−03	4.12−01	−1.845	B	LS
			9 257	9 259	1 657 520–1 668 320	4–6	1.64−04	3.17−04	3.87−02	−2.897	C	LS
			8 770	8 772	1 657 520–1 668 920	2–4	4.81−04	1.11−03	6.41−02	−2.654	C	LS

[a] Wavelengths (Å) are always given unless cm^{-1} is indicated.

10.7.3. Forbidden Transitions for Na VII

The MCHF results of Tachiev and Froese Fischer[94] and the results of Galavis *et al.*[41] were used. As part of the Iron Project, Galavis *et al.*[41] used the SUPERSTRUCTURE code with CI, relativistic effects, and semiempirical energy corrections.

To estimate accuracies, we pooled the relative standard deviation of the mean (RSDM) for each of the lines with transition rates published in both of the references,[41,94] as described in the general introduction.

10.7.4. References for Forbidden Transitions for Na VII

[41] M. E. Galavis, C. Mendoza, and C. Zeippen, Astron. Astrophys., Suppl. Ser. **131**, 499 (1998).

[87] G. Tachiev and C. Froese Fischer, J. Phys. B **33**, 2419 (2000).

[94] G. Tachiev and C. Froese Fischer, http://www.vuse.vanderbilt.edu/~cff/mchf_collection/ (MCHF, *ab initio*, downloaded on May 6, 2002). See Tachiev and Froese Fischer (Ref. 87).

TABLE 29. Wavelength finding list for forbidden lines for Na VII

Wavelength (vac) (Å)	Mult. No.	Wavelength (vac) (Å)	Mult. No.	Wavelength (vac) (Å)	Mult. No.	Wavelength (vac) (Å)	Mult. No.
242.535	3	856.33	2	1 067 *cm*$^{-1}$	4	1 897.3	10
243.800	3	864.22	2	1 105.78	5	2 139 *cm*$^{-1}$	1
598.48	7	872.30	2	1 274.58	9		
677.41	6	880.50	2	1 695.26	8		
733 *cm*$^{-1}$	4	886.22	2	1 800 *cm*$^{-1}$	4		

TABLE 30. Transition probabilities of forbidden lines for Na VII (references for this table are as follows: 1=Tachiev and Froese Fischer[94] and 2=Galavis *et al.*.[41])

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	Type	A_{ki} (s^{-1})	S (a.u.)	Acc.	Source
1	$2p-2p$	$^2P^\circ-^2P^\circ$									
				2 139 cm^{-1}	0–2 139	2–4	M1	8.77−02	1.33+00	A	1,2
				2 139 cm^{-1}	0–2 139	2–4	E2	1.54−07	1.23−01	B+	1
2	$2s^22p-2s2p^2$	$^2P^\circ-^4P$									
				[880.5]	2 139–115 711	4–4	M2	3.16−03	4.49−01	B+	1
				[886.2]	2 139–114 978	4–2	M2	1.53−02	1.13+00	B+	1
				[872.3]	2 139–116 778	4–6	M2	7.00−02	1.42+01	A	1
				[864.2]	0–115 711	2–4	M2	5.70−02	7.38+00	A	1
				[856.3]	0–116 778	2–6	M2	2.31−02	4.27+00	B+	1

TABLE 30. Transition probabilities of forbidden lines for Na VII (references for this table are as follows: 1=Tachiev and Froese Fischer[94] and 2=Galavis *et al.*.[41])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	Type	A_{ki} (s^{-1})	S (a.u.)	Acc.	Source
3	$2s^22p-2p^3$	^{2}P°$-^2$D°									
				242.535	0–412 311	2–6	E2	2.85+03	1.28−02	B	2
				243.800	2 139–412 311	4–6	E2	9.78+03	4.51−02	B+	2
4	$2s2p^2-2s2p^2$	^{4}P$-^4$P									
				1 067 cm^{-1}	115 711–116 778	4–6	M1	1.98−02	3.62+00	A	1,2
				1 067 cm^{-1}	115 711–116 778	4–6	E2	4.92−09	1.91−01	B+	1
				733 cm^{-1}	114 978–115 711	2–4	M1	8.82−03	3.32+00	A	1,2
				733 cm^{-1}	114 978–115 711	2–4	E2	8.95−11	1.51−02	B	1
				1 800 cm^{-1}	114 978–116 778	2–6	E2	4.83−08	1.37−01	A	1,2
5		^{4}P$-^2$D									
				[1 105.8]	114 978–205 412	2–6	E2	5.91−04	5.24−06	D+	2
6		^{4}P$-^2$S									
				[677.4]	116 778–264 400	6–2	E2	2.57−02	6.56−06	D+	2
7		^{4}P$-^2$P									
				[598.5]	116 778–283 869	6–2	E2	2.52−03	3.45−07	D	2
8		^{2}D$-^2$S									
				1 695.26	205 412–264 400	6–2	E2	1.41+01	3.52−01	B+	2
9		^{2}D$-^2$P									
				1 274.58	205 412–283 869	6–2	E2	2.58−02	1.55−04	C	2
10	$2p^3-2p^3$	^{2}D°$-^2$P°									
				1 897.3	412 311–465 017	6–2	E2	3.84+00	1.69−01	B+	2

[a] Wavelengths (Å) are always given unless cm^{-1} is indicated.

10.8. Na VIII

Beryllium isoelectronic sequence
Ground State: $1s^22s^2\ ^1S_0$
Ionization energy: 264.25 eV=2 131 300 cm^{-1}

10.8.1. Allowed Transitions for Na VIII

In general the transition rates for this beryllium-like spectrum have proven accurate, including the results of the OP.[113] Most of the compiled data below have been taken from this source. The apparent high-quality (based on good agreement) data from the other references[19,80,82,94] were available primarily for the lower-lying transitions. Wherever available we have used the data of Tachiev and Froese Fischer,[94] which result from extensive MCHF calculations with Breit-Pauli corrections to order α^2. Only OP results were available for transitions from energy levels above the $3d$.

To estimate accuracies, we pooled the relative standard deviation of the mean (RSDM) for each of the lines with transition rates published in two or more references,[19,80,82,94,113] as described in the general introduction. For this purpose the spin-allowed (non-OP) and intercombination data were treated separately and each of these was in turn divided into two upper-level energy groups below and above 1 370 000 cm^{-1}. Estimated accuracies were substantially better for the lower energy groups, and none of the high-lying intercombination lines had estimated accuracies sufficiently good to be included in this compilation. OP lines constituted a fifth group. The energy level labeled $2s2p\ ^1P_1^{\mathrm{o}}$ energy level appears to be of highly mixed character in LS coupling because transitions from it agreed much less well among different authors than did other levels. Thus transitions involving this energy level were assigned lower accuracy.

10.8.2. References for Allowed Transitions for Na VIII

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[113] J. A. Tully, M. J. Seaton, and K. A. Berrington, http://

legacy.gsfc.nasa.gov/topbase, downloaded on Aug. 8, 1995 (Opacity Project). See Tully *et al.* (Ref. 111).

TABLE 31. Wavelength finding list for allowed lines for Na VIII

Wavelength (vac) (Å)	Mult. No.
53.704	33
53.750	33
54.380	7
55.324	31
55.346	31
55.395	31
57.046	56
57.073	56
57.119	56
57.230	34
58.045	29
58.070	29
58.124	29
58.953	26
59.009	26
59.101	32
59.193	25
59.204	25
59.249	25
59.759	6
59.962	53
59.992	53
60.002	53
60.043	53
60.053	53
60.073	52
61.088	55
61.347	54
62.276	30
63.114	28
63.695	27
64.206	23
64.236	23
64.302	23
66.062	5
66.321	47
66.358	47
66.370	47
66.420	47
66.433	47
66.498	46
67.672	49
68.193	48
69.120	24
70.120	4
71.583	50
71.799	51
74.954	19
74.964	19
75.005	19
75.044	19
75.096	19
75.385	18
75.427	18
75.518	18
76.123	17
76.124	17
76.131	17
76.173	17
76.217	17
76.266	17
77.266	3
80.756	22
81.210	21
83.240	15
83.288	15
83.291	15
83.391	15
83.400	15
83.402	15
84.050	20
85.826	41
85.861	41
85.887	41
85.935	41
85.992	41
86.040	41
86.381	40
86.428	40
86.443	40
86.479	40
86.534	40
86.549	40
86.761	44
87.211	43
89.759	13
89.818	13
89.948	13
90.252	42
90.536	16
93.119	37
93.197	37
93.243	37
93.270	37
93.339	37
93.393	37
93.669	45
93.898	38
98.080	14
102.042	39
107.171	35
117.911	36
149.671	66
153.754	88
155.994	136
156.006	76
156.201	136

TABLE 31. Wavelength finding list for allowed lines for Na VIII—Continued

Wavelength (vac) (Å)	Mult. No.
156.597	136
161.132	137
161.371	137
167.978	63
168.057	63
170.007	102
170.509	102
172.316	64
173.572	65
177.175	103
179.134	129
180.268	75
180.470	130
180.999	130
184.230	131
184.322	131
186.794	133
186.888	133
187.115	133
187.210	133
187.406	132
187.473	74
191.004	135
193.558	134
196.826	85
196.841	85
196.934	85
196.949	85
196.997	85
198.594	153
198.673	153
198.965	153
203.595	87
203.616	86
207.147	154
209.727	155
236.499	101
236.737	98
237.710	98
240.651	97
240.912	97
241.657	97
243.540	62
243.825	117
246.348	127
249.057	100
252.602	119
252.691	73
252.781	119
253.145	119
253.325	119
253.428	116
254.278	118
254.369	119
255.330	118

TABLE 31. Wavelength finding list for allowed lines for Na VIII—Continued

Wavelength (vac) (Å)	Mult. No.
258.355	99
261.172	120
261.363	120
266.354	122
266.553	122
267.008	122
267.208	122
268.269	121
271.348	125
274.514	124
275.080	151
275.232	151
275.794	151
276.549	126
279.799	128
280.355	152
280.867	152
281.144	152
283.294	123
290.664	143
296.086	145
296.261	145
296.912	145
301.250	144
301.923	144
302.206	147
302.234	144
302.416	144
302.801	147
303.095	144
307.078	84
307.399	146
308.613	146
309.234	146
312.647	148
315.308	166
318.563	150
324.507	173
333.934	149
364.844	160
378.143	192
379.010	96
379.983	192
381.913	165
388.229	193
395.248	61
395.795	61
396.816	61
411.171	2
415.041	172
426.379	9
429.319	9
433.473	95
492.327	8
492.786	12

TABLE 31. Wavelength finding list for allowed lines for Na VIII—Continued

Wavelength (vac) (Å)	Mult. No.
493.998	8
495.791	8
496.251	8
497.849	8
499.770	8
502.993	114
521.159	115
522.493	140
524.274	140
525.238	140
533.960	71
536.797	158
538.184	157
538.996	157
548.908	141
549.179	159
554.477	70
558.067	187
558.909	187
560.664	186
561.703	185
562.94	187
564.72	186
567.41	142
569.57	164
580.32	189
581.23	189
583.12	188
586.54	191
602.45	83
603.30	80
604.58	80
604.72	80
606.97	80
607.11	80
607.56	80
611.32	190
612.20	60
613.61	200
616.42	59
623.07	59
624.80	82
626.19	59
629.66	79
630.15	79
632.46	79
632.61	79
633.10	79
633.26	79
633.41	79
634.92	139
637.55	139
638.98	139
644.54	201
648.30	163
650.75	202
651.93	202
658.24	168
659.28	203
659.46	168
659.50	207
665.96	167
670.38	212
671.41	171
671.64	170
678.29	204
680.13	216
682.45	209
683.71	209
686.34	208
702.94	211
715.31	162
720.72	69
726.74	169
789.81	1
823.66	81
847.91	11
968.34	184
1 016.05	198
1 018.95	198
1 038.21	206
1 085.54	199
1 089.56	222
1 155.79	10
1 175.06	10
1 186.69	10
1 220.26	210
1 238.39	105
1 275.75	78
1 333.80	77
1 334.49	77
1 336.68	77
1 365.30	77
1 366.03	77
1 380.38	77
1 589.83	217
1 618.91	215
1 626.02	215
1 658.37	91
1 661.68	91
1 677.01	214
1 684.07	91
1 707.36	91
1 734.61	91
1 805.5	94
1 843.1	57
1 866.7	107
1 868.8	68
1 879.0	107
1 896.5	90

TABLE 31. Wavelength finding list for allowed lines for Na VIII—Continued

Wavelength (vac) (Å)	Mult. No.
1 902.2	107
1 909.5	107
1 925.7	90
1 933.5	107
1 992.0	90
1 996.0	107

Wavelength (air) (Å)	Mult. No.
2 063.1	93
2 176.5	106
2 181.8	106
2 186.1	106
2 217.6	106
2 227.5	106
2 261.7	106
2 300.3	106
2 463.5	108
2 485.0	108
2 512.4	89
2 515.6	89
2 519.4	89
2 525.8	108
2 553.5	112
2 567.3	89
2 626.6	89
2 686.7	89
2 763.9	104
3 010.3	111
3 017.5	110
3 026.2	67
3 029.8	67
3 049.8	110
3 102.8	113
3 111.5	110
3 137.8	110
3 178.7	58
3 203.2	110
3 341.3	175
3 886.9	182
3 922.0	109
3 949.9	109
3 953.0	109
4 068.9	109
4 102.2	109
4 673.8	195
5 185.3	177
5 261.7	177
5 642	177
5 706	176
6 030	161
6 033	156
6 156	176
6 462	181
6 952	174
7 319	194
7 472	194
8 056	179
8 242	179
8 871	183
8 910	180
9 387	178
9 898	196
9 948	205
13 172	221
14 584	92
15 333	219
15 996	219
17 089	197
17 570	218
18 411	138

Wavenumber (cm^{-1})	Mult. No.
4 320	213
680	220

TABLE 32. Transition probabilities of allowed lines for Na VIII (references for this table are as follows: 1=Tully *et al.*,[113] 2=Tachiev and Froese Fischer,[94] 3=Curtis *et al.*,[19] 4=Safronova *et al.*,[80] and 5=Safronova *et al.*[82])

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
1	$2s^2-2s2p$	$^1S-^3P^\circ$										
				[789.8]	0–126 612	1–3	3.63−04	1.02−05	2.65−05	−4.991	D	2,5
2		$^1S-^1P^\circ$		411.171	0–243 208	1–3	4.40+01	3.35−01	4.53−01	−0.475	B+	2,5
3	$2s^2-2s3p$	$^1S-^1P^\circ$		77.266	0–1 294 230	1–3	1.87+03	5.02−01	1.28−01	−0.299	A	2,3,4
4	$2s^2-2p3s$	$^1S-^1P^\circ$		70.120	0–1 426 125	1–3	7.17+01	1.59−02	3.66−03	−1.799	C	4
5	$2s^2-2p3d$	$^1S-^1P^\circ$		66.062	0–1 513 730	1–3	1.66+02	3.26−02	7.09−03	−1.487	C	4
6	$2s^2-2s4p$	$^1S-^1P^\circ$		59.759	0–1 673 390	1–3	8.47+02	1.36−01	2.68−02	−0.866	D+	1

TABLE 32. Transition probabilities of allowed lines for Na VIII (references for this table are as follows: 1=Tully *et al.*,[113] 2=Tachiev and Froese Fischer,[94] 3=Curtis *et al.*,[19] 4=Safronova *et al.*,[80] and 5=Safronova *et al.*[82])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
7	$2s^2-2s5p$	$^1S-^1P^\circ$		54.380	0–1 838 910	1–3	4.44+02	5.91−02	1.06−02	−1.228	D	1
8	$2s2p-2p^2$	$^3P^\circ-^3P$		*496.07*	*127 423–329 006*	9–9	3.55+01	1.31−01	1.92+00	0.072	A	2,5
				496.251	128 218–329 729	5–5	2.66+01	9.81−02	8.02−01	−0.309	A+	2,5
				495.791	126 612–328 310	3–3	8.89+00	3.28−02	1.60−01	−1.007	A	2,5
				499.770	128 218–328 310	5–3	1.45+01	3.25−02	2.67−01	−0.789	A	2,5
				497.849	126 612–327 476	3–1	3.51+01	4.35−02	2.14−01	−0.884	A	2,5
				492.327	126 612–329 729	3–5	9.09+00	5.51−02	2.68−01	−0.782	A	2,5
				493.998	125 880–328 310	1–3	1.20+01	1.32−01	2.14−01	−0.879	A	2,5
9		$^3P^\circ-^1D$										
				[426.38]	126 612–361 145	3–5	2.64−03	1.20−05	5.05−05	−4.444	E+	2,5
				[429.32]	128 218–361 145	5–5	4.21−02	1.16−04	8.22−04	−3.237	D+	2,5
10		$^1P^\circ-^3P$										
				[1 175.1]	243 208–328 310	3–3	5.36−05	1.11−06	1.29−05	−5.478	E+	2,5
				[1 186.7]	243 208–327 476	3–1	6.40−04	4.51−06	5.28−05	−4.869	E+	2,5
				[1 155.8]	243 208–329 729	3–5	1.92−03	6.40−05	7.31−04	−3.717	D+	2,5
11		$^1P^\circ-^1D$		847.91	243 208–361 145	3–5	6.66+00	1.20−01	1.00+00	−0.444	A+	2,5
12		$^1P^\circ-^1S$		492.786	243 208–446 136	3–1	6.59+01	8.00−02	3.89−01	−0.620	A	2,5
13	$2s2p-2s3s$	$^3P^\circ-^3S$		*89.88*	*127 423–1 239 974*	9–3	8.96+02	3.62−02	9.63−02	−0.487	A	2,4
				89.948	128 218–1 239 974	5–3	4.98+02	3.63−02	5.37−02	−0.741	A	2,4
				89.818	126 612–1 239 974	3–3	2.98+02	3.61−02	3.20−02	−0.965	A	2,4
				89.759	125 880–1 239 974	1–3	9.93+01	3.60−02	1.06−02	−1.444	A	2,4
14		$^1P^\circ-^1S$		98.080	243 208–1 262 780	3–1	2.98+02	1.43−02	1.39−02	−1.368	B+	2,4
15	$2s2p-2s3d$	$^3P^\circ-^3D$		*83.34*	*127 423–1 327 315*	9–15	4.00+03	6.94−01	1.71+00	0.796	A	2,4
				83.391	128 218–1 327 388	5–7	3.99+03	5.83−01	8.00−01	0.465	A+	2,4
				83.288	126 612–1 327 265	3–5	3.00+03	5.20−01	4.28−01	0.193	A	2,4
				83.240	125 880–1 327 226	1–3	2.23+03	6.94−01	1.90−01	−0.159	A	2,4
				83.400	128 218–1 327 265	5–5	9.99+02	1.04−01	1.43−01	−0.284	A	2,4
				83.291	126 612–1 327 226	3–3	1.67+03	1.74−01	1.43−01	−0.282	A	2,4
				83.402	128 218–1 327 226	5–3	1.11+02	6.95−03	9.54−03	−1.459	A	2,4
16		$^1P^\circ-^1D$		90.536	243 208–1 347 740	3–5	2.54+03	5.21−01	4.66−01	0.194	A	2,4
17	$2s2p-2p3p$	$^3P^\circ-^3D$		*76.14*	*127 423–1 440 846*	9–15	4.90+02	7.10−02	1.60−01	−0.194	C+	4
				76.123	128 218–1 441 880	5–7	4.94+02	6.01−02	7.53−02	−0.522	B	4
				76.124	126 612–1 440 260	3–5	3.81+02	5.52−02	4.15−02	−0.781	C+	4
				76.131	125 880–1 439 410	1–3	2.81+02	7.32−02	1.84−02	−1.135	C+	4
				76.217	128 218–1 440 260	5–5	1.09+02	9.53−03	1.20−02	−1.322	C	4
				76.173	126 612–1 439 410	3–3	1.88+02	1.63−02	1.23−02	−1.311	C	4
				76.266	128 218–1 439 410	5–3	1.18+01	6.19−04	7.78−04	−2.509	D+	4
18		$^3P^\circ-^3S$		*75.47*	*127 423–1 452 400*	9–3	8.78+02	2.50−02	5.59−02	−0.648	C+	4
				75.518	128 218–1 452 400	5–3	4.07+02	2.09−02	2.60−02	−0.981	C+	4
				75.427	126 612–1 452 400	3–3	3.42+02	2.92−02	2.17−02	−1.057	C+	4
				75.385	125 880–1 452 400	1–3	1.29+02	3.30−02	8.20−03	−1.481	C	4
19		$^3P^\circ-^3P$				9–9						4
				75.044	128 218–1 460 770	5–5	7.07+02	5.97−02	7.37−02	−0.525	B	4
				75.005	126 612–1 459 850	3–3	1.90+02	1.60−02	1.19−02	−1.319	C	4
				75.096	128 218–1 459 850	5–3	4.72+02	2.39−02	2.96−02	−0.923	C+	4

TABLE 32. Transition probabilities of allowed lines for Na VIII (references for this table are as follows: 1=Tully *et al.*,[113] 2=Tachiev and Froese Fischer,[94] 3=Curtis *et al.*,[19] 4=Safronova *et al.*,[80] and 5=Safronova *et al.*[82])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				74.954	126 612–1 460 770	3–5	2.15+02	3.01−02	2.23−02	−1.044	C+	4
				74.964	125 880–1 459 850	1–3	2.62+02	6.63−02	1.64−02	−1.178	C+	4
20		$^{1}\mathrm{P}^{\circ}-{}^{1}\mathrm{P}$		84.050	243 208–1 432 980	3–3	1.11+03	1.17−01	9.72−02	−0.455	B	4
21		$^{1}\mathrm{P}^{\circ}-{}^{1}\mathrm{D}$		81.210	243 208–1 474 580	3–5	1.51+03	2.49−01	2.00−01	−0.127	B	4
22		$^{1}\mathrm{P}^{\circ}-{}^{1}\mathrm{S}$		80.756	243 208–1 481 510	3–1	6.26+02	2.04−02	1.63−02	−1.213	D	1
23	$2s2p-2s4d$	$^{3}\mathrm{P}^{\circ}-{}^{3}\mathrm{D}$		*64.27*	*127 423–1 683 370*	9–15	1.28+03	1.32−01	2.52−01	0.075	D+	1
				64.302	128 218–1 683 370	5–7	1.28+03	1.11−01	1.17−01	−0.256	C	LS
				64.236	126 612–1 683 370	3–5	9.64+02	9.94−02	6.31−02	−0.525	D+	LS
				64.206	125 880–1 683 370	1–3	7.17+02	1.33−01	2.81−02	−0.876	D+	LS
				64.302	128 218–1 683 370	5–5	3.21+02	1.99−02	2.11−02	−1.002	D	LS
				64.236	126 612–1 683 370	3–3	5.35+02	3.31−02	2.10−02	−1.003	D	LS
				64.302	128 218–1 683 370	5–3	3.55+01	1.32−03	1.40−03	−2.180	E	LS
24		$^{1}\mathrm{P}^{\circ}-{}^{1}\mathrm{D}$		69.120	243 208–1 689 970	3–5	9.72+02	1.16−01	7.92−02	−0.458	C	1
25	$2s2p-2p4p$	$^{3}\mathrm{P}^{\circ}-{}^{3}\mathrm{D}$				9–15						1
				59.204	128 218–1 817 290	5–7	3.79+02	2.79−02	2.72−02	−0.855	D+	LS
				59.193	126 612–1 816 010	3–5	2.84+02	2.49−02	1.46−02	−1.127	D	LS
				59.249	128 218–1 816 010	5–5	9.44+01	4.97−03	4.85−03	−1.605	E+	LS
26		$^{3}\mathrm{P}^{\circ}-{}^{3}\mathrm{P}$				9–9						1
				59.009	128 218–1 822 880	5–5	3.35+02	1.75−02	1.70−02	−1.058	D	LS
				58.953	126 612–1 822 880	3–5	1.12+02	9.75−03	5.68−03	−1.534	E+	LS
27		$^{1}\mathrm{P}^{\circ}-{}^{1}\mathrm{P}$		63.695	243 208–1 813 190	3–3	4.59+02	2.79−02	1.76−02	−1.077	D	1
28		$^{1}\mathrm{P}^{\circ}-{}^{1}\mathrm{D}$		63.114	243 208–1 827 640	3–5	5.04+02	5.02−02	3.13−02	−0.822	D+	1
29	$2s2p-2s5d$?	$^{3}\mathrm{P}^{\circ}-{}^{3}\mathrm{D}$?		*[58.1]*	*127 423–1 848 670*	9–15	5.38+02	4.53−02	7.80−02	−0.390	D	1
				58.124	128 218–1 848 670	5–7	5.37+02	3.81−02	3.65−02	−0.720	D+	LS
				58.070	126 612–1 848 670	3–5	4.04+02	3.40−02	1.95−02	−0.991	D	LS
				58.045	125 880–1 848 670	1–3	3.00+02	4.54−02	8.68−03	−1.343	D	LS
				58.124	128 218–1 848 670	5–5	1.34+02	6.80−03	6.51−03	−1.469	E+	LS
				58.070	126 612–1 848 670	3–3	2.24+02	1.13−02	6.48−03	−1.470	E+	LS
				58.124	128 218–1 848 670	5–3	1.49+01	4.53−04	4.33−04	−2.645	E	LS
30		$^{1}\mathrm{P}^{\circ}-{}^{1}\mathrm{D}$		62.276	243 208–1 848 960	3–5	5.28+02	5.12−02	3.15−02	−0.814	D+	1
31	$2s2p-2s6d$?	$^{3}\mathrm{P}^{\circ}-{}^{3}\mathrm{D}$?		*[55.4]*	*127 423–1 933 430*	9–15	3.33+02	2.55−02	4.18−02	−0.639	D	1
				55.395	128 218–1 933 430	5–7	3.32+02	2.14−02	1.95−02	−0.971	D	LS
				55.346	126 612–1 933 430	3–5	2.50+02	1.91−02	1.04−02	−1.242	D	LS
				55.324	125 880–1 933 430	1–3	1.85+02	2.55−02	4.64−03	−1.593	E+	LS
				55.395	128 218–1 933 430	5–5	8.30+01	3.82−03	3.48−03	−1.719	E+	LS
				55.346	126 612–1 933 430	3–3	1.39+02	6.37−03	3.48−03	−1.719	E+	LS
				55.395	128 218–1 933 430	5–3	9.24+00	2.55−04	2.33−04	−2.894	E	LS
32		$^{1}\mathrm{P}^{\circ}-{}^{1}\mathrm{D}$		59.101	243 208–1 935 230	3–5	2.53+02	2.21−02	1.29−02	−1.178	D	1
33	$2s2p-2p5p$	$^{3}\mathrm{P}^{\circ}-{}^{3}\mathrm{P}$				9–9						1
				53.750	128 218–1 988 680	5–5	1.78+02	7.72−03	6.83−03	−1.413	D	LS
				53.704	126 612–1 988 680	3–5	5.95+01	4.29−03	2.28−03	−1.890	E+	LS
34		$^{1}\mathrm{P}^{\circ}-{}^{1}\mathrm{D}$		57.230	243 208–1 990 540	3–5	4.04+02	3.31−02	1.87−02	−1.003	D	1

TABLE 32. Transition probabilities of allowed lines for Na VIII (references for this table are as follows: 1=Tully *et al.*,[113] 2=Tachiev and Froese Fischer,[94] 3=Curtis *et al.*,[19] 4=Safronova *et al.*,[80] and 5=Safronova *et al.*[82])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})$^{\mathrm{a}}$	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
35	$2p^2-2s3p$	$^1\mathrm{D}-^1\mathrm{P}^\circ$		107.171	361 145–1 294 230	5–3	1.17+02	1.21−02	2.13−02	−1.218	C+	2,4
36		$^1\mathrm{S}-^1\mathrm{P}^\circ$		117.911	446 136–1 294 230	1–3	3.66+00	2.29−03	8.89−04	−2.640	C	2,4
37	$2p^2-2p3s$	$^3\mathrm{P}-^3\mathrm{P}^\circ$		*93.25*	*329 006–1 401 342*	9–9	6.98+02	9.10−02	2.52−01	−0.087	C+	4
				93.243	329 729–1 402 200	5–5	5.24+02	6.84−02	1.05−01	−0.466	B	4
				93.270	328 310–1 400 470	3–3	1.72+02	2.25−02	2.07−02	−1.171	C+	4
				93.393	329 729–1 400 470	5–3	2.90+02	2.27−02	3.49−02	−0.945	C+	4
				93.339	328 310–1 399 670	3–1	6.92+02	3.01−02	2.78−02	−1.044	C+	4
				93.119	328 310–1 402 200	3–5	1.77+02	3.85−02	3.54−02	−0.937	C+	4
				93.197	327 476–1 400 470	1–3	2.33+02	9.09−02	2.79−02	−1.041	C+	4
38		$^1\mathrm{D}-^1\mathrm{P}^\circ$		93.898	361 145–1 426 125	5–3	5.15+02	4.08−02	6.31−02	−0.690	B	4
39		$^1\mathrm{S}-^1\mathrm{P}^\circ$		102.042	446 136–1 426 125	1–3	1.99+02	9.31−02	3.13−02	−1.031	C+	4
40	$2p^2-2p3d$	$^3\mathrm{P}-^3\mathrm{D}^\circ$		*86.46*	*329 006–1 485 645*	9–15	4.86+03	9.07−01	2.32+00	0.912	B+	4
				86.479	329 729–1 486 080	5–7	4.88+03	7.65−01	1.09+00	0.583	B+	4
				86.428	328 310–1 485 340	3–5	4.02+03	7.51−01	6.41−01	0.353	B+	4
				86.381	327 476–1 485 140	1–3	2.98+03	1.00+00	2.85−01	0.000	B+	4
				86.534	329 729–1 485 340	5–5	8.12+02	9.11−02	1.30−01	−0.342	B	4
				86.443	328 310–1 485 140	3–3	1.81+03	2.02−01	1.73−01	−0.218	B	4
				86.549	329 729–1 485 140	5–3	7.23+01	4.87−03	6.95−03	−1.614	C	4
41		$^3\mathrm{P}-^3\mathrm{P}^\circ$		*85.96*	*329 006–1 492 308*	9–9	2.60+03	2.88−01	7.34−01	0.414	B	4
				86.040	329 729–1 491 980	5–5	2.33+03	2.59−01	3.66−01	0.112	B+	4
				85.887	328 310–1 492 630	3–3	8.74+02	9.67−02	8.20−02	−0.537	B	4
				85.992	329 729–1 492 630	5–3	1.14+03	7.56−02	1.07−01	−0.423	B	4
				85.861	328 310–1 492 980	3–1	2.58+03	9.51−02	8.07−02	−0.545	B	4
				85.935	328 310–1 491 980	3–5	2.74+02	5.06−02	4.29−02	−0.819	C+	4
				85.826	327 476–1 492 630	1–3	5.87+02	1.95−01	5.50−02	−0.710	B	4
42		$^1\mathrm{D}-^1\mathrm{D}^\circ$		90.252	361 145–1 469 150	5–5	1.35+03	1.65−01	2.45−01	−0.084	B	4
43		$^1\mathrm{D}-^1\mathrm{F}^\circ$		87.211	361 145–1 507 790	5–7	5.65+03	9.02−01	1.30+00	0.654	B+	4
44		$^1\mathrm{D}-^1\mathrm{P}^\circ$		86.761	361 145–1 513 730	5–3	1.80+02	1.22−02	1.74−02	−1.215	C+	4
45		$^1\mathrm{S}-^1\mathrm{P}^\circ$		93.669	446 136–1 513 730	1–3	3.14+03	1.24+00	3.82−01	0.093	B+	4
46	$2p^2-2p4d$	$^3\mathrm{P}-^3\mathrm{D}^\circ$				9–15						1
				66.498	329 729–1 833 530	5–7	1.72+03	1.60−01	1.75−01	−0.097	C	LS
47		$^3\mathrm{P}-^3\mathrm{P}^\circ$				9–9						1
				66.433	329 729–1 835 010	5–5	5.43+02	3.59−02	3.93−02	−0.746	D+	LS
				66.358	328 310–1 835 290	3–3	1.82+02	1.20−02	7.86−03	−1.444	D	LS
				66.420	329 729–1 835 290	5–3	3.02+02	1.20−02	1.31−02	−1.222	D	LS
				66.370	328 310–1 835 010	3–5	1.81+02	1.99−02	1.30−02	−1.224	D	LS
				66.321	327 476–1 835 290	1–3	2.42+02	4.79−02	1.05−02	−1.320	D	LS
48		$^1\mathrm{D}-^1\mathrm{D}^\circ$		68.193	361 145–1 827 570	5–5	5.72+02	3.99−02	4.48−02	−0.700	D+	1
49		$^1\mathrm{D}-^1\mathrm{F}^\circ$		67.672	361 145–1 838 860	5–7	1.76+03	1.69−01	1.88−01	−0.073	C	1
50		$^1\mathrm{S}-^1\mathrm{P}^\circ$		71.583	446 136–1 843 110	1–3	7.55+02	1.74−01	4.10−02	−0.759	D+	1
51	$2p^2-2s5p$	$^1\mathrm{S}-^1\mathrm{P}^\circ$		71.799	446 136–1 838 910	1–3	3.46+02	8.03−02	1.90−02	−1.095	D	1
52	$2p^2-2p5d$	$^3\mathrm{P}-^3\mathrm{D}^\circ$				9–15						1

TABLE 32. Transition probabilities of allowed lines for Na VIII (references for this table are as follows: 1=Tully *et al.*,[113] 2=Tachiev and Froese Fischer,[94] 3=Curtis *et al.*,[19] 4=Safronova *et al.*,[80] and 5=Safronova *et al.*[82])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^{a}	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				60.073	329 729–1 994 370	5–7	8.15+02	6.17−02	6.10−02	−0.511	D+	LS
53		^{3}P–^{3}P°				9–9						1
				60.053	329 729–1 994 930	5–5	3.09+02	1.67−02	1.65−02	−1.078	D	LS
				59.992	328 310–1 995 200	3–3	1.03+02	5.57−03	3.30−03	−1.777	E+	LS
				60.043	329 729–1 995 200	5–3	1.72+02	5.57−03	5.51−03	−1.555	E+	LS
				60.002	328 310–1 994 930	3–5	1.03+02	9.29−03	5.51−03	−1.555	E+	LS
				59.962	327 476–1 995 200	1–3	1.38+02	2.23−02	4.40−03	−1.652	E+	LS
54		^{1}D–^{1}D°		61.347	361 145–1 991 220	5–5	2.66+02	1.50−02	1.51−02	−1.125	D	1
55		^{1}D–^{1}F°		61.088	361 145–1 998 130	5–7	1.01+03	7.90−02	7.94−02	−0.403	C	1
56	$2p^2-2p6d$	^{3}P–^{3}D°		*57.10*	*329 006–2 080 460*	9–15	4.50+02	3.67−02	6.20−02	−0.481	D	1
				57.119	329 729–2 080 460	5–7	4.50+02	3.08−02	2.90−02	−0.812	D+	LS
				57.073	328 310–2 080 460	3–5	3.38+02	2.75−02	1.55−02	−1.084	D	LS
				57.046	327 476–2 080 460	1–3	2.51+02	3.67−02	6.89−03	−1.435	D	LS
				57.119	329 729–2 080 460	5–5	1.12+02	5.49−03	5.16−03	−1.561	E+	LS
				57.073	328 310–2 080 460	3–3	1.88+02	9.16−03	5.16−03	−1.561	E+	LS
				57.119	329 729–2 080 460	5–3	1.25+01	3.66−04	3.44−04	−2.738	E	LS
57	$2s3s-2s3p$	^{3}S–^{1}P°										
				[1 843]	1 239 974–1 294 230	3–3	1.70−02	8.67−04	1.58−02	−2.585	C	2
58		^{1}S–^{1}P°	3 178.7	3 179.7	1 262 780–1 294 230	1–3	3.10−01	1.41−01	1.48+00	−0.851	A	2
59	$2s3s-2p3s$	^{3}S–^{3}P°		*619.7*	*1 239 974–1 401 342*	3–9	7.73+00	1.34−01	8.18−01	−0.396	C+	1
				616.42	1 239 974–1 402 200	3–5	7.86+00	7.46−02	4.54−01	−0.650	C+	LS
				623.07	1 239 974–1 400 470	3–3	7.61+00	4.43−02	2.73−01	−0.876	C+	LS
				626.19	1 239 974–1 399 670	3–1	7.50+00	1.47−02	9.09−02	−1.356	C	LS
60		^{1}S–^{1}P°		612.20	1 262 780–1 426 125	1–3	1.99+01	3.35−01	6.75−01	−0.475	B	1
61	$2s3s-2p3d$	^{3}S–^{3}P°		*396.30*	*1 239 974–1 492 308*	3–9	6.91−01	4.88−03	1.91−02	−1.834	D	1
				396.816	1 239 974–1 491 980	3–5	6.89−01	2.71−03	1.06−02	−2.090	D	LS
				395.795	1 239 974–1 492 630	3–3	6.94−01	1.63−03	6.37−03	−2.311	E+	LS
				395.248	1 239 974–1 492 980	3–1	6.96−01	5.43−04	2.12−03	−2.788	E+	LS
62	$2s3s-2s4p$	^{1}S–^{1}P°		243.540	1 262 780–1 673 390	1–3	1.04+02	2.77−01	2.22−01	−0.558	C	1
63	$2s3s-2p4d$	^{3}S–^{3}P°				3–9						1
				168.057	1 239 974–1 835 010	3–5	2.99+01	2.11−02	3.50−02	−1.199	D+	LS
				167.978	1 239 974–1 835 290	3–3	3.00+01	1.27−02	2.11−02	−1.419	D	LS
64		^{1}S–^{1}P°		172.316	1 262 780–1 843 110	1–3	1.67+01	2.23−02	1.27−02	−1.652	D	1
65	$2s3s-2s5p$	^{1}S–^{1}P°		173.572	1 262 780–1 838 910	1–3	3.82+01	5.18−02	2.96−02	−1.286	D+	1
66	$2s3s-2s6p$	^{1}S–^{1}P°		149.671	1 262 780–1 930 910	1–3	3.55+01	3.58−02	1.76−02	−1.446	D	1
67	$2s3p-2s3d$	^{1}P°–^{3}D										
			[3 026]	[3 027]	1 294 230–1 327 265	3–5	2.47−03	5.66−04	1.69−02	−2.770	C	2
			[3 030]	[3 031]	1 294 230–1 327 226	3–3	1.22−03	1.69−04	5.05−03	−3.295	D+	2
68		^{1}P°–^{1}D		1 868.8	1 294 230–1 347 740	3–5	1.63+00	1.42−01	2.62+00	−0.371	A+	2
69	$2s3p-2p3p$	^{1}P°–^{1}P		720.72	1 294 230–1 432 980	3–3	1.39+01	1.08−01	7.69−01	−0.489	B	1
70		^{1}P°–^{1}D		554.477	1 294 230–1 474 580	3–5	1.61+00	1.24−02	6.79−02	−1.429	C	1

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No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
71		$^1P^\circ-{}^1S$		533.960	1 294 230–1 481 510	3–1	7.93+00	1.13−02	5.96−02	−1.470	D+	1
72	$2s3p-2s4s$	$^1P^\circ-{}^1S$		275.794	1 294 230–1 656 820	3–1	1.23+02	4.68−02	1.27−01	−0.853	C	1
73	$2s3p-2s4d$	$^1P^\circ-{}^1D$		252.691	1 294 230–1 689 970	3–5	2.51+02	4.00−01	9.98−01	0.079	B	1
74	$2s3p-2p4p$	$^1P^\circ-{}^1D$		187.473	1 294 230–1 827 640	3–5	8.23+00	7.23−03	1.34−02	−1.664	D	1
75	$2s3p-2s5d$	$^1P^\circ-{}^1D$		180.268	1 294 230–1 848 960	3–5	1.37+02	1.11−01	1.98−01	−0.478	C	1
76	$2s3p-2s6d$	$^1P^\circ-{}^1D$		156.006	1 294 230–1 935 230	3–5	8.12+01	4.94−02	7.61−02	−0.829	C	1
77	$2s3d-2p3s$	$^3D-{}^3P^\circ$		*1 350.8*	*1 327 315–1 401 342*	15–9	1.11−01	1.83−03	1.22−01	−1.561	D+	1
				1 336.68	1 327 388–1 402 200	7–5	9.67−02	1.85−03	5.70−02	−1.888	D+	LS
				1 366.03	1 327 265–1 400 470	5–3	8.04−02	1.35−03	3.04−02	−2.171	D+	LS
				1 380.38	1 327 226–1 399 670	3–1	1.04−01	9.93−04	1.35−02	−2.526	D	LS
				1 334.49	1 327 265–1 402 200	5–5	1.73−02	4.62−04	1.01−02	−2.636	D	LS
				1 365.30	1 327 226–1 400 470	3–3	2.69−02	7.53−04	1.02−02	−2.646	D	LS
				1 333.80	1 327 226–1 402 200	3–5	1.16−03	5.14−05	6.77−04	−3.812	E	LS
78		$^1D-{}^1P^\circ$		1 275.75	1 347 740–1 426 125	5–3	3.32−01	4.86−03	1.02−01	−1.614	C	1
79	$2s3d-2p3d$	$^3D-{}^3D^\circ$		*631.6*	*1 327 315–1 485 645*	15–15	1.05+01	6.27−02	1.95+00	−0.027	C+	1
				630.15	1 327 388–1 486 080	7–7	9.37+00	5.58−02	8.10−01	−0.408	B	LS
				632.61	1 327 265–1 485 340	5–5	7.25+00	4.35−02	4.53−01	−0.663	C+	LS
				633.26	1 327 226–1 485 140	3–3	7.80+00	4.69−02	2.93−01	−0.852	C+	LS
				633.10	1 327 388–1 485 340	7–5	1.62+00	6.96−03	1.02−01	−1.312	C	LS
				633.41	1 327 265–1 485 140	5–3	2.60+00	9.37−03	9.77−02	−1.329	C	LS
				629.66	1 327 265–1 486 080	5–7	1.18+00	9.80−03	1.02−01	−1.310	C	LS
				632.46	1 327 226–1 485 340	3–5	1.56+00	1.56−02	9.74−02	−1.330	C	LS
80		$^3D-{}^3P^\circ$		*606.1*	*1 327 315–1 492 308*	15–9	1.20+01	3.98−02	1.19+00	−0.224	C+	1
				607.56	1 327 388–1 491 980	7–5	1.00+01	3.97−02	5.56−01	−0.556	C+	LS
				604.72	1 327 265–1 492 630	5–3	9.09+00	2.99−02	2.98−01	−0.825	C+	LS
				603.30	1 327 226–1 492 980	3–1	1.22+01	2.22−02	1.32−01	−1.177	C	LS
				607.11	1 327 265–1 491 980	5–5	1.80+00	9.92−03	9.91−02	−1.305	C	LS
				604.58	1 327 226–1 492 630	3–3	3.03+00	1.66−02	9.91−02	−1.303	C	LS
				606.97	1 327 226–1 491 980	3–5	1.19−01	1.10−03	6.59−03	−2.481	E+	LS
81		$^1D-{}^1D^\circ$		823.66	1 347 740–1 469 150	5–5	4.18+00	4.25−02	5.76−01	−0.673	C+	1
82		$^1D-{}^1F^\circ$		624.80	1 347 740–1 507 790	5–7	1.73+00	1.42−02	1.46−01	−1.149	C	1
83		$^1D-{}^1P^\circ$		602.45	1 347 740–1 513 730	5–3	1.27+01	4.14−02	4.11−01	−0.684	C+	1
84	$2s3d-2s4p$	$^1D-{}^1P^\circ$		307.078	1 347 740–1 673 390	5–3	2.83+01	2.40−02	1.21−01	−0.921	C	1
85	$2s3d-2p4d$	$^3D-{}^3P^\circ$				15–9						1
				196.997	1 327 388–1 835 010	7–5	5.25+00	2.18−03	9.90−03	−1.816	D	LS
				196.841	1 327 265–1 835 290	5–3	4.68+00	1.63−03	5.28−03	−2.089	E+	LS
				196.949	1 327 265–1 835 010	5–5	9.35−01	5.44−04	1.76−03	−2.565	E+	LS
				196.826	1 327 226–1 835 290	3–3	1.56+00	9.08−04	1.77−03	−2.565	E+	LS
				196.934	1 327 226–1 835 010	3–5	6.24−02	6.05−05	1.18−04	−3.741	E	LS
86		$^1D-{}^1F^\circ$		203.616	1 347 740–1 838 860	5–7	1.36+01	1.18−02	3.95−02	−1.229	D+	1
87	$2s3d-2s5p$	$^1D-{}^1P^\circ$		203.595	1 347 740–1 838 910	5–3	9.41+00	3.51−03	1.18−02	−1.756	D	1
88	$2s3d-2p5d$	$^1D-{}^1F^\circ$		153.754	1 347 740–1 998 130	5–7	1.02+01	5.08−03	1.29−02	−1.595	D	1

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No.	Transition array	Mult.	$\lambda_{\rm air}$ (Å)	$\lambda_{\rm vac}$ (Å) or σ (cm^{-1})$^{\rm a}$	$E_i - E_k$ (cm^{-1})	$g_i - g_k$	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
89	$2p3s-2p3p$	$^3P^\circ - ^3D$	*2 531*	*2 531*	*1 401 342–1 440 846*	9–15	8.82−01	1.41−01	1.06+01	0.103	B+	1
			2 519.4	2 520.2	1 402 200–1 441 880	5–7	8.93−01	1.19−01	4.94+00	−0.225	B+	LS
			2 512.4	2 513.2	1 400 470–1 440 260	3–5	6.78−01	1.07−01	2.66+00	−0.493	B+	LS
			2 515.6	2 516.4	1 399 670–1 439 410	1–3	4.99−01	1.42−01	1.18+00	−0.848	B	LS
			2 626.6	2 627.4	1 402 200–1 440 260	5–5	1.98−01	2.05−02	8.87−01	−0.989	B	LS
			2 567.3	2 568.1	1 400 470–1 439 410	3–3	3.53−01	3.49−02	8.85−01	−0.980	B	LS
			2 686.7	2 687.4	1 402 200–1 439 410	5–3	2.05−02	1.33−03	5.88−02	−2.177	D+	LS
90		$^3P^\circ - ^3S$		*1 959*	*1 401 342–1 452 400*	9–3	1.87+00	3.59−02	2.08+00	−0.491	B	1
				1 992.0	1 402 200–1 452 400	5–3	9.89−01	3.53−02	1.16+00	−0.753	B	LS
				1 925.7	1 400 470–1 452 400	3–3	6.57−01	3.65−02	6.94−01	−0.961	B	LS
				1 896.5	1 399 670–1 452 400	1–3	2.29−01	3.70−02	2.31−01	−1.432	C	LS
91		$^3P^\circ - ^3P$				9–9						1
				1 707.36	1 402 200–1 460 770	5–5	2.43+00	1.06−01	2.98+00	−0.276	B+	LS
				1 684.07	1 400 470–1 459 850	3–3	8.42−01	3.58−02	5.95−01	−0.969	C+	LS
				1 734.61	1 402 200–1 459 850	5–3	1.29+00	3.48−02	9.94−01	−0.759	B	LS
				1 658.37	1 400 470–1 460 770	3–5	8.82−01	6.06−02	9.93−01	−0.740	B	LS
				1 661.68	1 399 670–1 459 850	1–3	1.17+00	1.45−01	7.93−01	−0.839	B	LS
92		$^1P^\circ - ^1P$	14 584	14 588	1 426 125–1 432 980	3–3	3.45−03	1.10−02	1.58+00	−1.481	B	1
93		$^1P^\circ - ^1D$	2 063.1	2 063.8	1 426 125–1 474 580	3–5	2.03+00	2.16−01	4.40+00	−0.188	B+	1
94		$^1P^\circ - ^1S$		1 805.5	1 426 125–1 481 510	3–1	4.17+00	6.80−02	1.21+00	−0.690	B	1
95	$2p3s-2s4s$	$^1P^\circ - ^1S$		433.473	1 426 125–1 656 820	3–1	2.46+00	2.31−03	9.89−03	−2.159	D	1
96	$2p3s-2s4d$	$^1P^\circ - ^1D$		379.010	1 426 125–1 689 970	3–5	1.78+01	6.40−02	2.40−01	−0.717	C+	1
97	$2p3s-2p4p$	$^3P^\circ - ^3D$				9–15						1
				240.912	1 402 200–1 817 290	5–7	1.14+02	1.39−01	5.51−01	−0.158	C+	LS
				240.651	1 400 470–1 816 010	3–5	8.57+01	1.24−01	2.95−01	−0.429	C+	LS
				241.657	1 402 200–1 816 010	5–5	2.82+01	2.47−02	9.83−02	−0.908	C	LS
98		$^3P^\circ - ^3P$				9–9						1
				237.710	1 402 200–1 822 880	5–5	7.40+01	6.27−02	2.45−01	−0.504	C+	LS
				236.737	1 400 470–1 822 880	3–5	2.50+01	3.50−02	8.18−02	−0.979	C	LS
99		$^1P^\circ - ^1P$		258.355	1 426 125–1 813 190	3–3	1.09+02	1.09−01	2.78−01	−0.485	C+	1
100		$^1P^\circ - ^1D$		249.057	1 426 125–1 827 640	3–5	9.42+01	1.46−01	3.59−01	−0.359	C+	1
101	$2p3s-2s5d$	$^1P^\circ - ^1D$		236.499	1 426 125–1 848 960	3–5	1.03+01	1.44−02	3.36−02	−1.365	D+	1
102	$2p3s-2p5p$	$^3P^\circ - ^3P$				9–9						1
				170.509	1 402 200–1 988 680	5–5	4.45+01	1.94−02	5.44−02	−1.013	D+	LS
				170.007	1 400 470–1 988 680	3–5	1.50+01	1.08−02	1.81−02	−1.489	D	LS
103		$^1P^\circ - ^1D$		177.175	1 426 125–1 990 540	3–5	5.62+01	4.41−02	7.72−02	−0.878	C	1
104	$2p3p-2p3d$	$^1P - ^1D^\circ$	2 763.9	2 764.7	1 432 980–1 469 150	3–5	4.31−01	8.23−02	2.25+00	−0.607	B+	1
105		$^1P - ^1P^\circ$		1 238.39	1 432 980–1 513 730	3–3	3.47+00	7.98−02	9.76−01	−0.621	B	1
106		$^3D - ^3D^\circ$	*2 231*	*2 232*	*1 440 846–1 485 645*	15–15	2.33−01	1.74−02	1.92+00	−0.583	C+	1
			2 261.7	2 262.4	1 441 880–1 486 080	7–7	1.99−01	1.53−02	7.98−01	−0.970	B	LS
			2 217.6	2 218.3	1 440 260–1 485 340	5–5	1.65−01	1.22−02	4.45−01	−1.215	C+	LS

TABLE 32. Transition probabilities of allowed lines for Na VIII (references for this table are as follows: 1=Tully *et al.*,[113] 2=Tachiev and Froese Fischer,[94] 3=Curtis *et al.*,[19] 4=Safronova *et al.*,[80] and 5=Safronova *et al.*[82])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})$^{\mathrm{a}}$	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
			2 186.1	2 186.7	1 439 410–1 485 140	3–3	1.86−01	1.33−02	2.87−01	−1.399	C+	LS
			2 300.3	2 301.0	1 441 880–1 485 340	7–5	3.32−02	1.88−03	9.97−02	−1.881	C	LS
			2 227.5	2 228.2	1 440 260–1 485 140	5–3	5.87−02	2.62−03	9.61−02	−1.883	C	LS
			2 181.8	2 182.5	1 440 260–1 486 080	5–7	2.78−02	2.78−03	9.99−02	−1.857	C	LS
			2 176.5	2 177.2	1 439 410–1 485 340	3–5	3.77−02	4.46−03	9.59−02	−1.874	C	LS
107		$^{3}\mathrm{D}-{}^{3}\mathrm{P}^{\circ}$		*1 943*	*1 440 846–1 492 308*	15–9	3.21−01	1.09−02	1.05+00	−0.786	C+	1
				1 996.0	1 441 880–1 491 980	7–5	2.48−01	1.06−02	4.88−01	−1.130	C+	LS
				1 909.5	1 440 260–1 492 630	5–3	2.54−01	8.33−03	2.62−01	−1.380	C+	LS
				1 866.7	1 439 410–1 492 980	3–1	3.62−01	6.31−03	1.16−01	−1.723	C	LS
				1 933.5	1 440 260–1 491 980	5–5	4.89−02	2.74−03	8.72−02	−1.863	C	LS
				1 879.0	1 439 410–1 492 630	3–3	8.88−02	4.70−03	8.72−02	−1.851	C	LS
				1 902.2	1 439 410–1 491 980	3–5	3.43−03	3.10−04	5.82−03	−3.032	E+	LS
108		$^{3}\mathrm{S}-{}^{3}\mathrm{P}^{\circ}$	*2 505*	*2 506*	*1 452 400–1 492 308*	3–9	5.95−01	1.68−01	4.16+00	−0.298	B	1
			2 525.8	2 526.5	1 452 400–1 491 980	3–5	5.81−01	9.26−02	2.31+00	−0.556	B+	LS
			2 485.0	2 485.7	1 452 400–1 492 630	3–3	6.10−01	5.65−02	1.39+00	−0.771	B	LS
			2 463.5	2 464.3	1 452 400–1 492 980	3–1	6.26−01	1.90−02	4.62−01	−1.244	C+	LS
109		$^{3}\mathrm{P}-{}^{3}\mathrm{D}^{\circ}$				9–15						1
			3 949.9	3 951.0	1 460 770–1 486 080	5–7	1.52−01	4.99−02	3.25+00	−0.603	B+	LS
			3 922.0	3 923.1	1 459 850–1 485 340	3–5	1.17−01	4.49−02	1.74+00	−0.871	B	LS
			4 068.9	4 070.0	1 460 770–1 485 340	5–5	3.49−02	8.66−03	5.80−01	−1.364	C+	LS
			3 953.0	3 954.1	1 459 850–1 485 140	3–3	6.36−02	1.49−02	5.82−01	−1.350	C+	LS
			4 102.2	4 103.4	1 460 770–1 485 140	5–3	3.78−03	5.72−04	3.86−02	−2.544	D+	LS
110		$^{3}\mathrm{P}-{}^{3}\mathrm{P}^{\circ}$				9–9						1
			3 203.2	3 204.1	1 460 770–1 491 980	5–5	8.71−02	1.34−02	7.07−01	−1.174	B	LS
			3 049.8	3 050.6	1 459 850–1 492 630	3–3	3.37−02	4.70−03	1.42−01	−1.851	C	LS
			3 137.8	3 138.7	1 460 770–1 492 630	5–3	5.16−02	4.57−03	2.36−01	−1.641	C	LS
			3 017.5	3 018.4	1 459 850–1 492 980	3–1	1.39−01	6.34−03	1.89−01	−1.721	C	LS
			3 111.5	3 112.4	1 459 850–1 491 980	3–5	3.17−02	7.68−03	2.36−01	−1.638	C	LS
111		$^{1}\mathrm{D}-{}^{1}\mathrm{F}^{\circ}$	3 010.3	3 011.1	1 474 580–1 507 790	5–7	5.10−01	9.71−02	4.81+00	−0.314	B+	1
112		$^{1}\mathrm{D}-{}^{1}\mathrm{P}^{\circ}$	2 553.5	2 554.3	1 474 580–1 513 730	5–3	3.61−02	2.12−03	8.91−02	−1.975	C	1
113		$^{1}\mathrm{S}-{}^{1}\mathrm{P}^{\circ}$	3 102.8	3 103.7	1 481 510–1513 730	1–3	2.59−01	1.12−01	1.14+00	−0.951	B	1
114	$2p3p-2s4p$	$^{1}\mathrm{D}-{}^{1}\mathrm{P}^{\circ}$		502.993	1 474 580–1 673 390	5–3	1.32+00	3.01−03	2.49−02	−1.822	D+	1
115		$^{1}\mathrm{S}-{}^{1}\mathrm{P}^{\circ}$		521.159	1 481 510–1 673 390	1–3	2.08+00	2.54−02	4.36−02	−1.595	D+	1
116	$2p3p-2p4d$	$^{1}\mathrm{P}-{}^{1}\mathrm{D}^{\circ}$		253.428	1 432 980–1 827 570	3–5	2.27+02	3.64−01	9.11−01	0.038	B	1
117		$^{1}\mathrm{P}-{}^{1}\mathrm{P}^{\circ}$		243.825	1 432 980–1 843 110	3–3	3.69+01	3.29−02	7.92−02	−1.006	C	1
118		$^{3}\mathrm{D}-{}^{3}\mathrm{D}^{\circ}$				15–15						1
				255.330	1 441 880–1 833 530	7–7	6.18+01	6.04−02	3.55−01	−0.374	C+	LS
				254.278	1 440 260–1 833 530	5–7	7.88+00	1.07−02	4.48−02	−1.272	D+	LS
119		$^{3}\mathrm{D}-{}^{3}\mathrm{P}^{\circ}$				15–9						1
				254.369	1 441 880–1 835 010	7–5	5.40+00	3.74−03	2.19−02	−1.582	D	LS
				253.145	1 440 260–1 835 290	5–3	4.89+00	2.82−03	1.18−02	−1.851	D	LS
				253.325	1 440 260–1 835 010	5–5	9.77−01	9.40−04	3.92−03	−2.328	E+	LS
				252.602	1 439 410–1 835 290	3–3	1.64+00	1.57−03	3.92−03	−2.327	E+	LS
				252.781	1 439 410–1 835 010	3–5	6.58−02	1.05−04	2.62−04	−3.502	E	LS

TABLE 32. Transition probabilities of allowed lines for Na VIII (references for this table are as follows: 1=Tully *et al.*,[113] 2=Tachiev and Froese Fischer,[94] 3=Curtis *et al.*,[19] 4=Safronova *et al.*,[80] and 5=Safronova *et al.*[82])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})$^{\mathrm{a}}$	$E_i - E_k$ (cm^{-1})	$g_i - g_k$	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
120		^{3}S–^{3}P$^{\circ}$				3–9						1
				261.363	1 452 400–1 835 010	3–5	1.18+02	2.02−01	5.21−01	−0.218	C+	LS
				261.172	1 452 400–1 835 290	3–3	1.18+02	1.21−01	3.12−01	−0.440	C+	LS
121		^{3}P–^{3}D$^{\circ}$				9–15						1
				268.269	1 460 770–1 833 530	5–7	2.16+02	3.26−01	1.44+00	0.212	B	LS
122		^{3}P–^{3}P$^{\circ}$				9–9						1
				267.208	1 460 770–1 835 010	5–5	6.85+01	7.33−02	3.22−01	−0.436	C+	LS
				266.354	1 459 850–1 835 290	3–3	2.30+01	2.45−02	6.44−02	−1.134	C	LS
				267.008	1 460 770–1 835 290	5–3	3.82+01	2.45−02	1.08−01	−0.912	C	LS
				266.553	1 459 850–1 835 010	3–5	2.30+01	4.08−02	1.07−01	−0.912	C	LS
123		^{1}D–^{1}D$^{\circ}$		283.294	1 474 580–1 827 570	5–5	7.98+01	9.60−02	4.48−01	−0.319	C+	1
124		^{1}D–^{1}F$^{\circ}$		274.514	1 474 580–1 838 860	5–7	2.27+02	3.59−01	1.62+00	0.254	B	1
125		^{1}D–^{1}P$^{\circ}$		271.348	1 474 580–1 843 110	5–3	5.62+00	3.72−03	1.66−02	−1.730	D	1
126		^{1}S–^{1}P$^{\circ}$		276.549	1 481 510–1 843 110	1–3	1.03+02	3.56−01	3.24−01	−0.449	C+	1
127	$2p3p-2s5p$	^{1}P–^{1}P$^{\circ}$		246.348	1 432 980–1 838 910	3–3	6.12+01	5.57−02	1.36−01	−0.777	C	1
128		^{1}S–^{1}P$^{\circ}$		279.799	1 481 510–1 838 910	1–3	5.79+01	2.04−01	1.88−01	−0.690	C	1
129	$2p3p-2p5d$	^{1}P–^{1}D$^{\circ}$		179.134	1 432 980–1 991 220	3–5	1.19+02	9.52−02	1.68−01	−0.544	C	1
130		^{3}D–^{3}D$^{\circ}$				15–15						1
				180.999	1 441 880–1 994 370	7–7	3.42+01	1.68−02	7.01−02	−0.930	C	LS
				180.470	1 440 260–1 994 370	5–7	4.33+00	2.96−03	8.79−03	−1.830	D	LS
131		^{3}S–^{3}P$^{\circ}$				3–9						1
				184.322	1 452 400–1 994 930	3–5	7.99+01	6.78−02	1.23−01	−0.692	C	LS
				184.230	1 452 400–1 995 200	3–3	8.00+01	4.07−02	7.41−02	−0.913	C	LS
132		^{3}P–^{3}D$^{\circ}$				9–15						1
				187.406	1 460 770–1 994 370	5–7	1.09+02	8.04−02	2.48−01	−0.396	C+	LS
133		^{3}P–^{3}P$^{\circ}$				9–9						1
				187.210	1 460 770–1 994 930	5–5	3.98+01	2.09−02	6.44−02	−0.981	D+	LS
				186.794	1 459 850–1 995 200	3–3	1.33+01	6.97−03	1.29−02	−1.680	D	LS
				187.115	1 460 770–1 995 200	5–3	2.21+01	6.96−03	2.14−02	−1.458	D	LS
				186.888	1 459 850–1 994 930	3–5	1.33+01	1.16−02	2.14−02	−1.458	D	LS
134		^{1}D–^{1}D$^{\circ}$		193.558	1 474 580–1 991 220	5–5	3.79+01	2.13−02	6.79−02	−0.973	C	1
135		^{1}D–^{1}F$^{\circ}$		191.004	1 474 580–1 998 130	5–7	1.20+02	9.21−02	2.90−01	−0.337	C+	1
136	$2p3p-2p6d$	^{3}D–^{3}D$^{\circ}$		*156.34*	*1 440 846–2 080 460*	15–15	2.26+01	8.28−03	6.40−02	−0.906	D	1
				156.597	1 441 880–2 080 460	7–7	2.00+01	7.35−03	2.65−02	−1.289	D+	LS
				156.201	1 440 260–2 080 460	5–5	1.58+01	5.77−03	1.48−02	−1.540	D	LS
				155.994	1 439 410–2 080 460	3–3	1.70+01	6.22−03	9.58−03	−1.729	D	LS
				156.597	1 441 880–2 080 460	7–5	3.51+00	9.21−04	3.32−03	−2.191	E+	LS
				156.201	1 440 260–2 080 460	5–3	5.65+00	1.24−03	3.19−03	−2.208	E+	LS
				156.201	1 440 260–2 080 460	5–7	2.52+00	1.29−03	3.32−03	−2.190	E+	LS
				155.994	1 439 410–2 080 460	3–5	3.40+00	2.07−03	3.19−03	−2.207	E+	LS

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No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
137		$^{3}\mathrm{P}-^{3}\mathrm{D}^{\circ}$				9–15						1
				161.371	1 460 770–2 080 460	5–7	6.06+01	3.31−02	8.79−02	−0.781	C	LS
				161.132	1 459 850–2 080 460	3–5	4.56+01	2.96−02	4.71−02	−1.052	D+	LS
				161.371	1 460 770–2 080 460	5–5	1.51+01	5.91−03	1.57−02	−1.529	D	LS
				161.132	1 459 850–2 080 460	3–3	2.53+01	9.86−03	1.57−02	−1.529	D	LS
				161.371	1 460 770–2 080 460	5–3	1.68+00	3.94−04	1.05−03	−2.706	E	LS
138	$2p3d-2p3p$	$^{1}\mathrm{D}^{\circ}-^{1}\mathrm{D}$	18 411	18 416	1 469 150–1 474 580	5–5	4.01−04	2.04−03	6.18−01	−1.991	B	1
139	$2p3d-2s4s$	$^{3}\mathrm{P}^{\circ}-^{3}\mathrm{S}$		*636.2*	*1 492 308–1 649 480*	9–3	3.38−01	6.84−04	1.29−02	−2.211	E+	1
				634.92	1 491 980–1 649 480	5–3	1.89−01	6.85−04	7.16−03	−2.465	D	LS
				637.55	1 492 630–1 649 480	3–3	1.12−01	6.82−04	4.29−03	−2.689	E+	LS
				638.98	1 492 980–1 649 480	1–3	3.71−02	6.81−04	1.43−03	−3.167	E	LS
140	$2p3d-2s4d$	$^{3}\mathrm{P}^{\circ}-^{3}\mathrm{D}$		*523.39*	*1 492 308–1 683 370*	9–15	1.71+00	1.17−02	1.82−01	−0.978	D+	1
				522.493	1 491 980–1 683 370	5–7	1.72+00	9.86−03	8.48−02	−1.307	C	LS
				524.274	1 492 630–1 683 370	3–5	1.28+00	8.77−03	4.54−02	−1.580	D+	LS
				525.238	1 492 980–1 683 370	1–3	9.43−01	1.17−02	2.02−02	−1.932	D	LS
				522.493	1 491 980–1 683 370	5–5	4.30−01	1.76−03	1.51−02	−2.056	D	LS
				524.274	1 492 630–1 683 370	3–3	7.09−01	2.92−03	1.51−02	−2.057	D	LS
				522.493	1 491 980–1 683 370	5–3	4.76−02	1.17−04	1.01−03	−3.233	E	LS
141		$^{1}\mathrm{F}^{\circ}-^{1}\mathrm{D}$		548.908	1 507 790–1 689 970	7-5	6.01−01	1.94−03	2.45−02	−1.867	D+	1
142		$^{1}\mathrm{P}^{\circ}-^{1}\mathrm{D}$		567.41	1 513 730–1 689 970	3–5	1.78+00	1.43−02	8.01−02	−1.368	C	1
143	$2p3d-2p4p$	$^{1}\mathrm{D}^{\circ}-^{1}\mathrm{P}$		290.664	1 469 150–1 813 190	5–3	1.92+01	1.46−02	6.99−02	−1.137	C	1
144		$^{3}\mathrm{D}^{\circ}-^{3}\mathrm{D}$				15–15						1
				301.923	1 486 080–1 817 290	7–7	3.49+00	4.77−03	3.32−02	−1.476	D+	LS
				302.416	1 485 340–1 816 010	5–5	2.72+00	3.73−03	1.86−02	−1.729	D	LS
				303.095	1 486 080–1 816 010	7–5	6.06−01	5.96−04	4.16−03	−2.380	E+	LS
				301.250	1 485 340–1 817 290	5–7	4.40−01	8.39−04	4.16−03	−2.377	E+	LS
				302.234	1 485 140–1 816 010	3–5	5.87−01	1.34−03	4.00−03	−2.396	E+	LS
145		$^{3}\mathrm{D}^{\circ}-^{3}\mathrm{P}$				15–9						1
				296.912	1 486 080–1 822 880	7–5	1.53+01	1.44−02	9.85−02	−0.997	C	LS
				296.261	1 485 340–1 822 880	5–5	2.74+00	3.61−03	1.76−02	−1.744	D	LS
				296.086	1 485 140–1 822 880	3–5	1.83−01	4.01−04	1.17−03	−2.920	E	LS
146		$^{3}\mathrm{P}^{\circ}-^{3}\mathrm{D}$				9–15						1
				307.399	1 491 980–1 817 290	5–7	7.97+00	1.58−02	7.99−02	−1.102	C	LS
				309.234	1 492 630–1 816 010	3–5	5.86+00	1.40−02	4.28−02	−1.377	D+	LS
				308.613	1 491 980–1 816 010	5–5	1.96+00	2.80−03	1.42−02	−1.854	D	LS
147		$^{3}\mathrm{P}^{\circ}-^{3}\mathrm{P}$				9–9						1
				302.206	1 491 980–1 822 880	5–5	1.62+00	2.22−03	1.10−02	−1.955	D	LS
				302.801	1 492 630–1 822 880	3–5	5.37−01	1.23−03	3.68−03	−2.433	E+	LS
148		$^{1}\mathrm{F}^{\circ}-^{1}\mathrm{D}$		312.647	1 507 790–1 827 640	7–5	2.26+01	2.37−02	1.71−01	−0.780	C	1
149		$^{1}\mathrm{P}^{\circ}-^{1}\mathrm{P}$		333.934	1 513 730–1 813 190	3–3	1.53+01	2.55−02	8.41−02	−1.116	C	1
150		$^{1}\mathrm{P}^{\circ}-^{1}\mathrm{D}$		318.563	1 513 730–1 827 640	3–5	8.16+00	2.07−02	6.51−02	−1.207	C	1
151	$2p3d-2s5d$?	$^{3}\mathrm{D}^{\circ}-^{3}\mathrm{D}$?		*[275.5]*	*1 485 645–1 848 670*	15–15	1.70+00	1.94−03	2.64−02	−1.536	E+	1

TABLE 32. Transition probabilities of allowed lines for Na VIII (references for this table are as follows: 1=Tully *et al.*,[113] 2=Tachiev and Froese Fischer,[94] 3=Curtis *et al.*,[19] 4=Safronova *et al.*,[80] and 5=Safronova *et al.*[82])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				275.794	1 486 080–1 848 670	7–7	1.51+00	1.72−03	1.09−02	−1.919	D	LS
				275.232	1 485 340–1 848 670	5–5	1.19+00	1.35−03	6.12−03	−2.171	E+	LS
				275.080	1 485 140–1 848 670	3–3	1.28+00	1.45−03	3.94−03	−2.362	E+	LS
				275.794	1 486 080–1 848 670	7–5	2.64−01	2.15−04	1.37−03	−2.822	E	LS
				275.232	1 485 340–1 848 670	5–3	4.26−01	2.90−04	1.31−03	−2.839	E	LS
				275.232	1 485 340–1 848 670	5–7	1.90−01	3.02−04	1.37−03	−2.821	E	LS
				275.080	1 485 140–1 848 670	3–5	2.56−01	4.84−04	1.31−03	−2.838	E	LS
152		^{3}P$^\circ-^3$D?		*[280.6]*	*1 492 308–1 848 670*	9–15	1.39+01	2.74−02	2.27−01	−0.608	D+	1
				280.355	1 491 980–1 848 670	5–7	1.39+01	2.30−02	1.06−01	−0.939	C	LS
				280.867	1 492 630–1 848 670	3–5	1.04+01	2.05−02	5.69−02	−1.211	D+	LS
				281.144	1 492 980–1 848 670	1–3	7.68+00	2.73−02	2.53−02	−1.564	D+	LS
				280.355	1 491 980–1 848 670	5–5	3.49+00	4.11−03	1.90−02	−1.687	D	LS
				280.867	1 492 630–1 848 670	3–3	5.78+00	6.83−03	1.89−02	−1.688	D	LS
				280.355	1 491 980–1 848 670	5–3	3.88−01	2.74−04	1.26−03	−2.863	E	LS
153	2*p*3*d*−2*p*5*p*	^{3}D$^\circ-^3$P				15–9						1
				198.965	1 486 080–1 988 680	7–5	6.75+00	2.86−03	1.31−02	−1.699	D	LS
				198.673	1 485 340–1 988 680	5–5	1.21+00	7.17−04	2.34−03	−2.446	E+	LS
				198.594	1 485 140–1 988 680	3–5	8.09−02	7.97−05	1.56−04	−3.621	E	LS
154		^{1}F$^\circ-^1$D		207.147	1 507 790–1 990 540	7–5	8.05+00	3.70−03	1.77−02	−1.587	D	1
155		^{1}P$^\circ-^1$D		209.727	1 513 730–1 990 540	3–5	3.68+00	4.04−03	8.37−03	−1.916	D	1
156	2*s*4*s*−2*s*4*p*	^{1}S$-^1$P$^\circ$	6 033	6 035	1 656 820–1 673 390	1–3	2.15−01	3.52−01	6.99+00	−0.453	B+	1
157	2*s*4*s*−2*p*4*d*	^{3}S$-^3$P$^\circ$				3–9						1
				538.996	1 649 480–1 835 010	3–5	4.34+00	3.15−02	1.68−01	−1.025	C	LS
				538.184	1 649 480–1 835 290	3–3	4.35+00	1.89−02	1.00−01	−1.246	C	LS
158		^{1}S$-^1$P$^\circ$		536.797	1 656 820–1 843 110	1–3	1.51+01	1.96−01	3.46−01	−0.708	C+	1
159	2*s*4*s*−2*s*5*p*	^{1}S$-^1$P$^\circ$		549.179	1 656 820–1 838 910	1–3	4.34+00	5.89−02	1.06−01	−1.230	C	1
160	2*s*4*s*−2*s*6*p*	^{1}S$-^1$P$^\circ$		364.844	1 656 820–1 930 910	1–3	1.56+01	9.31−02	1.12−01	−1.031	C	1
161	2*s*4*p*−2*s*4*d*	^{1}P$^\circ-^1$D	6 030	6031	1 673 390–1 689 970	3–5	2.38−01	2.16−01	1.29+01	−0.188	A	1
162	2*s*4*p*−2*p*4*p*	^{1}P$^\circ-^1$P		715.31	1 673 390–1 813 190	3–3	1.05+01	8.03−02	5.67−01	−0.618	C+	1
163		^{1}P$^\circ-^1$D		648.30	1 673 390–1 827 640	3–5	3.69+00	3.87−02	2.48−01	−0.935	C+	1
164	2*s*4*p*−2*s*5*d*	^{1}P$^\circ-^1$D		569.57	1 673 390–1 848 960	3–5	4.93+01	4.00−01	2.25+00	0.079	B+	1
165	2*s*4*p*−2*s*6*d*	^{1}P$^\circ-^1$D		381.913	1 673 390–1 935 230	3–5	3.29+01	1.20−01	4.53−01	−0.444	C+	1
166	2*s*4*p*−2*p*5*p*	^{1}P$^\circ-^1$D		315.308	1 673 390–1 990 540	3–5	3.36+00	8.34−03	2.60−02	−1.602	D+	1
167	2*s*4*d*−2*p*4*d*	^{3}D$-^3$D$^\circ$				15–15						1
				665.96	1 683 370–1 833 530	7–7	7.10+00	4.72−02	7.24−01	−0.481	B	LS
				665.96	1 683 370–1 833 530	5–7	8.91−01	8.29−03	9.09−02	−1.382	C	LS
168		^{3}D$-^3$P$^\circ$				15–9						1
				659.46	1 683 370–1 835 010	7–5	1.57+01	7.31−02	1.11+00	−0.291	B	LS
				658.24	1 683 370–1 835 290	5–3	1.41+01	5.50−02	5.96−01	−0.561	C+	LS
				659.46	1 683 370–1 835 010	5–5	2.81+00	1.83−02	1.99−01	−1.039	C	LS
				658.24	1 683 370–1 835 290	3–3	4.70+00	3.05−02	1.98−01	−1.039	C	LS
				659.46	1 683 370–1 835 010	3–5	1.87−01	2.03−03	1.32−02	−2.215	D	LS

TABLE 32. Transition probabilities of allowed lines for Na VIII (references for this table are as follows: 1=Tully *et al.*,[113] 2=Tachiev and Froese Fischer,[94] 3=Curtis *et al.*,[19] 4=Safronova *et al.*,[80] and 5=Safronova *et al.*[82])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})$^{\text{a}}$	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
169		$^1\text{D}-^1\text{D}^\circ$		726.74	1 689 970–1 827 570	5–5	6.02+00	4.77−02	5.71−01	−0.623	C+	1
170		$^1\text{D}-^1\text{F}^\circ$		671.64	1 689 970–1 838 860	5–7	4.83+00	4.57−02	5.05−01	−0.641	C+	1
171	$2s4d-2s5p$	$^1\text{D}-^1\text{P}^\circ$		671.41	1 689 970–1 838 910	5–3	2.18+01	8.84−02	9.77−01	−0.355	B	1
172	$2s4d-2s6p$	$^1\text{D}-^1\text{P}^\circ$		415.041	1 689 970–1 930 910	5–3	6.43+00	9.97−03	6.81−02	−1.302	C	1
173	$2s4d-2p5d$	$^1\text{D}-^1\text{F}^\circ$		324.507	1 689 970–1 998 130	5–7	2.09+00	4.61−03	2.46−02	−1.637	D+	1
174	$2p4p-2p4d$	$^1\text{P}-^1\text{D}^\circ$	6 952	6 954	1 813 190–1 827 570	3–5	1.18−01	1.43−01	9.82+00	−0.368	A	1
175		$^1\text{P}-^1\text{P}^\circ$	3 341.3	3 342.2	1 813 190–1 843 110	3–3	2.04−01	3.41−02	1.13+00	−0.990	B	1
176		$^3\text{D}-^3\text{D}^\circ$				15–15						1
			6 156	6 158	1 817 290–1 833 530	7–7	4.87−02	2.77−02	3.93+00	−0.712	B+	LS
			5 706	5 708	1 816 010–1 833 530	5–7	7.68−03	5.25−03	4.93−01	−1.581	C+	LS
177		$^3\text{D}-^3\text{P}^\circ$				15–9						1
			5 642	5 643	1 817 290–1 835 010	7–5	2.49−02	8.49−03	1.10+00	−1.226	B	LS
			5 185.3	5 186.7	1 816 010–1 835 290	5–3	2.86−02	6.93−03	5.92−01	−1.460	C+	LS
			5 261.7	5 263.2	1 816 010–1 835 010	5–5	5.49−03	2.28−03	1.98−01	−1.943	C	LS
178		$^3\text{P}-^3\text{D}^\circ$				9–15						1
			9 387	9 390	1 822 880–1 833 530	5–7	4.89−02	9.04−02	1.40+01	−0.345	A	LS
179		$^3\text{P}-^3\text{P}^\circ$				9–9						1
			8 242	8 244	1 822 880–1 835 010	5–5	1.91−02	1.95−02	2.65+00	−1.011	B+	LS
			8 056	8 058	1 822 880–1 835 290	5–3	1.14−02	6.65−03	8.82−01	−1.478	B	LS
180		$^1\text{D}-^1\text{F}^\circ$	8 910	8 913	1 827 640–1 838 860	5–7	6.12−02	1.02−01	1.50+01	−0.292	A	1
181		$^1\text{D}-^1\text{P}^\circ$	6 462	6 464	1 827 640–1 843 110	5–3	1.30−02	4.90−03	5.21−01	−1.611	C+	1
182	$2p4p-2s5p$	$^1\text{P}-^1\text{P}^\circ$	3 886.9	3 888.0	1 813 190–1 838 910	3–3	3.84−01	8.71−02	3.34+00	−0.583	B+	1
183		$^1\text{D}-^1\text{P}^\circ$	8 871	8 873	1 827 640–1 838 910	5–3	1.09−04	7.75−05	1.13−02	−3.412	D	1
184	$2p4p-2s6p$	$^1\text{D}-^1\text{P}^\circ$		968.34	1 827 640–1 930 910	5–3	7.65−01	6.45−03	1.03−01	−1.491	C	1
185	$2p4p-2p5d$	$^1\text{P}-^1\text{D}^\circ$		561.703	1 813 190–1 991 220	3–5	4.39+01	3.46−01	1.92+00	0.016	B+	1
186		$^3\text{D}-^3\text{D}^\circ$				15–15						1
				564.72	1 817 290–1 994 370	7–7	1.08+01	5.14−02	6.69−01	−0.444	B	LS
				560.664	1 816 010–1 994 370	5–7	1.38+00	9.09−03	8.39−02	−1.342	C	LS
187		$^3\text{D}-^3\text{P}^\circ$				15–9						1
				562.94	1 817 290–1 994 930	7–5	1.83+00	6.20−03	8.04−02	−1.363	C	LS
				558.067	1 816 010–1 995 200	5–3	1.67+00	4.69−03	4.31−02	−1.630	D+	LS
				558.909	1 816 010–1 994 930	5–5	3.33−01	1.56−03	1.44−02	−2.108	D	LS
188		$^3\text{P}-^3\text{D}^\circ$				9–15						1
				583.12	1 822 880–1 994 370	5–7	4.32+01	3.08−01	2.96+00	0.188	B+	LS
189		$^3\text{P}-^3\text{P}^\circ$				9–9						1
				581.23	1 822 880–1 994 930	5–5	1.43+01	7.26−02	6.95−01	−0.440	B	LS
				580.32	1 822 880–1 995 200	5–3	7.99+00	2.42−02	2.31−01	−0.917	C	LS
190		$^1\text{D}-^1\text{D}^\circ$		611.32	1 827 640–1 991 220	5–5	1.47+01	8.22−02	8.27−01	−0.386	B	1

TABLE 32. Transition probabilities of allowed lines for Na VIII (references for this table are as follows: 1=Tully *et al.*,[113] 2=Tachiev and Froese Fischer,[94] 3=Curtis *et al.*,[19] 4=Safronova *et al.*,[80] and 5=Safronova *et al.*[82])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
191		^{1}D–^{1}F°		586.54	1 827 640–1 998 130	5–7	4.92+01	3.55−01	3.43+00	0.249	B+	1
192	2*p*4*p*–2*p*6*d*	^{3}D–^{3}D°				15–15						1
				379.983	1 817 290–2 080 460	7–7	7.30+00	1.58−02	1.38−01	−0.956	C	LS
				378.143	1 816 010–2 080 460	5–5	5.83+00	1.25−02	7.78−02	−1.204	C	LS
				379.983	1 817 290–2 080 460	7–5	1.29+00	1.99−03	1.74−02	−1.856	D	LS
				378.143	1 816 010–2 080 460	5–3	2.09+00	2.69−03	1.67−02	−1.871	D	LS
				378.143	1 816 010–2 080 460	5–7	9.30−01	2.79−03	1.74−02	−1.855	D	LS
193		^{3}P–^{3}D°				9–15						1
				388.229	1 822 880–2 080 460	5–7	2.62+01	8.29−02	5.30−01	−0.382	C+	LS
				388.229	1 822 880–2 080 460	5–5	6.55+00	1.48−02	9.46−02	−1.131	C	LS
				388.229	1 822 880–2 080 460	5–3	7.28−01	9.87−04	6.31−03	−2.307	E+	LS
194	2*p*4*d*–2*s*5*d*?	^{3}P°–^{3}D?				9–15						1
			7 319	7 321	1 835 010–1 848 670	5–7	5.79−02	6.51−02	7.84+00	−0.487	A	LS
			7 472	7 474	1 835 290–1 848 670	3–5	4.08−02	5.69−02	4.20+00	−0.768	B+	LS
			7 319	7 321	1 835 010–1 848 670	5–5	1.44−02	1.16−02	1.40+00	−1.237	B	LS
			7 472	7 474	1 835 290–1 848 670	3–3	2.27−02	1.90−02	1.40+00	−1.244	B	LS
			7 319	7 321	1 835 010–1 848 670	5–3	1.61−03	7.75−04	9.34−02	−2.412	C	LS
195		^{1}D°–^{1}D	4 673.8	4 675.1	1 827 570–1 848 960	5–5	6.96−04	2.28−04	1.75−02	−2.943	D	1
196		^{1}F°–^{1}D	9 898	9 901	1 838 860–1 848 960	7–5	2.75−02	2.89−02	6.59+00	−0.694	B+	1
197		^{1}P°–^{1}D	17 089	17 094	1 843 110–1 848 960	3–5	1.41−02	1.03−01	1.74+01	−0.510	A	1
198	2*p*4*d*–2*s*6*d*?	^{3}P°–^{3}D?				9–15						1
				1 016.05	1 835 010–1 933 430	5–7	2.70+00	5.84−02	9.77−01	−0.535	B	LS
				1 018.95	1 835 290–1 933 430	3–5	2.00+00	5.20−02	5.23−01	−0.807	C+	LS
				1 016.05	1 835 010–1 933 430	5–5	6.72−01	1.04−02	1.74−01	−1.284	C	LS
				1 018.95	1 835 290–1 933 430	3–3	1.11+00	1.73−02	1.74−01	−1.285	C	LS
				1 016.05	1 835 010–1 933 430	5–3	7.49−02	6.96−04	1.16−02	−2.458	D	LS
199		^{1}P°–^{1}D		1 085.54	1 843 110–1 935 230	3–5	9.85+00	2.90−01	3.11+00	−0.060	B+	1
200	2*p*4*d*–2*p*5*p*	^{1}D°–^{1}D		613.61	1 827 570–1 990 540	5–5	2.29−01	1.29−03	1.30−02	−2.190	D	1
201		^{3}D°–^{3}P				15–9						1
				644.54	1 833 530–1 988 680	7–5	7.60+00	3.38−02	5.02−01	−0.626	C+	LS
202		^{3}P°–^{3}P				9–9						1
				650.75	1 835 010–1 988 680	5–5	4.13+00	2.62−02	2.81−01	−0.883	C+	LS
				651.93	1 835 290–1 988 680	3–5	1.37+00	1.45−02	9.34−02	−1.362	C	LS
203		^{1}F°–^{1}D		659.28	1 838 860–1 990 540	7–5	7.18+00	3.34−02	5.07−01	−0.631	C+	1
204		^{1}P°–^{1}D		678.29	1 843 110–1 990 540	3–5	1.17+00	1.35−02	9.04−02	−1.393	C	1
205	2*s*5*p*–2*s*5*d*	^{1}P°–^{1}D	9 948	9 950	1 838 910–1 848 960	3–5	7.40−02	1.83−01	1.80+01	−0.260	A	1
206	2*s*5*p*–2*s*6*d*	^{1}P°–^{1}D		1 038.21	1 838 910–1 935 230	3–5	6.16+00	1.66−01	1.70+00	−0.303	B	1
207	2*s*5*p*–2*p*5*p*	^{1}P°–^{1}D		659.50	1 838 910–1 990 540	3–5	9.75−01	1.06−02	6.90−02	−1.498	C	1
208	2*s*5*d*?–2*p*5*d*	^{3}D?–^{3}D°				15–15						1
				686.34	1 848 670–1 994 370	7–7	6.26+00	4.42−02	6.99−01	−0.509	B	LS
				686.34	1 848 670–1 994 370	5–7	7.84−01	7.75−03	8.76−02	−1.412	C	LS

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No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
209		^{3}D?−^{3}P$^\circ$				15–9						1
				683.71	1 848 670–1 994 930	7–5	3.20+00	1.60−02	2.52−01	−0.951	C+	LS
				682.45	1 848 670–1 995 200	5–3	2.86+00	1.20−02	1.35−01	−1.222	C	LS
				683.71	1 848 670–1 994 930	5–5	5.71−01	4.00−03	4.50−02	−1.699	D+	LS
				682.45	1 848 670–1 995 200	3–3	9.57−01	6.68−03	4.50−02	−1.698	D+	LS
				683.71	1 848 670–1 994 930	3–5	3.80−02	4.44−04	3.00−03	−2.875	E+	LS
210	$2s5d-2s6p$	^{1}D−^{1}P$^\circ$		1 220.26	1 848 960–1 930 910	5–3	7.00+00	9.38−02	1.88+00	−0.329	B+	1
211	$2s5d-2p5d$	^{1}D−^{1}D$^\circ$		702.94	1 848 960–1 991 220	5–5	7.57+00	5.61−02	6.49−01	−0.552	B	1
212		^{1}D−^{1}F$^\circ$		670.38	1 848 960–1 998 130	5–7	7.61+00	7.18−02	7.92−01	−0.445	B	1
213	$2s6p-2s6d$	^{1}P$^\circ$−^{1}D		4 320 cm^{-1}	1 930 910–1 935 230	3–5	2.61−02	3.49−01	7.98+01	0.020	A	1
214	$2s6p-2p5p$	^{1}P$^\circ$−^{1}D		1 677.01	1 930 910–1 990 540	3–5	1.61+00	1.13−01	1.87+00	−0.470	B+	1
215	$2s6d?-2p5d$	^{3}D?−^{3}P$^\circ$				15–9						1
				1 626.02	1 933 430–1 994 930	7–5	3.89−02	1.10−03	4.12−02	−2.114	D+	LS
				1 618.91	1 933 430–1 995 200	5–3	3.52−02	8.30−04	2.21−02	−2.382	D	LS
				1 626.02	1 933 430–1 994 930	5–5	6.96−03	2.76−04	7.39−03	−2.860	D	LS
				1 618.91	1 933 430–1 995 200	3–3	1.17−02	4.61−04	7.37−03	−2.859	D	LS
				1 626.02	1 933 430–1 994 930	3–5	4.63−04	3.06−05	4.91−04	−4.037	E	LS
216	$2s6d?-2p6d$	^{3}D?−^{3}D$^\circ$		*[680]*	*1 933 430–2 080 460*	15–15	6.63+00	4.60−02	1.54+00	−0.161	C+	1
				680.13	1 933 430–2 080 460	7–7	5.88+00	4.08−02	6.39−01	−0.544	B	LS
				680.13	1 933 430–2 080 460	5–5	4.61+00	3.20−02	3.58−01	−0.796	C+	LS
				680.13	1 933 430–2 080 460	3–3	4.97+00	3.45−02	2.32−01	−0.985	C	LS
				680.13	1 933 430–2 080 460	7–5	1.03+00	5.12−03	8.02−02	−1.446	C	LS
				680.13	1 933 430–2 080 460	5–3	1.66+00	6.90−03	7.72−02	−1.462	C	LS
				680.13	1 933 430–2 080 460	5–7	7.38−01	7.17−03	8.03−02	−1.446	C	LS
				680.13	1 933 430–2 080 460	3–5	9.95−01	1.15−02	7.72−02	−1.462	C	LS
217	$2s6d-2p5d$	^{1}D−^{1}F$^\circ$		1 589.83	1 935 230–1 998 130	5–7	8.78−02	4.66−03	1.22−01	−1.633	C	1
218	$2p5p-2p5d$	^{3}P−^{3}D$^\circ$				9–15						1
			17 570	17 575	1 988 680–1 994 370	5–7	2.05−02	1.33−01	3.85+01	−0.177	A	LS
219		^{3}P−^{3}P$^\circ$				9–9						1
			15 996	16 000	1 988 680–1 994 930	5–5	7.87−03	3.02−02	7.95+00	−0.821	A	LS
			15 333	15 337	1 988 680–1 995 200	5–3	4.96−03	1.05−02	2.65+00	−1.280	B+	LS
220		^{1}D−^{1}D$^\circ$		680 cm^{-1}	1 990 540–1 991 220	5–5	7.68−06	2.49−03	6.03+00	−1.905	B+	1
221		^{1}D−^{1}F$^\circ$	13 172	13 175	1 990 540–1 998 130	5–7	3.35−02	1.22−01	2.65+01	−0.215	A	1
222	$2p5p-2p6d$	^{3}P−^{3}D$^\circ$				9–15						1
				1 089.56	1 988 680–2 080 460	5–7	1.22+01	3.03−01	5.43+00	0.180	B+	LS
				1 089.56	1 988 680–2 080 460	5–5	3.04+00	5.41−02	9.70−01	−0.568	B	LS
				1 089.56	1 988 680–2 080 460	5–3	3.38−01	3.61−03	6.47−02	−1.744	C	L

[a] Wavelength (Å) are always given unless cm^{-1} is indicated.

10.8.3. Forbidden Transitions for Na VIII

The MCHF results of Tachiev and Froese Fischer[94] and the second-order relativistic MBPT results of Safronova *et al.*[82] were used for all the compiled transitions.

To estimate accuracies, we pooled the relative standard deviation of the mean (RSDM) for each of the lines with transition rates published in both of the references,[82,94] as described in the general introduction.

10.8.4. References for Forbidden Transitions for Na VIII

[82] U. I. Safronova, W. R. Johnson, M. S. Safronova, and A. Derevianko, Phys. Scr. **59**, 286 (1999).

[86] G. Tachiev and C. Froese Fischer, J. Phys. B **32**, 5805 (1999).

[94] G. Tachiev and C. Froese Fischer, http://www.vuse.vanderbilt.edu/~cff/mchf_collection/ (MCHF, *ab initio*), downloaded on May 6, 2002. See Tachiev and Froese Fuscher (Ref. 86).

TABLE 33. Wavelength finding list for forbidden lines for Na VIII

Wavelength (vac) (Å)	Mult. No.	Wavelength (vac) (Å)	Mult. No.	Wavelength (vac) (Å)	Mult. No.
779.36	2	848.71	7	857.66	4
779.92	1	852.31	4	869.64	4
Wavelength (air) (Å)	**Mult. No.**	**Wavelength (air) (Å)**	**Mult. No.**	**Wavelength (air) (Å)**	**Mult. No.**
3 044.6	6	3 182.2	6		
Wavenumber (cm^{-1})	**Mult. No.**	**Wavenumber (cm^{-1})**	**Mult. No.**	**Wavenumber (cm^{-1})**	**Mult. No.**
2 338	3	1 419	5	732	3
1 606	3	834	5		

TABLE 34. Transition probabilities of forbidden lines for Na VIII (references for this table are as follows: 1=Tachiev and Froese Fischer[94] and 2 =Safronova *et al.*[82])

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i–E_k (cm^{-1})	g_i–g_k	Type	A_{ki} (s^{-1})	S (a.u.)	Acc.	Source
1	$2s^2$–$2s2p$	^1S–$^3P^\circ$									
				[779.9]	0–128 218	1–5	M2	8.60−02	8.32+00	A	1
2	$2s^2$–$2p^2$	^1S–^3P									
				[304.590]	0–328 310	1–3	M1	1.43+00	4.49−06	D	2
3	$2s2p$–$2s2p$	$^3P^\circ$–$^3P^\circ$									
				1 606 cm^{-1}	126 612–128 218	3–5	M1	5.59−02	2.50+00	A+	1,2
				1 606 cm^{-1}	126 612–128 218	3–5	E2	3.38−08	1.41−01	A	1
				732 cm^{-1}	125 880–126 612	1–3	M1	7.10−03	2.01+00	A+	1,2
				2 338 cm^{-1}	125 880–128 218	1–5	E2	9.82−08	6.28−02	B+	1
4		$^3P^\circ$–$^1P^\circ$									
				[857.7]	126 612–243 208	3–3	M1	1.85+00	1.29−04	D+	1,2
				[857.7]	126 612–243 208	3–3	E2	2.60−02	3.23−05	D+	1
				[869.6]	128 218–243 208	5–3	M1	2.92+00	2.14−04	D+	1,2
				[869.6]	128 218–243 208	5–3	E2	1.20−02	1.59−05	D+	1
				[852.3]	125 880–243 208	1–3	M1	2.45+00	1.68−04	D+	1,2
5	$2p^2$–$2p^2$	^3P–^3P									
				1 419 cm^{-1}	328 310–329 729	3–5	M1	3.93−02	2.55+00	A+	2
				834 cm^{-1}	327 476–328 310	1–3	M1	1.06−02	2.03+00	A+	2
6		^3P–^1D									
			[3 045]	[3 046]	328 310–361 145	3–5	M1	3.03−01	1.59−03	C+	2
			[3 182]	[3 183]	329 729–361 145	5–5	M1	8.12−01	4.85−03	B	2
7		^3P–^1S									
				[848.7]	328 310–446 136	3–1	M1	2.05+01	4.65−04	C	2

[a] Wavelengths (Å) are always given unless cm^{-1} is indicated.

10.9. Na IX

Lithium isoelectronic sequence
Ground state: $1s^22s\ ^2S_{1/2}$
Ionization energy: 299.864 eV=2 418 570 cm^{-1}

10.9.1. Allowed Transitions for Na IX

In general the transition rates from different sources for this lithiumlike spectrum have proven to be in good agreement, including the results of the OP.[76] OP values do not include spin-orbit or other relativistic effects, which we do not, however, expect to be important in this alkali spectrum. Most of the compiled data below have been taken from this source. The high-quality (based on good overall agreement) data utilized from the other references.[59,127,129] were generally available for only the lower-lying transitions.

To estimate accuracies, we pooled the relative standard deviation of the mean (RSDM) for each of the lines with transition rates published in two or more references,[59,76,105,127,129] as described in the general introduction.

10.9.2. References for Allowed Transitions for Na IX

[59] I. Martin, J. Karwowski, G. H. F. Diercksen, and C. Barrientos, Astron. Astrophys., Suppl. Ser. **100**, 595 (1993).
[74] G. Peach, H. E. Saraph, and M. J. Seaton, J. Phys. B **21**, 3669 (1988).
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[105] C. E. Theodosiou, L. J. Curtis, and M. El-Mekki, Phys. Rev. A **44**, 7144 (1991).
[127] Z.-C. Yan, M. Tambasco, and G. W. F. Drake, Phys. Rev. A **57**, 1652 (1998).
[129] H. L. Zhang, H. H. Sampson, and C. J. Fontes, At. Data Nucl. Data Tables **44**, 31 (1990).

TABLE 35. Wavelength finding list for allowed lines for Na IX

Wavelength (vac) (Å)	Mult. No.	Wavelength (vac) (Å)	Mult. No.	Wavelength (vac) (Å)	Mult. No.	Wavelength (vac) (Å)	Mult. No.
44.725	6	77.923	8	208.121	16	485.225	37
46.090	5	81.176	7	223.774	22	506.714	40
47.776	14	81.350	7	223.994	22	507.537	40
47.836	14	116.287	19	224.155	22	512.610	36
48.553	4	121.686	26	234.318	27	513.479	36
49.326	13	121.797	26	234.428	27	542.388	45
49.386	13	121.798	26	234.500	27	563.16	48
49.390	13	124.086	30	235.305	21	563.19	48
52.116	12	124.117	30	235.727	21	577.93	50
52.186	12	125.989	18	252.819	34	578.10	50
52.187	12	132.272	25	262.660	39	681.72	1
52.426	11	132.377	25	262.881	39	694.15	1
52.498	11	132.405	25	262.888	39	846.38	44
53.857	3	135.195	29	267.637	42	893.26	47
53.867	3	135.232	29	267.867	42	894.53	47
58.201	10	146.274	17	303.656	33	936.24	49
58.279	10	154.443	24	317.511	38	936.68	49
58.290	10	154.612	24	317.682	38	1 481.48	52
58.952	9	154.624	24	317.844	38	1 481.70	52
59.044	9	157.196	23	325.288	41	1 550.39	53
70.615	2	157.384	23	325.627	41	1 554.24	53
70.653	2	158.831	28	456.100	32		
77.764	8	158.881	28	484.449	37		
77.911	8	207.978	16	485.107	37		
Wavelength (air) (Å)	Mult. No.	Wavelength (air) (Å)	Mult. No.	Wavelength (air) (Å)	Mult. No.	Wavelength (air) (Å)	Mult. No.
2 488.0	15	6 213	31	7 208	20	17 237	35
2 536.0	15	6 833	20	12 373	43	18 243	35
6 088	31	7 105	20	17 207	35		
Wavenumber (cm^{-1})	Mult. No.	Wavenumber (cm^{-1})	Mult. No.	Wavenumber (cm^{-1})	Mult. No.		
3 310	46	1 880	51	1 280	54		
3 260	46	1 720	51	1 270	54		

TABLE 36. Transition probabilities of allowed lines for Na IX (references for this table are as follows: 1=Peach *et al.*,[76] 2=Yan *et al.*,[127] 3=Zhang *et al.*[129] and 4=Martin *et al.*[59])

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})$^{\text{a}}$	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
1	2*s*−2*p*	^{2}S−^{2}P$^\circ$		*685.8*	*0–145 813*	2–6	6.48+00	1.37−01	6.18−01	−0.562	AA	2
				681.72	0–146 688	2–4	6.60+00	9.19−02	4.13−01	−0.736	AA	2
				694.15	0–144 062	2–2	6.23+00	4.50−02	2.06−01	−1.046	AA	2
2	2*s*−3*p*	^{2}S−^{2}P$^\circ$		*70.63*	*0–1 415 877*	2–6	1.40+03	3.13−01	1.46−01	−0.203	A	1,3,4
				70.615	0–1 416 130	2–4	1.40+03	2.09−01	9.71−02	−0.379	A	1,3,4
				70.653	0–1 415 370	2–2	1.40+03	1.05−01	4.86−02	−0.678	A	1,3,4
3	2*s*−4*p*	^{2}S−^{2}P$^\circ$		*53.86*	*0–1 856 660*	2–6	6.39+02	8.34−02	2.96−02	−0.778	A	1,3,4
				53.857	0–1 856 770	2–4	6.40+02	5.57−02	1.98−02	−0.953	A	1,3,4
				53.867	0–1 856 440	2–2	6.38+02	2.77−02	9.84−03	−1.256	A	1,3,4
4	2*s*−5*p*	^{2}S−^{2}P$^\circ$		*48.55*	*0–2 059 600*	2–6	3.36+02	3.56−02	1.14−02	−1.148	B+	1,3
				48.553	0–2 059 600	2–4	3.36+02	2.37−02	7.59−03	−1.324	A	1,3
				48.553	0–2 059 600	2–2	3.37+02	1.19−02	3.80−03	−1.623	B+	1,3
5	2*s*−6*p*	^{2}S−^{2}P$^\circ$		*46.09*	*0–2 169 670*	2–6	1.95+02	1.86−02	5.64−03	−1.429	B+	1
				46.090	0–2 169 670	2–4	1.95+02	1.24−02	3.76−03	−1.606	B+	LS
				46.090	0–2 169 670	2–2	1.95+02	6.20−03	1.88−03	−1.907	B+	LS
6	2*s*−7*p*	^{2}S−^{2}P$^\circ$		*44.72*	*0–2 235 890*	2–6	1.22+02	1.10−02	3.25−03	−1.658	C+	1
				44.725	0–2 235 890	2–4	1.23+02	7.35−03	2.16−03	−1.833	C+	LS
				44.725	0–2 235 890	2–2	1.22+02	3.67−03	1.08−03	−2.134	C+	LS
7	2*p*−3*s*	^{2}P$^\circ$−^{2}S		*81.29*	*145 813–1 375 950*	6–2	6.92+02	2.29−02	3.67−02	−0.862	A	1,3
				81.350	146 688–1 375 950	4–2	4.62+02	2.29−02	2.45−02	−1.038	A	1,3
				81.176	144 062–1 375 950	2–2	2.31+02	2.28−02	1.22−02	−1.341	A	1,3
8	2*p*−3*d*	^{2}P$^\circ$−^{2}D		*77.86*	*145 813–1 430 120*	6–10	4.37+03	6.62−01	1.02+00	0.599	A	1,3,4
				77.911	146 688–1 430 200	4–6	4.36+03	5.96−01	6.11−01	0.377	A	1,3,4
				77.764	144 062–1 430 000	2–4	3.65+03	6.62−01	3.39−01	0.122	A	1,3,4
				77.923	146 688–1 430 000	4–4	7.27+02	6.62−02	6.79−02	−0.577	A	1,3,4
9	2*p*−4*s*	^{2}P$^\circ$−^{2}S		*59.01*	*145 813–1 840 350*	6–2	2.73+02	4.75−03	5.53−03	−1.545	B+	1,3
				59.044	146 688–1 840 350	4–2	1.82+02	4.76−03	3.70−03	−1.720	B+	1,3
				58.952	144 062–1 840 350	2–2	9.05+01	4.71−03	1.83−03	−2.026	B+	1,3
10	2*p*−4*d*	^{2}P$^\circ$−^{2}D		*58.25*	*145 813–1 862 442*	6–10	1.46+03	1.24−01	1.42−01	−0.128	A	1,3,4
				58.279	146 688–1 862 570	4–6	1.46+03	1.11−01	8.53−02	−0.353	A	1,3,4
				58.201	144 062–1 862 250	2–4	1.22+03	1.24−01	4.75−02	−0.606	A	1,3,4
				58.290	146 688–1 862 250	4–4	2.40+02	1.22−02	9.36−03	−1.312	A	1,3,4
11	2*p*−5*s*	^{2}P$^\circ$−^{2}S		*52.47*	*145 813–2 051 520*	6–2	1.33+02	1.84−03	1.90−03	−1.957	B+	1,3
				52.498	146 688–2 051 520	4–2	8.88+01	1.83−03	1.27−03	−2.135	B+	1,3
				52.426	144 062–2 051 520	2–2	4.45+01	1.83−03	6.33−04	−2.437	B+	1,3
12	2*p*−5*d*	^{2}P$^\circ$−^{2}D		*52.16*	*145 813–2 062 890*	6–10	6.74+02	4.58−02	4.72−02	−0.561	A	1,3
				52.186	146 688–2 062910	4–6	6.74+02	4.12−02	2.83−02	−0.783	A	1,3
				52.116	144 062–2 062 860	2–4	5.63+02	4.58−02	1.57−02	−1.038	A	1,3
				52.187	146 688–2 062 860	4–4	1.12+02	4.57−03	3.14−03	−1.738	B+	1,3
13	2*p*−6*d*	^{2}P$^\circ$−^{2}D		*49.37*	*145 813–2 171 486*	6–10	3.65+02	2.22−02	2.17−02	−0.875	B+	1

TABLE 36. Transition probabilities of allowed lines for Na IX (references for this table are as follows: 1=Peach *et al.*,[76] 2=Yan *et al.*,[127] 3=Zhang *et al.*[129] and 4=Martin *et al.*[59])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				49.386	146 688–2 171 550	4–6	3.65+02	2.00−02	1.30−02	−1.097	B+	LS
				49.326	144 062–2 171 390	2–4	3.04+02	2.22−02	7.21−03	−1.353	B+	LS
				49.390	146 688–2 171 390	4–4	6.07+01	2.22−03	1.44−03	−2.052	B+	LS
14	$2p-7d$	$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{D}$		*47.82*	*145 813–2 237 166*	6–10	2.24+02	1.28−02	1.21−02	−1.115	B	1
				47.836	146 688–2 237 170	4–6	2.23+02	1.15−02	7.24−03	−1.337	B	LS
				47.776	144 062–2 237 160	2–4	1.87+02	1.28−02	4.03−03	−1.592	B	LS
				47.836	146 688–2 237 160	4–4	3.70+01	1.27−03	8.00−04	−2.294	C+	LS
15	$3s-3p$	$^{2}\mathrm{S}-{}^{2}\mathrm{P}^{\circ}$	*2 504*	*2 505*	1 375 950–*1 415 877*	2–6	8.24−01	2.32−01	3.83+00	−0.333	A	1
			2 488.0	2 488.8	1 375 950–1 416 130	2–4	8.40−01	1.56−01	2.56+00	−0.506	A+	LS
			2 536.0	2 536.8	1 375 950–1 415 370	2–2	7.93−01	7.65−02	1.28+00	−0.815	A	LS
16	$3s-4p$	$^{2}\mathrm{S}-{}^{2}\mathrm{P}^{\circ}$		*208.03*	1 375 950–*1 856 660*	2–6	1.73+02	3.37−01	4.62−01	−0.171	A	1
				207.978	1 375 950–1 856 770	2–4	1.73+02	2.25−01	3.08−01	−0.347	A	LS
				208.121	1 375 950–1 856 440	2–2	1.72+02	1.12−01	1.53−01	−0.650	A	LS
17	$3s-5p$	$^{2}\mathrm{S}-{}^{2}\mathrm{P}^{\circ}$		*146.27*	1 375 950–*2 059 600*	2–6	9.83+01	9.46−02	9.11−02	−0.723	A	1
				146.274	1 375 950–2 059 600	2–4	9.84+01	6.31−02	6.08−02	−0.899	A	LS
				146.274	1 375 950–2 059 600	2–2	9.82+01	3.15−02	3.03−02	−1.201	A	LS
18	$3s-6p$	$^{2}\mathrm{S}-{}^{2}\mathrm{P}^{\circ}$		*125.99*	1 375 950–*2 169 670*	2–6	5.87+01	4.19−02	3.48−02	−1.077	B+	1
				125.989	1 375 950–2 169 670	2–4	5.86+01	2.79−02	2.31−02	−1.253	B+	LS
				125.989	1 375 950–2 169 670	2–2	5.88+01	1.40−02	1.16−02	−1.553	B+	LS
19	$3s-7p$	$^{2}\mathrm{S}-{}^{2}\mathrm{P}^{\circ}$		*116.29*	1 375 950–*2 235 890*	2–6	3.75+01	2.28−02	1.74−02	−1.341	B	1
				116.287	1 375 950–2 235 890	2–4	3.75+01	1.52−02	1.16−02	−1.517	B	LS
				116.287	1 375 950–2 235 890	2–2	3.74+01	7.58−03	5.80−03	−1.819	B	LS
20	$3p-3d$	$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{D}$	*7 020*	*7 021*	*1 415 877–1 430 120*	6–10	2.95−02	3.64−02	5.06+00	−0.661	A	1
			7 105	7 107	1 416 1 30–1430 200	4–6	2.85−02	3.24−02	3.03+00	−0.887	A+	LS
			6 833	6 835	1 415 370–1 430 000	2–4	2.68−02	3.75−02	1.69+00	−1.125	A	LS
			7 208	7 210	1 416 130–1 430 000	4–4	4.56−03	3.55−03	3.37−01	−1.848	A	LS
21	$3p-4s$	$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{S}$		*235.59*	*1 415 877*–1 840 350	6–2	1.90+02	5.27−02	2.45−01	−0.500	A	1
				235.727	1 416 130–1 840 350	4–2	1.27+02	5.27−02	1.64−01	−0.676	A	LS
				235.305	1 415 370–1 840 350	2–2	6.36+01	5.28−02	8.18−02	−0.976	A	LS
22	$3p-4d$	$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{D}$		*223.93*	*1 415 877–1 862 442*	6–10	4.57+02	5.72−01	2.53+00	0.536	A	1
				223.994	1 416 130–1 862 570	4–6	4.56+02	5.15−01	1.52+00	0.314	A	LS
				223.774	1 415 370–1 862 250	2–4	3.82+02	5.73−01	8.44−01	0.059	A	LS
				224.155	1 416 130–1 862 250	4–4	7.59+01	5.72−02	1.69−01	−0.641	A	LS
23	$3p-5s$	$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{S}$		*157.32*	*1 415 877*–2 051 520	6–2	8.97+01	1.11−02	3.45−02	−1.177	B+	1
				157.384	1 416 130–2 051 520	4–2	5.98+01	1.11−02	2.30−02	−1.353	B+	LS
				157.196	1 415 370–2 051 520	2–2	3.00+01	1.11−02	1.15−02	−1.654	B+	LS
24	$3p-5d$	$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{D}$		*154.56*	*1 415 877–2 062 890*	6–10	2.27+02	1.35−01	4.13−01	−0.092	A	1
				154.612	1 416 130–2 062 910	4–6	2.27+02	1.22−01	2.48−01	−0.312	A	LS
				154.443	1 415 370–2 062 860	2–4	1.89+02	1.35−01	1.37−01	−0.569	A	LS
				154.624	1 416 130–2 062 860	4–4	3.77+01	1.35−02	2.75−02	−1.268	A	LS
25	$3p-6d$	$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{D}$		*132.34*	*1 415 877–2 171 486*	6–10	1.27+02	5.56−02	1.45−01	−0.477	A	1

TABLE 36. Transition probabilities of allowed lines for Na IX (references for this table are as follows: 1=Peach *et al.*,[76] 2=Yan *et al.*,[127] 3=Zhang *et al.*[129] and 4=Martin *et al.*[59])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				132.377	1 416 130–2 171 550	4–6	1.27+02	5.00−02	8.72−02	−0.699	A	LS
				132.272	1 415 370–2 171 390	2–4	1.06+02	5.56−02	4.84−02	−0.954	A	LS
				132.405	1 416 130–2 171 390	4–4	2.11+01	5.55−01	9.68−03	−1.654	B+	LS
26	$3p-7d$	$^2P^\circ-^2D$		*121.76*	*1 415 877–2 237 166*	6–10	7.84+01	2.90−02	6.98−02	−0.759	B+	1
				121.797	1 416 130–2 237 170	4–6	7.82+01	2.61−02	4.19−02	−0.981	B+	LS
				121.686	1 415 370–2 237 160	2–4	6.55+01	2.91−02	2.33−02	−1.235	B	LS
				121.798	1416 130–2237 160	4–4	1.30+01	2.90−03	4.65−03	−1.936	B	LS
27	$3d-4p$	$^2D-^2P^\circ$		*234.44*	*1 430 120–1 856 660*	10–6	2.85+01	1.41−02	1.09−01	−0.851	A	1
				234.428	1 430 200–1 856 770	6–4	2.57+01	1.41−02	6.53−02	−1.073	A	LS
				234.500	1 430 000–1 856 440	4–2	2.84+01	1.17−02	3.61−02	−1.330	A	LS
				234.318	1 430 000–1 856 770	4–4	2.85+00	2.35−03	7.25−03	−2.027	B+	LS
28	$3d-5p$	$^2D-^2P^\circ$		*158.86*	*1 43 0120–2 059 600*	10–6	1.22+01	2.77−03	1.45−02	−1.558	B+	1
				158.881	1 430 200–2 059 600	6–4	1.10+01	2.77−03	8.69−03	−1.779	B+	LS
				158.831	1 430 000–2 059 600	4–2	1.22+01	2.31−03	4.83−03	−2.034	B+	LS
				158.831	1 430 000–2 059 600	4–4	1.22+00	4.62−04	9.66−04	−2.733	B	LS
29	$3d-6p$	$^2D-^2P^\circ$		*135.22*	*1 430 120–2 169 670*	10–6	6.38+00	1.05−03	4.67−03	−1.979	B+	1
				135.232	1 430 200–2 169 670	6–4	5.74+00	1.05−03	2.80−03	−2.201	B+	LS
				135.195	1 430 000–2 169 670	4–2	6.39+00	8.75−04	1.56−03	−2.456	B+	LS
				135.195	1 430 000–2 169 670	4–4	6.39−01	1.75−04	3.12−04	−3.155	B	LS
30	$3d-7p$	$^2D-^2P^\circ$		*124.10*	*1 430 120–2 235 890*	10–6	3.78+00	5.24−04	2.14−03	−2.281	C+	1
				124.117	1 430 200–2 235 890	6–4	3.40+00	5.24−04	1.28−03	−2.503	C+	LS
				124.086	1 430 000–2 235 890	4–2	3.79+00	4.37−04	7.14−04	−2.757	C+	LS
				124.086	1 430 000–2 235 890	4–4	3.78+01	8.73−05	1.43−04	−3.457	C	LS
31	$4s-4p$	$^2S-^2P^\circ$	*6 130*	*6 131*	1 840 350–1 856 660	2–6	1.89+01	3.19−01	1.29+01	−0.195	A+	1
			6 088	6 090	1 840 350–1 856 770	2–4	1.92−01	2.14−01	8.58+00	−0.369	A+	LS
			6 213	6 215	1 840 350–1 856 440	2–2	1.81−01	1.05−01	4.30+00	−0.678	A+	LS
32	$4s-5p$	$^2S-^2P^\circ$		*456.10*	1 840 350–*2 059 600*	2–6	3.94+01	3.69−01	1.11+00	−0.132	A	1
				456.100	1 840 350–2 059 600	2–4	3.94+01	2.46−01	7.39−01	−0.308	A	LS
				456.100	1 840 350–2 059 600	2–2	3.94+01	1.23−01	3.69−01	−0.609	A	LS
33	$4s-6p$	$^2S-^2P^\circ$		*303.66*	1 840 350–*2 169 670*	2–6	2.55+01	1.06−01	2.11−01	−0.674	A	1
				303.656	1 840 350–2 169 670	2–4	2.55+01	7.04−02	1.41−01	−0.851	A	LS
				303.656	1 840 350–2 169 670	2–2	2.55+01	3.52−02	7.04−02	−1.152	A	LS
34	$4s-7p$	$^2S-^2P^\circ$		*252.82*	1 840 350–*2 235 890*	2–6	1.65+01	4.75−02	7.91−02	−1.022	B+	1
				252.819	1 840 350–2 235 890	2–4	1.65+01	3.17−02	5.28−02	−1.198	B+	LS
				252.819	1 840 350–2 235 890	2–2	1.65+01	1.58−02	2.63−02	−1.500	B	LS
35	$4p-4d$	$^2P^\circ-^2D$	*17 290*	*17 295*	*1 856 660–1 862 442*	6–10	8.38−03	6.27−02	2.14+01	−0.425	A+	1
			17 237	17 241	1 856 770–1 862 570	4–6	8.47−03	5.66−02	1.29+01	−0.645	A+	LS
			17 207	17 212	1 856 440–1 862 250	2–4	7.09−03	6.30−02	7.14+00	−0.900	A+	LS
			18 243	18 248	1 856 770–1 862 250	4–4	1.19−03	5.94−03	1.43+00	−1.624	A	LS
36	$4p-5s$	$^2P^\circ-^2S$		*513.19*	*1 856 660–2 051 520*	6–2	6.40+01	8.42−02	8.53−01	−0.297	A	1
				513.479	1 856 770–2 051 520	4–2	4.26+01	8.41−02	5.69−01	−0.473	A	LS
				512.610	1 856 440–2 051 520	2–2	2.14+01	8.43−02	2.85−01	−0.773	A	LS

TABLE 36. Transition probabilities of allowed lines for Na IX (references for this table are as follows: 1=Peach *et al.*,[76] 2=Yan *et al.*,[127] 3=Zhang *et al.*[129] and 4=Martin *et al.*[59])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
37	$4p-5d$	$^2\mathrm{P}^\circ-{}^2\mathrm{D}$		*484.90*	*1 856 660–2 062 890*	6–10	9.44+01	5.55−01	5.31+00	0.522	A+	1
				485.107	1 856 770–2 062 910	4–6	9.43+01	4.99−01	3.19+00	0.300	A+	LS
				484.449	1 856 440–2 062 860	2–4	7.89+01	5.55−01	1.77+00	0.045	A	LS
				485.225	1 856 770–2 062 860	4–4	1.57+01	5.54−02	3.54−01	−0.654	A	LS
38	$4p-6d$	$^2\mathrm{P}^\circ-{}^2\mathrm{D}$		*317.64*	*1 856 660–2 171 486*	6–10	5.61+01	1.41−01	8.87−01	−0.073	A	1
				317.682	1 856 770–2 171 550	4–6	5.60+01	1.27−01	5.31−01	−0.294	A	LS
				317.511	1 856 440–2 171 390	2–4	4.70+01	1.42−01	2.97−01	−0.547	A	LS
				317.844	1 856 770–2 171 390	4–4	9.31+00	1.41−02	5.90−02	−1.249	A	LS
39	$4p-7d$	$^2\mathrm{P}^\circ-{}^2\mathrm{D}$		*262.81*	*1 856 660–2 237 166*	6–10	3.52+01	6.07−02	3.15−01	−0.439	B+	1
				262.881	1 856 770–2 237 170	4–6	3.51+09	5.46−02	1.89−01	−0.661	B+	LS
				262.660	1 856 440–2 237 160	2–4	2.94+01	6.08−02	1.05−01	−0.915	B+	LS
				262.888	1 856 770–2 237 160	4–4	5.86+00	6.07−03	2.10−02	−1.615	B	LS
40	$4d-5p$	$^2\mathrm{D}-{}^2\mathrm{P}^\circ$		*507.21*	*1 862 442–2 059 600*	10–6	1.50+01	3.48−02	5.81−01	−0.458	A	1
				507.537	1 862 570–2 059 600	6–4	1.35+01	3.48−02	3.49−01	−0.680	A	LS
				506.714	1 862 250–2 059 600	4–2	1.51+01	2.90−02	1.94−01	−0.936	A	LS
				506.714	1 862 250–2 059 600	4–4	1.51+00	5.80−03	3.87−02	−1.635	A	LS
41	$4d-6p$	$^2\mathrm{D}-{}^2\mathrm{P}^\circ$		*325.49*	*1 862 442–2 169 670*	10–6	7.48+00	7.12−03	7.63−02	−1.148	A	1
				325.627	1 862 570–2 169 670	6–4	6.72+00	7.12−03	4.58−02	−1.369	A	LS
				325.288	1 862 250–2 169 670	4–2	7.49+00	5.94−03	2.54−02	−1.624	B+	LS
				325.288	1 862 250–2 169 670	4–4	7.50−01	1.19−03	5.10−03	−2.322	B+	LS
42	$4d-7p$	$^2\mathrm{D}-{}^2\mathrm{P}^\circ$		*267.77*	*1 862 442–2 235 890*	10–6	4.28+00	2.76−03	2.43−02	−1.559	B	1
				267.867	1 862 570–2 235 890	6–4	3.85+00	2.76−03	1.46−02	−1.781	B	LS
				267.637	1 862 250–2 235 890	4–2	4.28+00	2.30−03	8.11−03	−2.036	B	LS
				267.637	1 862 250–2 235 890	4–4	4.28−01	4.60−04	1.62−03	−2.735	C+	LS
43	$5s-5p$	$^2\mathrm{S}-{}^2\mathrm{P}^\circ$	*12 370*	*12 376*	*2 051 520–2 059 600*	2–6	5.78−02	3.98−01	3.24+01	−0.099	A+	1
			12 373	12 376	2 051 520–2 059 600	2–4	5.77−02	2.65−01	2.16+01	−0.276	A+	LS
			12 373	12 376	2 051 520–2 059 600	2–2	5.79−02	1.33−01	1.08+01	−0.575	A+	LS
44	$5s-6p$	$^2\mathrm{S}-{}^2\mathrm{P}^\circ$		*846.4*	*2 051 520–2 169 670*	2–6	1.26+01	4.06−01	2.26+00	−0.090	A	1
				846.38	2 051 520–2 169 670	2–4	1.26+01	2.71−01	1.51+00	−0.266	A	LS
				846.38	2 051 520–2 169 670	2–2	1.26+01	1.35−01	7.52−01	−0.569	A	LS
45	$5s-7p$	$^2\mathrm{S}-{}^2\mathrm{P}^\circ$		*542.39*	*2 051 520–2 235 890*	2–6	8.81+00	1.17−01	4.16−01	−0.631	B+	1
				542.388	2 051 520–2 235 890	2–4	8.81+00	7.77−02	2.77−01	−0.809	B+	LS
				542.388	2 051 520–2 235 890	2–2	8.82+00	3.89−02	1.39−01	−1.109	B+	LS
46	$5p-5d$	$^2\mathrm{P}^\circ-{}^2\mathrm{D}$		*3 290 cm*$^{-1}$	*2 059 600–2 062 890*	6–10	4.22−03	9.74−02	5.85+01	−0.233	A+	1
				3 310 cm^{-1}	2 059 600–2 062 910	4–6	4.30−03	8.82−02	3.51+01	−0.452	A+	LS
				3 260 cm^{-1}	2 059 600–2 062 860	2–4	3.42−03	9.65−02	1.95+01	−0.714	A+	LS
				3 260 cm^{-1}	2 059 600–2 062 860	4–4	6.84+04	9.65−03	3.90+00	−1.413	A+	LS
47	$5p-6d$	$^2\mathrm{P}^\circ-{}^2\mathrm{D}$		*893.8*	*2 059 600–2 171 486*	6–10	2.81+01	5.61−01	9.91+00	0.527	A+	1
				893.26	2 059 600–2 171 550	4–6	2.81+01	5.05−01	5.94+00	0.305	A+	LS
				894.53	2 059 600–2 171 390	2–4	2.34+01	5.61−01	3.30+00	0.050	A+	LS
				894.53	2 059 600–2 171 390	4–4	4.68+00	5.61−02	6.61−01	−0.649	A	LS
48	$5p-7d$	$^2\mathrm{P}^\circ-{}^2\mathrm{D}$		*563.2*	*2 059 600–2 237 166*	6–10	1.87+01	1.48−01	1.64+00	−0.052	A	1

TABLE 36. Transition probabilities of allowed lines for Na IX (references for this table are as follows: 1=Peach *et al.*,[76] 2=Yan *et al.*,[127] 3=Zhang *et al.*[129] and 4=Martin *et al.*[59])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				563.16	2 059 600–2 237 170	4–6	1.86+01	1.33−01	9.86−01	−0.274	A	LS
				563.19	2 059 600–2 237 160	2–4	1.56+01	1.48−01	5.49−01	−0.529	A	LS
				563.19	2 059 600–2 237 160	4–4	3.11+00	1.48−02	1.10−01	−1.228	B+	LS
49	$5d$–$6p$	^{2}D–^{2}P$^\circ$		*936.5*	*2 062 890–2 169 670*	10–6	7.49+00	5.91−02	1.82+00	−0.228	A	1
				936.68	2 062 910–2 169 670	6–4	6.74+00	5.91−02	1.09+00	−0.450	A	LS
				936.24	2 062 860–2 169 670	4–2	7.49+00	4.92−02	6.07−01	−0.706	A	LS
				936.24	2 062 860–2 169 670	4–4	7.50−01	9.85−03	1.21−01	−1.405	A	LS
50	$5d$–$7p$	^{2}D–^{2}P$^\circ$		*578.0*	*2 062 890–2 235 890*	10–6	4.12+00	1.24−02	2.36−01	−0.907	B+	1
				578.10	2 062 910–2 235 890	6–4	3.71+00	1.24−02	1.42−01	−1.128	B+	LS
				577.93	2 062 860–2 235 890	4–2	4.11+00	1.03−02	7.84−02	−1.385	B+	LS
				577.93	2 062 860–2 235 890	4–4	4.11−01	2.06−03	1.57−02	−2.084	B	LS
51	$6p$–$6d$	^{2}P$^\circ$–^{2}D		*1 816 cm^{-1}*	*2 169 670–2 171 486*	6–10	1.54−03	1.18−01	1.28+02	−0.150	A+	1
				1 880 cm^{-1}	2 169 670–2 171 550	4–6	1.73−03	1.10−01	7.70+01	−0.357	A+	LS
				1 720 cm^{-1}	2 169 670–2 171 390	2–4	1.11−03	1.12−01	4.29+01	−0.650	A+	LS
				1 720 cm^{-1}	2 169 670–2 171 390	4–4	2.21+04	1.12−02	8.57+00	−1.349	A+	LS
52	$6p$–$7d$	^{2}P$^\circ$–^{2}D		*1 481.6*	*2 169 670–2 237 166*	6–10	1.06+01	5.82−01	1.70+01	0.543	A	1
				1 481.48	2 169 670–2 237 170	4–6	1.06+01	5.24−01	1.02+01	0.321	A	LS
				1 481.70	2 169 670–2 237 160	2–4	8.84+00	5.82−01	5.68+00	0.066	A	LS
				1 481.70	2 169 670–2 237 160	4–4	1.77+00	5.82−02	1.14+00	−0.633	A	LS
53	$6d$–$7p$	^{2}D–^{2}P$^\circ$		*1 552.7*	*2 171 486–2 235 890*	10–6	3.95+00	8.57−02	4.38+00	−0.067	A	1
				1 554.24	2 171 550–2 235 890	6–4	3.55+00	8.56−02	2.63+00	−0.289	A	LS
				1 550.39	2 171 390–2 235 890	4–2	3.97+00	7.15−02	1.46+00	−0.544	A	LS
				1 550.39	2 171 390–2 235 890	4–4	3.97−01	1.43−02	2.92−01	−1.243	B+	LS
54	$7p$–$7d$	^{2}P$^\circ$–^{2}D		*1 276 cm^{-1}*	*2 235 890–2 237 166*	6–10	1.02−03	1.58−01	2.45+02	−0.023	A+	1
				1 280 cm^{-1}	2 235 890–2 237 170	4–6	1.04−03	1.43−01	1.47+02	−0.243	A+	LS
				1 270 cm^{-1}	2 235 890–2 237 160	2–4	8.50+04	1.58−01	8.19+01	−0.500	A+	LS
				1 270 cm^{-1}	2 235 890–2 237 160	4–4	1.70+04	1.58−02	1.64+01	−1.199	A	LS

[a] Wavelengths (Å) are always given unless cm^{-1} is indicated.

10.10. Na X

Helium isoelectronic sequence
Ground state: $1s^2\ ^1S_0$
Ionization energy: 1465.1202 eV = 11 816 996 cm^{-1}

10.10.1. Allowed Transitions for Na X

In general the transition rates from different sources for this heliumlike spectrum have proven to be in good agreement, including the results of the OP.[27] Most of the compiled data below have been taken from this source. The high-quality data from Khan *et al.*[50] were available primarily for the lower-lying transitions.

To estimate accuracies, we pooled the relative standard deviation of the mean (RSDM) for each of the lines with transition rates published in the references,[27,50] as described in the general introduction.

10.10.2. References for Allowed Transitions for Na X

[22] J. A. Fernley, K. T. Taylor, and M. J. Seaton, J. Phys. B **20**, 6457 (1987).

[27] J. A. Fernley, K. T. Taylor, and M. J. Seaton, http://legacy.gsfc.nasa.gov/topbase, downloaded on Aug. 8, 1995 (Opacity Project). See Fernley *et al.* (Ref. 22).

[50] F. Khan, G. S. Khandelwal, and J. W. Wilson, Astrophys. J. **329**, 493 (1988).

TABLE 37. Wavelength finding list for allowed lines for Na X

Wavelength (vac) (Å)	Mult. No.
8.542	9
8.560	8
8.587	7
8.626	6
8.686	5
8.788	4
8.983	3
9.433	2
11.003	1
36.081	26
36.421	24
36.908	22
37.259	50
37.266	50
37.300	50
37.323	27
37.625	48
37.633	48
37.642	20
37.667	48
37.684	25
38.150	46
38.158	46
38.193	46
38.195	51
38.202	23
38.576	49
38.834	18
38.945	44
38.953	44
38.982	21
38.989	44
39.123	47
39.949	45
40.166	42
40.175	42
40.213	42
40.239	40
40.248	40
40.249	19
40.287	40
40.989	16
40.991	16
40.992	16
41.264	43
41.295	41
42.455	38
42.465	38
42.508	38
42.541	17
42.598	36
42.607	36
42.651	36
43.682	39
43.741	37
45.664	14
45.670	14
45.672	14
47.432	34
47.443	34
47.497	34
47.519	15
47.785	32
47.797	32
47.851	32
48.964	35
49.109	33
60.668	12
60.694	12
60.700	12
63.520	30
63.540	30
63.541	30
63.569	13
63.627	30
63.637	30
63.638	30
65.079	28
65.101	28
65.203	28
66.279	31
66.902	29
87.113	66
88.976	67
89.010	87
89.023	87
89.079	87
89.123	64
90.072	102
90.073	102
90.094	102
90.102	103
90.434	88
91.060	65
91.128	85
91.142	85
91.201	85
92.095	62
92.222	100
92.223	100
92.239	101
92.245	100
92.602	86
94.141	63
94.271	83
94.285	83
94.349	83
95.402	99
95.408	98
95.409	98

TABLE 37. Wavelength finding list for allowed lines for Na X—Continued

Wavelength (vac) (Å)	Mult. No.
95.433	98
95.816	84
96.808	60
99.028	61
99.274	81
99.291	81
99.361	81
100.424	97
100.475	96
100.477	96
100.503	96
100.929	82
105.104	58
107.617	79
107.634	59
107.636	79
107.719	79
108.145	77
108.164	77
108.247	77
109.286	95
109.440	94
109.443	94
109.474	94
109.763	80
109.982	78
122.536	56
122.559	56
122.565	56
125.752	57
125.788	75
125.815	75
125.927	75
127.048	73
127.074	73
127.189	73
128.013	93
128.471	92
128.474	92
128.496	92
128.500	92
128.502	92
128.517	92
128.716	76
129.234	74
168.973	116
171.721	117
172.005	133
172.026	133
172.115	133
173.518	147
173.540	146
174.076	134
176.585	54
176.679	54

TABLE 37. Wavelength finding list for allowed lines for Na X—Continued

Wavelength (vac) (Å)	Mult. No.
176.701	54
176.702	114
179.654	115
180.095	131
180.119	131
180.216	131
181.622	145
181.702	144
182.162	55
182.291	132
182.529	71
182.584	71
182.822	71
186.945	91
187.870	69
187.928	69
188.180	69
188.702	72
188.780	112
189.180	90
189.187	90
189.280	90
189.287	90
189.295	90
189.313	90
190.874	70
192.056	113
192.795	129
192.822	129
192.933	129
194.307	143
194.499	142
195.178	130
209.707	110
213.556	111
214.953	127
214.986	127
215.125	127
216.342	141
216.788	140
217.637	128
252.958	108
258.052	109
258.311	125
258.359	125
258.559	125
261.372	123
261.421	123
261.626	123
262.131	139
263.333	138
263.335	126
264.601	124
296.746	158
300.789	159

TABLE 37. Wavelength finding list for allowed lines for Na X—Continued

Wavelength (vac) (Å)	Mult. No.
301.742	171
301.776	171
301.915	171
303.635	183
303.852	182
304.683	172
321.436	156
326.005	157
327.555	169
327.595	169
327.759	169
329.350	181
329.789	180
330.775	170
363.777	154
369.278	155
372.140	167
372.191	167
372.403	167
373.576	179
374.512	178
375.797	168
384.664	106
384.891	106
384.946	106
394.228	107
395.423	121
395.534	121
396.004	121
403.830	137
407.181	122
408.140	119
408.258	119
408.759	119
409.177	136
409.433	136
409.495	136
412.414	120
450.384	152
457.917	153
464.546	177
464.578	165
464.658	165
464.989	165
466.956	176
468.982	166
501.489	192
507.596	193
510.558	201
512.321	211
513.157	210
514.533	202
576.30	190
583.80	191
589.11	199
590.06	209
591.76	208
593.61	200
711.74	150
726.55	151
728.27	188
729.07	163
729.27	163
730.08	163
738.84	189
743.38	175
748.90	207
749.11	164
750.91	197
753.14	206
753.99	161
754.03	174
754.20	161
755.08	161
756.19	198
759.45	162
856.28	218
866.15	219
874.65	224
880.22	225
1 100.11	216
1 112.01	10
1 114.36	217
1 133.61	222
1 140.02	223
1 142.47	10
1 149.32	10
1 184.12	186
1 205.87	187
1 232.88	205
1 251.30	204
1 254.64	195
1 259.94	196
1 579.35	230
1 597.95	231
1 626.81	234
1 634.28	235
1 646.93	11
1 828.5	214
1 859.0	215
1 936.6	220
1 941.8	221

Wavelength (air) (Å)	Mult. No.
2 670.6	228
2 711.8	229
2 827.8	232
2 832.1	233
3 738.5	238

TABLE 37. Wavelength finding list for allowed lines for Na X—Continued

Wavelength (air) (Å)	Mult. No.
3 792.4	239
3 957.7	240
3 960.2	241
4 045.5	52
4 165.3	52
4 194.3	52
5 664	53
7 210	68
7 287	68
7 297	68
7 535	68
7 685	68
7 697	68
9 821	104
10 120	104
10 193	104
13 497	105
17 338	118
17 554	118
18 531	118
19 431	148

TABLE 37. Wavelength finding list for allowed lines for Na X—Continued

Wavenumber (cm^{-1})	Mult. No.
4 992	148
4 955	148
3 778	149
3 605	89
2 925	160
2 918	184
2 888	160
2 735	160
2 185	185
1 829	212
1 616	194
1 376	135
1 374	213
1 223	226
920	227
857	236
662	173
646	237
624	242
471	243
368	203

TABLE 38. Transition probabilities of allowed lines for Na X (reference for this table are as follows: 1=Fernely *et al.*[27] and 2=Khan *et al.*[50])

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
1	$1s^2-1s2p$	$^1S-^1P^\circ$		11.003	0–9 088 700	1–3	1.35+05	7.33−01	2.66−02	−0.135	A+	1,2
2	$1s^2-1s3p$	$^1S-^1P^\circ$		9.433	0–10 601 080	1–3	3.74+04	1.49−01	4.64−03	−0.827	A+	1,2
3	$1s^2-1s4p$	$^1S-^1P^\circ$		8.983	0–11 132 393	1–3	1.54+04	5.60−02	1.66−03	−1.252	A+	1,2
4	$1s^2-1s5p$	$^1S-^1P^\circ$		8.788	0–11 378 646	1–3	7.81+03	2.71−02	7.85−04	−1.567	A+	1,2
5	$1s^2-1s6p$	$^1S-^1P^\circ$		8.686	0–11 512 505	1–3	4.50+03	1.53−02	4.37−04	−1.815	A+	1,2
6	$1s^2-1s7p$	$^1S-^1P^\circ$		8.626	0–11 593 248	1–3	2.83+03	9.47−03	2.69−04	−2.024	A	1,2
7	$1s^2-1s8p$	$^1S-^1P^\circ$		8.587	0–11 645 667	1–3	1.89+03	6.28−03	1.78−04	−2.202	A	1,2
8	$1s^2-1s9p$	$^1S-^1P^\circ$		8.560	0–11 681 612	1–3	1.33+03	4.38−03	1.23−04	−2.359	A	1,2
9	$1s^2-1s10p$	$^1S-^1P^\circ$		8.542	0–11 707 327	1–3	9.67+02	3.17−03	8.92−05	−2.499	A+	1,2
10	$1s2s-1s2p$	$^3S-^3P^\circ$		*1 126.1*	8 935 337–*9 024 141*	3–9	1.22+00	6.97−02	7.75−01	−0.680	A	1
				11 12.01	8 935 337–9 025 264	3–5	1.27+00	3.92−02	4.31−01	−0.930	A	LS
				1 142.47	8 935 337–9 022 867	3–3	1.17+00	2.29−02	2.58−01	−1.163	A	LS
				1 149.32	8 935 337–9 022 345	3–1	1.15+00	7.58−03	8.60−02	−1.643	A	LS
11		$^1S-^1P^\circ$		1 646.93	9 027 981–9 088 700	1–3	4.09−01	4.99−02	2.71−01	−1.302	A	1
12	$1s2s-1s3p$	$^3S-^3P^\circ$		*60.68*	8 935 337–*10 583 324*	3–9	2.26+03	3.75−01	2.24−01	0.051	A	1
				60.668	8 935 337–10 583 658	3–5	2.26+03	2.08−01	1.25−01	−0.205	A	LS
				60.694	8 935 337–10 582 947	3–3	2.26+03	1.25−01	7.49−02	−0.426	A	LS
				60.700	8 935 337–10 582 781	3–1	2.26+03	4.16−02	2.49−02	−0.904	A	LS

TABLE 38. Transition probabilities of allowed lines for Na X (reference for this table are as follows: 1=Fernely *et al.*[27] and 2=Khan *et al.*[50])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
13		$^{1}\mathrm{S}-{}^{1}\mathrm{P}^{\circ}$		63.569	9 027 981–10 601 080	1–3	2.16+03	3.92−01	8.20−02	−0.407	A	1
14	$1s2s-1s4p$	$^{3}\mathrm{S}-{}^{3}\mathrm{P}^{\circ}$		*45.67*	8 935 337–*11 125 103*	3–9	9.95+02	9.33−02	4.21−02	−0.553	A	1
				45.664	8 935 337–11 125 244	3–5	9.94+02	5.18−02	2.34−02	−0.809	A	LS
				45.670	8 935 337–11 124 944	3–3	9.95+02	3.11−02	1.40−02	−1.030	A	LS
				45.672	8 935 337–11 124 873	3–1	9.98+02	1.04−02	4.69−03	−1.506	A	LS
15		$^{1}\mathrm{S}-{}^{1}\mathrm{P}^{\circ}$		47.519	9 027 981–11 132 393	1–3	9.51+02	9.66−02	1.51−02	−1.015	A	1
16	$1s2s-1s5p$	$^{3}\mathrm{S}-{}^{3}\mathrm{P}^{\circ}$		*40.99*	8 935 337–*11 374 960*	3–9	5.12+02	3.87−02	1.57−02	−0.935	A	1
				40.989	8 935 337–11 375 032	3–5	5.12+02	2.15−02	8.70−03	−1.190	A	LS
				40.991	8 935 337–11 374 879	3–3	5.12+02	1.29−02	5.22−03	−1.412	A	LS
				40.992	8 935 337–11 374 842	3–1	5.13+02	4.31−03	1.74−03	−1.888	A	LS
17		$^{1}\mathrm{S}-{}^{1}\mathrm{P}^{\circ}$		42.541	9 027 981–11 378 646	1–3	4.90+02	3.99−02	5.59−03	−1.399	A	1
18	$1s2s-1s6p$	$^{3}\mathrm{S}-{}^{3}\mathrm{P}^{\circ}$		*38.83*	8 935 337–*11 510 387*	3–9	2.97+02	2.02−02	7.73−03	−1.218	A	1
				38.834	8 935 337–11 510 387	3–5	2.97+02	1.12−02	4.30−03	−1.474	A	LS
				38.834	8 935 337–11 510 387	3–3	2.97+02	6.72−03	2.58−03	−1.696	A	LS
				38.834	8 935 337–11 510 387	3–1	2.97+02	2.24−03	8.59−04	−2.173	A	LS
19		$^{1}\mathrm{S}-{}^{1}\mathrm{P}^{\circ}$		40.249	9 027 981–11 512 505	1–3	2.84+02	2.07−02	2.74−03	−1.684	A	1
20	$1s2s-1s7p$	$^{3}\mathrm{S}-{}^{3}\mathrm{P}^{\circ}$		*37.64*	8 935 337–*11 591 920*	3–9	1.88+02	1.20−02	4.45−03	−1.444	A	1
				37.642	8 935 337–11 591 920	3–5	1.88+02	6.64−03	2.47−03	−1.701	A	LS
				37.642	8 935 337–11 591 920	3–3	1.88+02	3.99−03	1.48−03	−1.922	A	LS
				37.642	8 935 337–11 591 920	3–1	1.88+02	1.33−03	4.94−04	−2.399	A	LS
21		$^{1}\mathrm{S}-{}^{1}\mathrm{P}^{\circ}$		38.982	9 027 981–11 593 248	1–3	1.79+02	1.22−02	1.57−03	−1.914	A	1
22	$1s2s-1s8p$	$^{3}\mathrm{S}-{}^{3}\mathrm{P}^{\circ}$		*36.91*	8 935 337–*11 644 781*	3–9	1.25+02	7.68−03	2.80−03	−1.638	A	1
				36.908	8 935 337–11 644 781	3–5	1.25+02	4.27−03	1.56−03	−1.892	A	LS
				36.908	8 935 337–11 644 781	3–3	1.25+02	2.56−03	9.33−04	−2.115	A	LS
				36.908	8 935 337–11 644 781	3–1	1.25+02	8.54−04	3.11−04	−2.591	A	LS
23		$^{1}\mathrm{S}-{}^{1}\mathrm{P}^{\circ}$		38.202	9 027 981–11 645 667	1–3	1.20+02	7.89−03	9.92−04	−2.103	A	1
24	$1s2s-1s9p$	$^{3}\mathrm{S}-{}^{3}\mathrm{P}^{\circ}$		*36.42*	8 935 337–*11 680 991*	3–9	8.84+01	5.28−03	1.90−03	−1.800	A	1
				36.421	8 935 337–11 680 991	3–5	8.84+01	2.93−03	1.05−03	−2.056	A	LS
				36.421	8 935 337–11 680 991	3–3	8.85+01	1.76−03	6.33−04	−2.277	A	LS
				36.421	8 935 337–11 680 991	3–1	8.84+01	5.86−04	2.11−04	−2.755	A	LS
25		$^{1}\mathrm{S}-{}^{1}\mathrm{P}^{\circ}$		37.684	9 027 981–11 681 612	1–3	8.44+01	5.39−03	6.69−04	−2.268	A	1
26	$1s2s-1s10p$	$^{3}\mathrm{S}-{}^{3}\mathrm{P}^{\circ}$		*36.08*	8 935 337–*11 706 875*	3–9	6.45+01	3.78−03	1.35−03	−1.945	A	1
				36.081	8 935 337–11 706 875	3–5	6.46+01	2.10−03	7.48−04	−2.201	A	LS
				36.081	8 935 337–11 706 875	3–3	6.46+01	1.26−03	4.49−04	−2.423	A	LS
				36.081	8 935 337–11 706 875	3–1	6.44+01	4.19−04	1.49−04	−2.901	A	LS
27		$^{1}\mathrm{S}-{}^{1}\mathrm{P}^{\circ}$		37.323	9 027 981–11 707 327	1–3	6.16+01	3.86−03	4.74−04	−2.413	A	1
28	$1s2p-1s3s$	$^{3}\mathrm{P}^{\circ}-{}^{3}\mathrm{S}$		*65.15*	*9 024 141*–10 558 946	9–3	8.44+02	1.79−02	3.46−02	−0.793	A	1
				65.203	9 025 264–10 558 946	5–3	4.68+02	1.79−02	1.92−02	−1.048	A	LS
				65.101	9 022 867–10 558 946	3–3	2.82+02	1.79−02	1.15−02	−1.270	A	LS
				65.079	9 022 345–10 558 946	1–3	9.40+01	1.79−02	3.84−03	−1.747	A	LS
29		$^{1}\mathrm{P}^{\circ}-{}^{1}\mathrm{S}$		66.902	9 088 700–10 583 431	3–1	7.73+02	1.73−02	1.14−02	−1.285	A	1

TABLE 38. Transition probabilities of allowed lines for Na X (reference for this table are as follows: 1=Fernely *et al.*[27] and 2=Khan *et al.*[50])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
30	$1s2p-1s3d$	$^{3}\mathrm{P}^{\circ}-{}^{3}\mathrm{D}$		*63.59*	*9 024 141–10 596 783*	9–15	6.67+03	6.74−01	1.27+00	0.783	A	1
				63.627	9 025 264–10 596 925	5–7	6.66+03	5.66−01	5.93−01	0.452	A	LS
				63.540	9 022 867–10 596 667	3–5	5.02+03	5.06−01	3.18−01	0.181	A	LS
				63.520	9 022 345–10 596 647	1–3	3.72+03	6.75−01	1.41−01	−0.171	A	LS
				63.637	9 025 264–10 596 667	5–5	1.66+03	1.01−01	1.06−01	−0.297	A	LS
				63.541	9 022 867–10 596 647	3–3	2.79+03	1.69−01	1.06−01	−0.295	A	LS
				63.638	9 025 264–10 596 647	5–3	1.85+02	6.74−03	7.06−03	−1.472	A	LS
31		$^{1}\mathrm{P}^{\circ}-{}^{1}\mathrm{D}$		66.279	9 088 700–10 597 475	3–5	6.39+03	7.01−01	4.59−01	0.323	A	1
32	$1s2p-1s4s$	$^{3}\mathrm{P}^{\circ}-{}^{3}\mathrm{S}$		*47.83*	*9 024 141–11 115 065*	9–3	3.35+02	3.83−03	5.43−03	−1.463	A	1
				47.851	9 025 264–11 115 065	5–3	1.86+02	3.83−03	3.02−03	−1.718	A	LS
				47.797	9 022 867–11 115 065	3–3	1.12+02	3.84−03	1.81−03	−1.939	A	LS
				47.785	9 022 345–11 115 065	1–3	3.74+01	3.84−03	6.04−04	−2.416	A	LS
33		$^{1}\mathrm{P}^{\circ}-{}^{1}\mathrm{S}$		49.109	9 088 700–11 124 986	3–1	3.15+02	3.80−03	1.84−03	−1.943	A	1
34	$1s2p-1s4d$	$^{3}\mathrm{P}^{\circ}-{}^{3}\mathrm{D}$		*47.47*	*9 024 141–11 130 639*	9–15	2.17+03	1.22−01	1.72−01	0.041	A	1
				47.497	9 025 264–11 130 639	5–7	2.18+03	1.03−01	8.05−02	−0.288	A	LS
				47.443	9 022 867–11 130 639	3–5	1.63+03	9.18−02	4.30−02	−0.560	A	LS
				47.432	9 022 345–11 130 639	1–3	1.21+03	1.22−01	1.91−02	−0.914	A	LS
				47.497	9 025 264–11 130 639	5–5	5.41+02	1.83−02	1.43−02	−1.039	A	LS
				47.443	9 022 867–11 130 639	3–3	9.07+02	3.06−02	1.43−02	−1.037	A	LS
				47.497	9 025 264–11 130 639	5–3	6.01+01	1.22−03	9.54−04	−2.215	A	LS
35		$^{1}\mathrm{P}^{\circ}-{}^{1}\mathrm{D}$		48.964	9 088 700–11 131 017	3–5	2.00+03	1.20−01	5.80−02	−0.444	A	1
36	$1s2p-1s5s$	$^{3}\mathrm{P}^{\circ}-{}^{3}\mathrm{S}$		*42.63*	*9 024 141–11 369 887*	9–3	1.66+02	1.51−03	1.91−03	−1.867	A	1
				42.651	9 025 264–11 369 887	5–3	9.23+01	1.51−03	1.06−03	−2.122	A	LS
				42.607	9 022 867–11 369 887	3–3	5.55+01	1.51−03	6.35−04	−2.344	A	LS
				42.598	9 022 345–11 369 887	1–3	1.85+01	1.51−03	2.12−04	−2.821	A	LS
37		$^{1}\mathrm{P}^{\circ}-{}^{1}\mathrm{S}$		43.741	9 088 700–11 374 868	3–1	1.57+02	1.50−03	6.48−04	−2.347	A	1
38	$1s2p-1s5d$	$^{3}\mathrm{P}^{\circ}-{}^{3}\mathrm{D}$		42.49	9 024 141–11 377 767	9–15	1.01+03	4.53−02	5.71−02	−0.390	A	1
				42.508	9 025 264–11 377 767	5–7	1.00+03	3.81−02	2.67−02	−0.720	A	LS
				42.465	9 022 867–11 377 767	3–5	7.55+02	3.40−02	1.43−02	−0.991	A	LS
				42.455	9 022 345–11 377 767	1–3	5.60+02	4.54−02	6.35−03	−1.343	A	LS
				42.508	9 025 264–11 377 767	5–5	2.51+02	6.80−03	4.76−03	−1.469	A	LS
				42.465	9 022 867–11 377 767	3–3	4.18+02	1.13−02	4.74−03	−1.470	A	LS
				42.508	9 025 264–11 377 767	5–3	2.79+01	4.53−04	3.17−04	−2.645	A	LS
39		$^{1}\mathrm{P}^{\circ}-{}^{1}\mathrm{D}$		43.682	9 088 700–11 377 984	3–5	9.10+02	4.34−02	1.87−02	−0.885	A	1
40	$1s2p-1s6s$	$^{3}\mathrm{P}^{\circ}-{}^{3}\mathrm{S}$		*40.27*	*9 024 141–11 507 469*	9–3	9.41+01	7.62−04	9.10−04	−2.164	A	1
				40.287	9 025 264–11 507 469	5–3	5.22+01	7.62−04	5.05−04	−2.419	A	LS
				40.248	9 022 867–11 507 469	3–3	3.14+01	7.63−04	3.03−04	−2.640	A	LS
				40.239	9 022 345–11 507 469	1–3	1.05+01	7.63−04	1.01−04	−3.117	A	LS
41		$^{1}\mathrm{P}^{\circ}-{}^{1}\mathrm{S}$		41.295	9 088 700–11 510 320	3–1	8.97+01	7.64−04	3.12−04	−2.640	A	1
42	$1s2p-1s6d$	$^{3}\mathrm{P}^{\circ}-{}^{3}\mathrm{D}$		*40.20*	*9 024 141–11 512 003*	9–15	5.51+02	2.23−02	2.65−02	−0.697	A	1
				40.213	9 025 264–11 512 003	5–7	5.51+02	1.87−02	1.24−02	−1.029	A	LS
				40.175	9 022 867–11 512 003	3–5	4.14+02	1.67−02	6.63−03	−1.300	A	LS
				40.166	9 022 345–11 512 003	1–3	3.07+02	2.23−02	2.95−03	−1.652	A	LS
				40.213	9 025 264–11 512 003	5–5	1.37+02	3.33−03	2.20−03	−1.779	A	LS
				40.175	9 022 867–11 512 003	3–3	2.30+02	5.56−03	2.21−03	−1.778	A	LS

TABLE 38. Transition probabilities of allowed lines for Na X (reference for this table are as follows: 1=Fernely *et al.*[27] and 2=Khan *et al.*[50])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				40.213	9 025 264–11 512 003	5–3	1.53+01	2.22−04	1.47−04	−2.955	A	LS
43		$^1P^\circ-{}^1D$		41.264	9 088 700–11 512 137	3–5	4.96+02	2.11−02	8.60−03	−1.199	A	1
44	$1s2p-1s7s$	$^3P^\circ-{}^3S$		*38.97*	*9 024 141–11 590 091*	9–3	5.86+01	4.45−04	5.14−04	−2.397	A	1
				38.989	9 025 264–11 590 091	5–3	3.25+01	4.45−04	2.86−04	−2.653	A	LS
				38.953	9 022 867–11 590 091	3–3	1.96+01	4.45−04	1.71−04	−2.875	A	LS
				38.945	9 022 345–11 590 091	1–3	6.52+00	4.45−04	5.71−05	−3.352	A	LS
45		$^1P^\circ-{}^1S$		39.949	9 088 700–11 591 874	3–1	5.60+01	4.47−04	1.76−04	−2.873	A	1
46	$1s2p-1s8s$	$^3P^\circ-{}^3S$		*38.18*	*9 024 141–11 643 558*	9–3	3.89+01	2.83−04	3.21−04	−2.594	A	1
				38.193	9 025 264–11 643 558	5–3	2.16+01	2.83−04	1.78−04	−2.849	A	LS
				38.158	9 022 867–11 643 558	3–3	1.30+01	2.84−04	1.07−04	−3.070	A	LS
				38.150	9 022 345–11 643 558	1–3	4.34+00	2.84−04	3.57−05	−3.547	A	LS
47		$^1P^\circ-{}^1S$		39.123	9 088 700–11 644 747	3–1	3.73+01	2.85−04	1.10−04	−3.068	A	1
48	$1s2p-1s9s$	$^3P^\circ-{}^3S$		*37.65*	*9 024 141*–11 680 134	9–3	2.71+01	1.92−04	2.14−04	−2.762	A	1
				37.667	9 025 264–11 680 134	5–3	1.50+01	1.92−04	1.19−04	−3.018	A	LS
				37.633	9 022 867–11 680 134	3–3	9.04+00	1.92−04	7.14−05	−3.240	A	LS
				37.625	9 022 345–11 680 134	1–3	3.03+00	1.93−04	2.39−05	−3.714	A	LS
49		$^1P^\circ-{}^1S$		38.576	9 088 700–11 680 966	3–1	2.61+01	1.94−04	7.39−05	−3.235	A	1
50	$1s2p-1s10s$	$^3P^\circ-{}^3S$		*37.28*	*9 024 141*–11 706 251	9–3	1.97+01	1.37−04	1.51−04	−2.909	A	1
				37.300	9 025 264–11 706 251	5–3	1.09+01	1.37−04	8.41−05	−3.164	A	LS
				37.266	9 022 867–11 706 251	3–3	6.58+00	1.37−04	5.04−05	−3.386	A	LS
				37.259	9 022 345–11 706 251	1–3	2.19+00	1.37−04	1.68−05	−3.863	A	LS
51		$^1P^\circ-{}^1S$		38.195	9 088 700–11 706 856	3–1	1.89+01	1.38−04	5.21−05	−3.383	A	1
52	$1s3s-1s3p$	$^3S-{}^3P^\circ$	*4 101*	*4 102*	10 558 946–*10 583 324*	3–9	1.54−01	1.17−01	4.72+00	−0.455	A	1
			4 045.5	4 046.6	10 558 946–10 583 658	3–5	1.60−01	6.56−02	2.62+00	−0.706	A	LS
			4 165.3	4 166.5	10 558 946–10 582 947	3–3	1.47−01	3.82−02	1.57+00	−0.941	A	LS
			4 194.3	4 195.5	10 558 946–10 582 781	3–1	1.44−01	1.27−02	5.26−01	−1.419	A	LS
53		$^1S-{}^1P^\circ$	5 664	5 666	10 583 431–10 601 080	1–3	6.04−02	8.72−02	1.63+00	−1.059	A	1
54	$1s3s-1s4p$	$^3S-{}^3P^\circ$		*176.63*	10 558 946–*11 125 103*	3–9	2.91+02	4.08−01	7.12−01	0.088	A	1
				176.585	10 558 946–11 125 244	3–5	2.91+02	2.27−01	3.96−01	−0.167	A	LS
				176.679	10 558 946–11 124 944	3–3	2.91+02	1.36−01	2.37−01	−0.389	A	LS
				176.701	10 558 946–11 124 873	3–1	2.90+02	4.53−02	7.91−02	−0.867	A	LS
55		$^1S-{}^1P^\circ$		182.162	10 583 431–11 132 393	1–3	2.88+02	4.30−01	2.58−01	−0.367	A	1
56	$1s3s-1s5p$	$^3S-{}^3P^\circ$		*122.55*	10 558 946–*11 374 960*	3–9	1.60+02	1.08−01	1.31−01	−0.489	A	1
				122.536	10 558 946–11 375 032	3–5	1.60+02	6.01−02	7.27−02	−0.744	A	LS
				122.559	10 558 946–11 374 879	3–3	1.60+02	3.61−02	4.37−02	−0.965	A	LS
				122.565	10 558 946–11 374 842	3–1	1.60+02	1.20−02	1.45−02	−1.444	A	LS
57		$^1S-{}^1P^\circ$		125.752	10 583 431–11 378 646	1–3	1.57+02	1.12−01	4.64−02	−0.951	A	1
58	$1s3s-1s6p$	$^3S-{}^3P^\circ$		*105.10*	*10 558 946–11 510 387*	3–9	9.42+01	4.68−02	4.86−02	−0.853	A	1
				105.104	10 558 946–11 510 387	3–5	9.42+01	2.60−02	2.70−02	−1.108	A	LS
				105.104	10 558 946–11 510 387	3–3	9.42+01	1.56−02	1.62−02	−1.330	A	LS
				105.104	10 558 946–11 510 387	3–1	9.40+01	5.19−03	5.39−03	−1.808	A	LS

TABLE 38. Transition probabilities of allowed lines for Na X (reference for this table are as follows: 1=Fernely *et al.*[27] and 2=Khan *et al.*[50])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^{a}	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
59		$^{1}\mathrm{S}-^{1}\mathrm{P}^{\circ}$		107.634	10 583 431–11 512 505	1–3	9.27+01	4.83−02	1.71−02	−1.316	A	1
60	$1s3s-1s7p$	$^{3}\mathrm{S}-^{3}\mathrm{P}^{\circ}$		*96.81*	10 558 946–*11 591 920*	3–9	5.98+01	2.52−02	2.41−02	−1.121	A	1
				96.808	10 558 946–11 591 920	3–5	5.98+01	1.40−02	1.34−02	−1.377	A	LS
				96.808	10 558 946–11 591 920	3–3	5.97+01	8.39−03	8.02−03	−1.599	A	LS
				96.808	10 558 946–11 591 920	3–1	5.98+01	2.80−03	2.68−03	−2.076	A	LS
61		$^{1}\mathrm{S}-^{1}\mathrm{P}^{\circ}$		99.028	10 583 431–11 593 248	1–3	5.87+01	2.59−02	8.44−03	−1.587	A	1
62	$1s3s-1s8p$	$^{3}\mathrm{S}-^{3}\mathrm{P}^{\circ}$		*92.10*	10 558 946–*11 644 781*	3–9	4.02+01	1.53−02	1.39−02	−1.338	A	1
				92.095	10 558 946–11 644 781	3–5	4.02+01	8.51−03	7.74−03	−1.593	A	LS
				92.095	10 558 946–11 644 781	3–3	4.02+01	5.11−03	4.65−03	−1.814	A	LS
				92.095	10 558 946–11 644 781	3–1	4.01+01	1.70−03	1.55−03	−2.292	A	LS
63		$^{1}\mathrm{S}-^{1}\mathrm{P}^{\circ}$		94.141	10 583 431–11 645 667	1–3	3.94+01	1.57−02	4.87−03	−1.804	A	1
64	$1s3s-1s9p$	$^{3}\mathrm{S}-^{3}\mathrm{P}^{\circ}$		*89.12*	10 558 946–*11 680 991*	3–9	2.82+01	1.01−02	8.87−03	−1.519	A	1
				89.123	10 558 946–11 680 991	3–5	2.82+01	5.60−03	4.93−03	−1.775	A	LS
				89.123	10 558 946–11 680 991	3–3	2.82+01	3.36−03	2.96−03	−1.997	A	LS
				89.123	10 558 946–11 680 991	3–1	2.82+01	1.12−03	9.86−04	−2.474	A	LS
65		$^{1}\mathrm{S}-^{1}\mathrm{P}^{\circ}$		91.060	10 583 431–11 681 612	1–3	2.76+01	1.03−02	3.09−03	−1.987	A	1
66	$1s3s-1s10p$	$^{3}\mathrm{S}-^{3}\mathrm{P}^{\circ}$		*87.11*	10 558 946–*11 706 875*	3–9	2.05+01	7.01−03	6.03−03	−1.677	A	1
				87.113	10 558 946–11 706 875	3–5	2.05+01	3.89−03	3.35−03	−1.933	A	LS
				87.113	10 558 946–11 706 875	3–3	2.06+01	2.34−03	2.01−03	−2.154	A	LS
				87.113	10 558 946–11 706 875	3–1	2.05+01	7.79−04	6.70−04	−2.631	A	LS
67		$^{1}\mathrm{S}-^{1}\mathrm{P}^{\circ}$		88.976	10 583 431–11 707 327	1–3	2.03+01	7.22−03	2.11−03	−2.141	A	1
68	$1s3p-1s3d$	$^{3}\mathrm{P}^{\circ}-^{3}\mathrm{D}$	*7 430*	*7 430*	*10 583 324–10 596 783*	9–15	2.01−02	2.78−02	6.11+00	−0.602	A	1
			7 535	7 537	10 583 658–10 596 925	5–7	1.93−02	2.30−02	2.85+00	−0.939	A	LS
			7 287	7 289	10 582 947–10 596 667	3–5	1.60−02	2.12−02	1.53+00	−1.197	A	LS
			7 210	7 212	10 582 781–10 596 647	1–3	1.22−02	2.86−02	6.79−01	−1.544	A	LS
			7 685	7 687	10 583 658–10 596 667	5–5	4.54−03	4.02−03	5.09−01	−1.697	A	LS
			7 297	7 299	10 582 947–10 596 647	3–3	8.84−03	7.06−03	5.09−01	−1.674	A	LS
			7 697	7 699	10 583 658–10 596 647	5–3	5.03+04	2.68−04	3.40−02	−2.873	A	LS
69	$1s3p-1s4s$	$^{3}\mathrm{P}^{\circ}-^{3}\mathrm{S}$		*188.06*	*10 583 324*–11 115 065	9–3	2.34+02	4.14−02	2.31−01	−0.429	A	1
				188.180	10 583 658–11 115 065	5–3	1.30+02	4.14−02	1.28−01	−0.684	A	LS
				187.928	10 582 947–11 115 065	3–3	7.84+01	4.15−02	7.70−02	−0.905	A	LS
				187.870	10 582 781–11 115 065	1–3	2.61+01	4.15−02	2.57−02	−1.382	A	LS
70		$^{1}\mathrm{P}^{\circ}-^{1}\mathrm{S}$		190.874	10 601 080–11 124 986	3–1	2.18+02	3.97−02	7.48−02	−0.924	A	1
71	$1s3p-1s4d$	$^{3}\mathrm{P}^{\circ}-^{3}\mathrm{D}$		*182.71*	*10 583 324–11 130 639*	9–15	7.00+02	5.84−01	3.16+00	0.721	A	1
				182.822	10 583 658–11 130 639	5–7	6.98+02	4.90−01	1.47+00	0.389	A	LS
				182.584	10 582 947–11 130 639	3–5	5.26+02	4.38−01	7.90−01	0.119	A	LS
				182.529	10 582 781–11 130 639	1–3	3.90+02	5.85−01	3.52−01	−0.233	A	LS
				182.822	10 583 658–11 130 639	5–5	1.75+02	8.75−02	2.63−01	−0.359	A	LS
				182.584	10 582 947–11 130 639	3–3	2.92+02	1.46−01	2.63−01	−0.359	A	LS
				182.822	10 583 658–11 130 639	5–3	1.94+01	5.84−03	1.76−02	−1.535	A	LS
72		$^{1}\mathrm{P}^{\circ}-^{1}\mathrm{D}$		188.702	10 601 080–11 131 017	3–5	7.09+02	6.31−01	1.18+00	0.277	A	1
73	$1s3p-1s5s$	$^{3}\mathrm{P}^{\circ}-^{3}\mathrm{S}$		*127.14*	*10 583 324*–11 369 887	9–3	1.13+02	9.15−03	3.45−02	−1.084	A	1
				127.189	10 583 658–11 369 887	5–3	6.29+01	9.15−03	1.92−02	−1.340	A	LS

TABLE 38. Transition probabilities of allowed lines for Na X (reference for this table are as follows: 1=Fernely *et al.*[27] and 2=Khan *et al.*[50])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				127.074	10 582 947–11 3698 87	3–3	3.78+01	9.15−03	1.15−02	−1.561	A	LS
				127.048	10 582 781–11 369 887	1–3	1.26+01	9.16−03	3.83−03	−2.038	A	LS
74		^{1}P$^\circ$−^{1}S		129.234	10 601 080–11 374 868	3–1	1.06+02	8.84−03	1.13−02	−1.576	A	1
75	1*s*3*p*−1*s*5*d*	^{3}P$^\circ$−^{3}D		*125.87*	*10 583 324–11 377 767*	9–15	3.46+02	1.37−01	5.11−01	0.091	A	1
				125.927	10 583 658–11 377 767	5–7	3.46+02	1.15−01	2.38−01	−0.240	A	LS
				125.815	10 582 947–11 377 767	3–5	2.60+02	1.03−01	1.28−01	−0.510	A	LS
				125.788	10 582 781–11 377 767	1–3	1.93+02	1.37−01	5.67−02	−0.863	A	LS
				125.927	10 583 658–11 377 767	5–5	8.62+01	2.05−02	4.25−02	−0.989	A	LS
				125.815	10 582 947–11 377 767	3–3	1.44+02	3.42−02	4.25−02	−0.989	A	LS
				125.927	10 583 658–11 377 767	5–3	9.60+00	1.37−03	2.84−03	−2.164	A	LS
76		^{1}P$^\circ$−^{1}D		128.716	10 601 080–11 377 984	3–5	3.38+02	1.40−01	1.78−01	−0.377	A	1
77	1*s*3*p*−1*s*6*s*	^{3}P$^\circ$−^{3}S		*108.21*	*10 583 324*–11 507 469	9–3	6.29+01	3.68−03	1.18−02	−1.480	A	1
				108.247	10 583 658–11 507 469	5–3	3.49+01	3.68−03	6.56−03	−1.735	A	LS
				108.164	10 582 947–11 507 469	3–3	2.10+01	3.68−03	3.93−03	−1.957	A	LS
				108.145	10 582 781–11 507 469	1–3	7.00+00	3.68−03	1.31−03	−2.434	A	LS
78		^{1}P$^\circ$−^{1}S		109.982	10 601 080–11 510 320	3–1	5.91+01	3.57−03	3.88−03	−1.970	A	1
79	1*s*3*p*−1*s*6*d*	^{3}P$^\circ$−^{3}D		*107.68*	*10 583 324–11 512 003*	9–15	1.92+02	5.57−02	1.78−01	−0.300	A	1
				107.719	10 583 658–11 512 003	5–7	1.92+02	4.68−02	8.30−02	−0.631	A	LS
				107.636	10 582 947–11 512 003	3–5	1.44+02	4.18−02	4.44−02	−0.902	A	LS
				107.617	10 582 781–11 512 003	1–3	1.07+02	5.58−02	1.98−02	−1.253	A	LS
				107.719	10 583 658–11 512 003	5–5	4.81+01	8.36−03	1.48−02	−1.379	A	LS
				107.636	10 582 947–11 512 003	3–3	8.00+01	1.39−02	1.48−02	−1.380	A	LS
				107.719	10 583 658–11 512 003	5–3	5.34+00	5.57−04	9.88−04	−2.555	A	LS
80		^{1}P$^\circ$−^{1}D		109.763	10 601 080–11 512 137	3–5	1.86+02	5.61−02	6.08−02	−0.774	A	1
81	1*s*3*p*−1*s*7*s*	^{3}P$^\circ$−^{3}S		*99.33*	*10 583 324*–11 590 091	9–3	3.85+01	1.90−03	5.59−03	−1.767	A	1
				99.361	10 583 658–11 590 091	5–3	2.14+01	1.90−03	3.11−03	−2.022	A	LS
				99.291	10 582 947–11 590 091	3–3	1.29+01	1.90−03	1.86−03	−2.244	A	LS
				99.274	10 582 781–11 590 091	1–3	4.29+00	1.90−03	6.21−04	−2.721	A	LS
82		^{1}P$^\circ$−^{1}S		100.929	10 601 080–11 591 874	3–1	3.65+01	1.86−03	1.85−03	−2.253	A	1
83	1*s*3*p*−1*s*8*s*	^{3}P$^\circ$−^{3}S		*94.32*	*10 583 324*–11 643 558	9–3	2.54+01	1.13−03	3.16−03	−1.993	A	1
				94.349	10 583 658–11 643 558	5–3	1.41+01	1.13−03	1.75−03	−2.248	A	LS
				94.285	10 582 947–11 643 558	3–3	8.48+00	1.13−03	1.05−03	−2.470	A	LS
				94.271	10 582 781–11 643 558	1–3	2.83+00	1.13−03	3.51−04	−2.947	A	LS
84		^{1}P$^\circ$−^{1}S		95.816	10 601 080–11 644 747	3–1	2.42+01	1.11−03	1.05−03	−2.478	A	1
85	1*s*3*p*−1*s*9*s*	^{3}P$^\circ$−^{3}S		*91.17*	*10 583 324*–11 680 134	9–3	1.77+01	7.35−04	1.99−03	−2.179	A	1
				91.201	10 583 658–11 680 134	5–3	9.82+00	7.35−04	1.10−03	−2.435	A	LS
				91.142	10 582 947–11 680 134	3–3	5.90+00	7.35−04	6.62−04	−2.657	A	LS
				91.128	10 582 781–11 680 134	1–3	1.97+00	7.35−04	2.21−04	−3.134	A	LS
86		^{1}P$^\circ$−^{1}S		92.602	10 601 080–11 680 966	3–1	1.67+01	7.17−04	6.56−04	−2.667	A	1
87	1*s*3*p*−1*s*10*s*	^{3}P$^\circ$−^{3}S		*89.05*	10 583 324–11 706 251	9–3	1.28+01	5.07−04	1.34−03	−2.341	A	1
				89.079	10 583 658–11 706 251	5–3	7.10+00	5.07−04	7.43−04	−2.596	A	LS
				89.023	10 582 947–11 706 251	3–3	4.27+00	5.07−04	4.46−04	−2.818	A	LS
				89.010	10 582 781–11 706 251	1–3	1.42+00	5.07−04	1.49−04	−3.295	A	LS

TABLE 38. Transition probabilities of allowed lines for Na X (reference for this table are as follows: 1=Fernely *et al.*[27] and 2=Khan *et al.*[50])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
88		$^1P^\circ-^1S$		90.434	10 601 080–11 706 856	3–1	1.22+01	4.97−04	4.44−04	−2.827	A	1
89	$1s3d-1s3p$	$^1D-^1P^\circ$		3 605 cm^{-1}	10 597 475–10 601 080	5–3	6.40−04	4.43−03	2.02+00	−1.655	A	1
90	$1s3d-1s4p$	$^3D-^3P^\circ$		*189.28*	*10 596 783–11 125 103*	15–9	4.12+01	1.33−02	1.24−01	−0.700	A	1
				189.280	10 596 925–11 125 244	7–5	3.47+01	1.33−02	5.80−02	−1.031	A	LS
				189.295	10 596 667–11 124 944	5–3	3.09+01	9.95−03	3.10−02	−1.303	A	LS
				189.313	10 596 647–11 124 873	3–1	4.12+01	7.37−03	1.38−02	−1.655	A	LS
				189.187	10 596 667–11 125 244	5–5	6.19+00	3.32−03	1.03−02	−1.780	A	LS
				189.287	10 596 647–11 124 944	3–3	1.03+01	5.53−03	1.03−02	−1.780	A	LS
				189.180	10 596 647–11 125 244	3–5	4.13−01	3.69−04	6.89−04	−2.956	A	LS
91		$^1D-^1P^\circ$		186.945	10 597 475–11 132 393	5–3	3.28+01	1.03−02	3.17−02	−1.288	A	1
92	$1s3d-1s5p$	$^3D-^3P^\circ$		*128.51*	*10 596 783–11 374 960*	15–9	1.77+01	2.62−03	1.66−02	−1.406	A	1
				128.517	10 596 925–11 375 032	7–5	1.48+01	2.62−03	7.76−03	−1.737	A	LS
				128.500	10 596 667–11 374 879	5–3	1.33+01	1.97−03	4.17−03	−2.007	A	LS
				128.502	10 596 647–11 374 842	3–1	1.77+01	1.46−03	1.85−03	−2.359	A	LS
				128.474	10 596 667–11 375 032	5–5	2.65+00	6.55−04	1.39−03	−2.485	A	LS
				128.496	10 596 647–11 374 879	3–3	4.40+00	1.09−03	1.38−03	−2.485	A	LS
				128.471	10 596 647–11 375 032	3–5	1.77−01	7.28−05	9.24−05	−3.661	A	LS
93		$^1D-^1P^\circ$		128.013	10 597 475–11 378 646	5–3	1.41+01	2.08−03	4.38−03	−1.983	A	1
94	$1s3d-1s6p$	$^3D-^3P^\circ$		*109.46*	*10 596 783–11 510 387*	15–9	9.22+00	9.94−04	5.37−03	−1.827	A	1
				109.474	10 596 925–11 510 387	7–5	7.75+00	9.94−04	2.51−03	−2.158	A	LS
				109.443	10 596 667–11 510 387	5–3	6.91+00	7.45−04	1.34−03	−2.429	A	LS
				109.440	10 596 647–11 510 387	3–1	9.22+00	5.52−04	5.97−04	−2.781	A	LS
				109.443	10 596 667–11 510 387	5–5	1.38+00	2.48−04	4.47−04	−2.907	A	LS
				109.440	10 596 647–11 510 387	3–3	2.31+00	4.14−04	4.47−04	−2.906	A	LS
				109.440	10 596 647–11 510 387	3–5	9.22−02	2.76−05	2.98−05	−4.082	A	LS
95		$^1D-^1P^\circ$		109.286	10 597 475–11 512 505	5–3	7.41+00	7.96−04	1.43−03	−2.400	A	1
96	$1s3d-1s7p$	$^3D-^3P^\circ$		*100.49*	*10 596 783–11 591 920*	15–9	5.47+00	4.97−04	2.47−03	−2.128	A	1
				100.503	10 596 925–11 591 920	7–5	4.59+00	4.97−04	1.15−03	−2.459	A	LS
				100.477	10 596 667–11 591 920	5–3	4.11+00	3.73−04	6.17−04	−2.729	A	LS
				100.475	10 596 647–11 591 920	3–1	5.47+00	2.76−04	2.74−04	−3.082	A	LS
				100.477	10 596 667–11 591 920	5–5	8.19−01	1.24−04	2.05−04	−3.208	A	LS
				100.475	10 596 647–11 591 920	3–3	1.37+00	2.07−04	2.05−04	−3.207	A	LS
				100.475	10 596 647–11 591 920	3–5	5.47−02	1.38−05	1.37−05	−4.383	A	LS
97		$^1D-^1P^\circ$		100.424	10 597 475–11 593 248	5–3	4.39+00	3.98−04	6.58−04	−2.701	A	1
98	$1s3d-1s8p$	$^3D-^3P^\circ$		*95.42*	*10 596 783–11 644 781*	15–9	3.53+00	2.89−04	1.36−03	−2.363	A	1
				95.433	10 596 925–11 644 781	7–5	2.96+00	2.89−04	6.36−04	−2.694	A	LS
				95.409	10 596 667–11 644 781	5–3	2.65+00	2.17−04	3.41−04	−2.965	A	LS
				95.408	10 596 647–11 644 781	3–1	3.52+00	1.60−04	1.51−04	−3.319	A	LS
				95.409	10 596 667–11 644 781	5–5	5.29−01	7.22−05	1.13−04	−3.442	A	LS
				95.408	10 596 647–11 644 781	3–3	8.79−01	1.20−04	1.13−04	−3.444	A	LS
				95.408	10 596 647–11 644 781	3–5	3.53−02	8.02−06	7.56−06	−4.619	A	LS
99		$^1D-^1P^\circ$		95.402	10 597 475–11 645 667	5–3	2.83+00	2.32−04	3.64−04	−2.936	A	1
100	$1s3d-1s9p$	$^3D-^3P^\circ$		*92.23*	*10 596 783–11 680 991*	15–9	2.40+00	1.84−04	8.38−04	−2.559	A	1
				92.245	10 596 925–11 680 991	7–5	2.02+00	1.84−04	3.91−04	−2.890	A	LS
				92.223	10 596 667–11 680 991	5–3	1.80+00	1.38−04	2.09−04	−3.161	A	LS
				92.222	10 596 647–11 680 991	3–1	2.40+00	1.02−04	9.29−05	−3.514	A	LS

TABLE 38. Transition probabilities of allowed lines for Na X (reference for this table are as follows: 1=Fernely *et al.*[27] and 2=Khan *et al.*[50])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				92.223	10 596 667–11 680 991	5–5	3.61−01	4.60−05	6.98−05	−3.638	A	LS
				92.222	10 596 647–11 680 991	3–3	6.02−01	7.67−05	6.99−05	−3.638	A	LS
				92.222	10 596 647–11 680 991	3–5	2.40−02	5.11−06	4.65−06	−4.814	A	LS
101		$^{1}\mathrm{D}-^{1}\mathrm{P}^{\circ}$		92.239	10 597 475–11 681 612	5–3	1.93+00	1.48−04	2.25−04	−3.131	A	1
102	$1s3d-1s10p$	$^{3}\mathrm{D}-^{3}\mathrm{P}^{\circ}$		*90.08*	*10 596 783–11 706 875*	15–9	1.73+00	1.26−04	5.61−04	−2.724	A	1
				90.094	10 596 925–11 706 875	7–5	1.45+00	1.26−04	2.62−04	−3.055	A	LS
				90.073	10 596 667–11 706 875	5–3	1.29+00	9.45−05	1.40−04	−3.326	A	LS
				90.072	10 596 647–11 706 875	3–1	1.73+00	7.00−05	6.23−05	−3.678	A	LS
				90.073	10 596 667–11 706 875	5–5	2.59−01	3.15−05	4.67−05	−3.803	A	LS
				90.072	10 596 647–11 706 875	3–3	4.32−01	5.25−05	4.67−05	−3.803	A	LS
				90.072	10 596 647–11 706 875	3–5	1.73−02	3.50−06	3.11−06	−4.979	A	LS
103		$^{1}\mathrm{D}-^{1}\mathrm{P}^{\circ}$		90.102	10 597 475–11 707 327	5–3	1.38+00	1.01−04	1.50−04	−3.297	A	1
104	$1s4s-1s4p$	$^{3}\mathrm{S}-^{3}\mathrm{P}^{\circ}$	*9 960*	*9 962*	11 115 065–*11 125 103*	3–9	3.62−02	1.62−01	1.59+01	−0.313	A	1
			9 821	9 824	11 115 065–11 125 244	3–5	3.77−02	9.10−02	8.83+00	−0.564	A	LS
			10 120	10 122	11 115 065–11 124 944	3–3	3.45−02	5.30−02	5.30+00	−0.799	A	LS
			10 193	10 196	11 115 065–11 124 873	3–1	3.37−02	1.75−02	1.76+00	−1.280	A	LS
105		$^{1}\mathrm{S}-^{1}\mathrm{P}^{\circ}$	13 497	13 501	11 124 986–11 132 393	1–3	1.49−02	1.22−01	5.42+00	−0.914	A	1
106	$1s4s-1s5p$	$^{3}\mathrm{S}-^{3}\mathrm{P}^{\circ}$		*384.77*	11 115 065–*11 374 960*	3–9	6.83+01	4.54−01	1.73+00	0.134	A	1
				384.664	11 115 065–11 375 032	3–5	6.84+01	2.53−01	9.61−01	−0.120	A	LS
				384.891	11 115 065–11 374 879	3–3	6.80+01	1.51−01	5.74−01	−0.344	A	LS
				384.946	11 115 065–11 374 842	3–1	6.82+01	5.05−02	1.92−01	−0.820	A	LS
107		$^{1}\mathrm{S}-^{1}\mathrm{P}^{\circ}$		394.228	11 124 986–11 378 646	1–3	6.84+01	4.78−01	6.20−01	−0.321	A	1
108	$1s4s-1s6p$	$^{3}\mathrm{S}-^{3}\mathrm{P}^{\circ}$		*252.96*	11 115 065–*11 510 387*	3–9	4.25+01	1.22−01	3.05−01	−0.437	A	1
				252.958	11 115 065–11 510 387	3–5	4.25+01	6.79−02	1.70−01	−0.691	A	LS
				252.958	11 115 065–11 510 387	3–3	4.24+01	4.07−02	1.02−01	−0.913	A	LS
				252.958	11 115 065–11 510 387	3–1	4.25+01	1.36−02	3.40−02	−1.389	A	LS
109		$^{1}\mathrm{S}-^{1}\mathrm{P}^{\circ}$		258.052	11 124 986–11 512 505	1–3	4.21+01	1.26−01	1.07−01	−0.900	A	1
110	$1s4s-1s7p$	$^{3}\mathrm{S}-^{3}\mathrm{P}^{\circ}$		*209.71*	11 115 065–*11 591 920*	3–9	2.72+01	5.38−02	1.11−01	−0.792	A	1
				209.707	11 115 065–11 591 920	3–5	2.72+01	2.99−02	6.19−02	−1.047	A	LS
				209.707	11 115 065–11 591 920	3–3	2.71+01	1.79−02	3.71−02	−1.270	A	LS
				209.707	11 115 065–11 591 920	3–1	2.72+01	5.97−03	1.24−02	−1.747	A	LS
111		$^{1}\mathrm{S}-^{1}\mathrm{P}^{\circ}$		213.556	11 124 986–11 593 248	1–3	2.71+01	5.55−02	3.90−02	−1.256	A	1
112	$1s4s-1s8p$	$^{3}\mathrm{S}-^{3}\mathrm{P}^{\circ}$		*188.78*	11 115 065–*11 644 781*	3–9	1.83+01	2.94−02	5.48−02	−1.055	A	1
				188.780	11 115 065–11 644 781	3–5	1.83+01	1.63−02	3.04−02	−1.311	A	LS
				188.780	11 115 065–11 644 781	3–3	1.84+01	9.81−03	1.83−02	−1.531	A	LS
				188.780	11 115 065–11 644 781	3–1	1.84+01	3.27−03	6.10−03	−2.008	A	LS
113		$^{1}\mathrm{S}-^{1}\mathrm{P}^{\circ}$		192.056	11 124 986–11 645 667	1–3	1.82+01	3.02−02	1.91−02	−1.520	A	1
114	$1s4s-1s9p$	$^{3}\mathrm{S}-^{3}\mathrm{P}^{\circ}$		*176.70*	11 115 065–*11 680 991*	3–9	1.29+01	1.82−02	3.17−02	−1.263	A	1
				176.702	11 115 065–11 680 991	3–5	1.29+01	1.01−02	1.76−02	−1.519	A	LS
				176.702	11 115 065–11 680 991	3–3	1.29+01	6.05−03	1.06−02	−1.741	A	LS
				176.702	11 115 065–11 680 991	3–1	1.29+01	2.02−03	3.53−03	−2.218	A	LS
115		$^{1}\mathrm{S}-^{1}\mathrm{P}^{\circ}$		179.654	11 124 986–11 681 612	1–3	1.28+01	1.86−02	1.10−02	−1.730	A	1

TABLE 38. Transition probabilities of allowed lines for Na X (reference for this table are as follows: 1=Fernely *et al.*[27] and 2=Khan *et al.*[50])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
116	$1s4s-1s10p$	^{3}S$-^3$P$^\circ$		*168.97*	11 115 065–*11 706 875*	3–9	9.44+00	1.21−02	2.02−02	−1.440	A	1
				168.973	11 115 065–11 706 875	3–5	9.43+00	6.73−03	1.12−02	−1.695	A	LS
				168.973	11 115 065–11 706 875	3–3	9.44+00	4.04−03	6.74−03	−1.916	A	LS
				168.973	11 115 065–11 706 875	3–1	9.46+00	1.35−03	2.25−03	−2.393	A	LS
117		^{1}S$-^1$P$^\circ$		171.721	11 124 986–11 707 327	1–3	9.35+00	1.24−02	7.01−03	−1.907	A	1
118	$1s4p-1s4d$	^{3}P$^\circ-^3$D	*18 060*	*18 064*	*11 125 103–11 130 639*	9–15	5.98−03	4.87−02	2.61+01	−0.358	A	1
			18 531	18 536	11 125 244–11 130 639	5–7	5.53−03	3.99−02	1.22+01	−0.700	A	LS
			17 554	17 559	11 124 944–11 130 639	3–5	4.88−03	3.76−02	6.52+00	−0.948	A	LS
			17 338	17 343	11 124 873–11 130 639	1–3	3.76−03	5.08−02	2.90+00	−1.294	A	LS
			18 531	18 536	11 125 244–11 130 639	5–5	1.38−03	7.12−03	2.17+00	−1.449	A	LS
			17 554	17 559	11 124 944–11 130 639	3–3	2.70−03	1.25−02	2.17+00	−1.426	A	LS
			18 531	18 536	11 125 244–11 130 639	5–3	1.54−04	4.75−04	1.45−01	−2.624	A	LS
119	$1s4p-1s5s$	^{3}P$^\circ-^3$S		*408.52*	*11 125 103*–11 369 887	9–3	8.06+01	6.72−02	8.14−01	−0.218	A	1
				408.759	11 125 244–11 369 887	5–3	4.47+01	6.72−02	4.52−01	−0.474	A	LS
				408.258	11 124 944–11 369 887	3–3	2.69+01	6.73−02	2.71−01	−0.695	A	LS
				408.140	11 124 873–11 369 887	1–3	8.98+00	6.73−02	9.04−02	−1.172	A	LS
120		^{1}P$^\circ-^1$S		412.414	11 132 393–11 374 868	3–1	7.53+01	6.40−02	2.61−01	−0.717	A	1
121	$1s4p-1s5d$	^{3}P$^\circ-^3$D		*395.78*	*11 125 103–11 377 767*	9–15	1.45+02	5.67−01	6.65+00	0.708	A	1
				396.004	11 125 244–11 377 767	5–7	1.45+02	4.76−01	3.10+00	0.377	A	LS
				395.534	11 124 944–11 377 767	3–5	1.09+02	4.26−01	1.66+00	0.107	A	LS
				395.423	11 124 873–11 377 767	1–3	8.08+01	5.68−01	7.39−01	−0.246	A	LS
				396.004	11 125 244–11 377 767	5–5	3.62+01	8.51−02	5.55−01	−0.371	A	LS
				395.534	11 124 944–11 377 767	3–3	6.05+01	1.42−01	5.55−01	−0.371	A	LS
				396.004	11 125 244–11 377 767	5–3	4.02+00	5.67−03	3.70−02	−1.547	A	LS
122		^{1}P$^\circ-^1$D		407.181	11 132 393–11 377 984	3–5	1.51+02	6.24−01	2.51+00	0.272	A	1
123	$1s4p-1s6s$	^{3}P$^\circ-^3$S		*261.53*	*11 125 103*–11 507 469	9–3	4.39+01	1.50−02	1.16−01	−0.870	A	1
				261.626	11 125 244–11 507 469	5–3	2.44+01	1.50−02	6.46−02	−1.125	A	LS
				261.421	11 124 944–11 507 469	3–3	1.46+01	1.50−02	3.87−02	−1.347	A	LS
				261.372	11 124 873–11 507 469	1–3	4.88+00	1.50−02	1.29−02	−1.824	A	LS
124		^{1}P$^\circ-^1$S		264.601	11 132 393–11 510 320	3–1	4.14+01	1.45−02	3.79−02	−1.362	A	1
125	$1s4p-1s6d$	^{3}P$^\circ-^3$D		*258.46*	*11 125 103–11 512 003*	9–15	8.59+01	1.43−01	1.10+00	0.110	A	1
				258.559	11 125 244–11 512 003	5–7	8.55+01	1.20−01	5.11−01	−0.222	A	LS
				258.359	11 124 944–11 512 003	3–5	6.48+01	1.08−01	2.76−01	−0.489	A	LS
				258.311	11 124 873–11 512 003	1–3	4.80+01	1.44−01	1.22−01	−0.842	A	LS
				258.559	11 125 244–11 512 003	5–5	2.15+01	2.15−02	9.15−02	−0.969	A	LS
				258.359	11 124 944–11 512 003	3–3	3.59+01	3.59−02	9.16−02	−0.968	A	LS
				258.559	11 125 244–11 512 003	5–3	2.38+00	1.43−03	6.09−03	−2.146	A	LS
126		^{1}P$^\circ-^1$D		263.335	11 132 393–11 512 137	3–5	8.66+01	1.50−01	3.90−01	−0.347	A	1
127	$1s4p-1s7s$	^{3}P$^\circ-^3$S		*215.06*	*11 125 103*–11 590 091	9–3	2.65+01	6.11−03	3.90−02	−1.260	A	1
				215.125	11 125 244–11 590 091	5–3	1.47+01	6.11−03	2.16−02	−1.515	A	LS
				214.986	11 124 944–11 590 091	3–3	8.83+00	6.12−03	1.30−02	−1.736	A	LS
				214.953	11 124 873–11 590 091	1–3	2.95+00	6.12−03	4.33−03	−2.213	A	LS
128		^{1}P$^\circ-^1$S		217.637	11 132 393–11 591 874	3–1	2.49+01	5.90−03	1.27−02	−1.752	A	1
129	$1s4p-1s8s$	^{3}P$^\circ-^3$S		*192.88*	*11 125 103*–11 643 558	9–3	1.72+01	3.20−03	1.83−02	−1.541	A	1

TABLE 38. Transition probabilities of allowed lines for Na X (reference for this table are as follows: 1=Fernely *et al.*[27] and 2=Khan *et al.*[50])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				192.933	11 125 244–11 643 558	5–3	9.56+00	3.20−03	1.02−02	−1.796	A	LS
				192.822	11 124 944–11 643 558	3–3	5.74+00	3.20−03	6.09−03	−2.018	A	LS
				192.795	11 124 873–11 643 558	1–3	1.91+00	3.20−03	2.03−03	−2.495	A	LS
130		$^1P^\circ-{}^1S$		195.178	11 132 393–11 644 747	3–1	1.63+01	3.10−03	5.98−03	−2.032	A	1
131	$1s4p-1s9s$	$^3P^\circ-{}^3S$		*180.17*	*11 125 103*–11 680 134	9–3	1.18+01	1.92−03	1.02−02	−1.762	A	1
				180.216	11 125 244–11680 134	5–3	6.57+00	1.92−03	5.70−03	−2.018	A	LS
				180.119	11 124 944–11 680 134	3–3	3.95+00	1.92−03	3.42−03	−2.240	A	LS
				180.095	11 124 873–11 680 134	1–3	1.32+00	1.92−03	1.14−03	−2.717	A	LS
132		$^1P^\circ-{}^1S$		182.291	11 132 393–11 680 966	3–1	1.12+01	1.86−03	3.35−03	−2.253	A	1
133	$1s4p-1s10s$	$^3P^\circ-{}^3S$		*172.07*	*11 125 103*–11 706 251	9–3	8.52+00	1.26−03	6.42−03	−1.945	A	1
				172.115	11 125 244–11 706 251	5–3	4.73+00	1.26−03	3.57−03	−2.201	A	LS
				172.026	11 124 944–11 706 251	3–3	2.84+00	1.26−03	2.14−03	−2.423	A	LS
				172.005	11 124 873–11 706 251	1–3	9.47−01	1.26−03	7.13−04	−2.900	A	LS
134		$^1P^\circ-{}^1S$		174.076	11 132 393–11 706 856	3–1	8.06+00	1.22−03	2.10−03	−2.437	A	1
135	$1s4d-1s4p$	$^1D-{}^1P^\circ$		1 376 cm^{-1}	11 131 017–11 132 393	5–3	1.52−04	7.20−03	8.61+00	−1.444	A	1
136	$1s4d-1s5p$	$^3D-{}^3P^\circ$		*409.30*	*11 130 639–11 374 960*	15–9	2.18+01	3.29−02	6.65−01	−0.307	A	1
				409.177	11 130 639–11 375 032	7–5	1.84+01	3.29−02	3.10−01	−0.638	A	LS
				409.433	11 130 639–11 374 879	5–3	1.64+01	2.47−02	1.66−01	−0.908	A	LS
				409.495	11 130 639–11 374 842	3–1	2.18+01	1.83−02	7.40−02	−1.260	A	LS
				409.177	11 130 639–11 375 032	5–5	3.28+00	8.23−03	5.54−02	−1.386	A	LS
				409.433	11 130 639–11 374 879	3–3	5.45+00	1.37−02	5.54−02	−1.386	A	LS
				409.177	11 130 639–11 375 032	3–5	2.19−01	9.15−04	3.70−03	−2.561	A	LS
137		$^1D-{}^1P^\circ$		403.830	11 131 017–11 378 646	5–3	1.80+01	2.64−02	1.75−01	−0.879	A	1
138	$1s4d-1s6p$	$^3D-{}^3P^\circ$		*263.33*	*11 130 639–11 510 387*	15–9	1.09+01	6.80−03	8.84−02	−0.991	A	1
				263.333	11 130 639–11 510 387	7–5	9.16+00	6.80−03	4.13−02	−1.322	A	LS
				263.333	11 130 639–11 510 387	5–3	8.18+00	5.10−03	2.21−02	−1.593	A	LS
				263.333	11 130 639–11 510 387	3–1	1.09+01	3.78−03	9.83−03	−1.945	A	LS
				263.333	11 130 639–11 510 387	5–5	1.64+00	1.70−03	7.37−03	−2.071	A	LS
				263.333	11 130 639–11 510 387	3–3	2.72+00	2.83−03	7.36−03	−2.071	A	LS
				263.333	11 130 639–11 510 387	3–5	1.09−01	1.89−04	4.92−04	−3.246	A	LS
139		$^1D-{}^1P^\circ$		262.131	11 131 017–11 512 505	5–3	9.00+00	5.56−03	2.40−02	−1.556	A	1
140	$1s4d-1s7p$	$^3D-{}^3P^\circ$		*216.79*	*11 130 639–11 591 920*	15–9	6.22+00	2.63−03	2.81−02	−1.404	A	1
				216.788	11 130 639–11 591 920	7–5	5.23+00	2.63−03	1.31−02	−1.735	A	LS
				216.788	11 130 639–11 591 920	5–3	4.66+00	1.97−03	7.03−03	−2.007	A	LS
				216.788	11 130 639–11591 920	3–1	6.22+00	1.46−03	3.13−03	−2.359	A	LS
				216.788	11 130 639–11 591 920	5–5	9.32−01	6.57−04	2.34−03	−2.483	A	LS
				216.788	11 130 639–11 591 920	3–3	1.55+00	1.09−03	2.33−03	−2.485	A	LS
				216.788	11 130 639–11 591 920	3–5	6.22−02	7.30−05	1.56−04	−3.660	A	LS
141		$^1D-{}^1P^\circ$		216.342	11 131 017–11 593 248	5–3	5.18+00	2.18−03	7.76−03	−1.963	A	1
142	$1s4d-1s8p$	$^3D-{}^3P^\circ$		*194.50*	*11 130 639–11 644 781*	15–9	3.91+00	1.33−03	1.28−02	−1.700	A	1
				194.499	11 130 639–11 644 781	7–5	3.28+00	1.33−03	5.96−03	−2.031	A	LS
				194.499	11 130 639–11 644 781	5–3	2.94+00	1.00−03	3.20−03	−2.301	A	LS
				194.499	11 130 639–11 644 781	3–1	3.92+00	7.41−04	1.42−03	−2.653	A	LS
				194.499	11 130 639–11 644 781	5–5	5.87−01	3.33−04	1.07−03	−2.779	A	LS
				194.499	11 130 639–11 644 781	3–3	9.80−01	5.56−04	1.07−03	−2.778	A	LS

TABLE 38. Transition probabilities of allowed lines for Na X (reference for this table are as follows: 1=Fernely *et al.*[27] and 2=Khan *et al.*[50])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})$^{\mathrm{a}}$	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				194.499	11 130 639–11 644 781	3–5	3.91−02	3.70−05	7.11−05	−3.955	A	LS
143		$^{1}\mathrm{D}-{}^{1}\mathrm{P}^{\circ}$		194.307	11 131 017–11 645 667	5–3	3.24+00	1.10−03	3.52−03	−2.260	A	1
144	$1s4d-1s9p$	$^{3}\mathrm{D}-{}^{3}\mathrm{P}^{\circ}$		*181.70*	*11 130 639–11 680 991*	15–9	2.65+00	7.87−04	7.06−03	−1.928	A	1
				181.702	11 130 639–11 680 991	7–5	2.23+00	7.87−04	3.30−03	−2.259	A	LS
				181.702	11 130 639–11 680 991	5–3	1.99+00	5.90−04	1.76−03	−2.530	A	LS
				181.702	11 130 639–11 680 991	3–1	2.65+00	4.37−04	7.84−04	−2.882	A	LS
				181.702	11 130 639–11 680 991	5–5	3.98−01	1.97−04	5.89−04	−3.007	A	LS
				181.702	11 130 639–11 680 991	3–3	6.63−01	3.28−04	5.89−04	−3.007	A	LS
				181.702	11 130 639–11 680 991	3–5	2.65−02	2.19−05	3.93−05	−4.182	A	LS
145		$^{1}\mathrm{D}-{}^{1}\mathrm{P}^{\circ}$		181.622	11 131 017–11 681 612	5–3	2.19+00	6.50−04	1.94−03	−2.488	A	1
146	$1s4d-1s10p$	$^{3}\mathrm{D}-{}^{3}\mathrm{P}^{\circ}$		*173.54*	*11 130 639–11 706 875*	15–9	1.87+00	5.06−04	4.33−03	−2.120	A	1
				173.540	11 130 639–11 706 875	7–5	1.57+00	5.06−04	2.02−03	−2.451	A	LS
				173.540	11 130 639–11 706 875	5–3	1.40+00	3.79−04	1.08−03	−2.722	A	LS
				173.540	11 130 639–11 706 875	3–1	1.87+00	2.81−04	4.82−04	−3.074	A	LS
				173.540	11 130 639–11 706 875	5–5	2.79−01	1.26−04	3.60−04	−3.201	A	LS
				173.540	11 130 639–11 706 875	3–3	4.67−01	2.11−04	3.62−04	−3.199	A	LS
				173.540	11 130 639–11 706 875	3–5	1.86−02	1.40−05	2.40−05	−4.377	A	LS
147		$^{1}\mathrm{D}-{}^{1}\mathrm{P}^{\circ}$		173.518	11 131 017–11 707 327	5–3	1.55+00	4.20−04	1.20−03	−2.678	A	1
148	$1s5s-1s5p$	$^{3}\mathrm{S}-{}^{3}\mathrm{P}^{\circ}$	*19 710*	*19 712*	11 369 887–*11 374 960*	3–9	1.17−02	2.04−01	3.97+01	−0.213	A	1
			19 431	19 436	11 369 887–11 375 032	3–5	1.22−02	1.15−01	2.21+01	−0.462	A	LS
				4 992 cm^{-1}	11 369 887–11 374 879	3–3	1.11−02	6.67−02	1.32+01	−0.699	A	LS
				4 955 cm^{-1}	11 369 887–11 374 842	3–1	1.09−02	2.21−02	4.40+00	−1.178	A	LS
149		$^{1}\mathrm{S}-{}^{1}\mathrm{P}^{\circ}$		3 778 cm^{-1}	11 374 868–11 378 646	1–3	4.89−03	1.54−01	1.34+01	−0.812	A	1
150	$1s5s-1s6p$	$^{3}\mathrm{S}-{}^{3}\mathrm{P}^{\circ}$		*711.7*	11 369 887–*11 510 387*	3–9	2.21+01	5.04−01	3.54+00	0.180	A	1
				711.74	11 369 887–11 510 387	3–5	2.21+01	2.80−01	1.97+00	−0.076	A	LS
				711.74	11 369 887–11 510 387	3–3	2.21+01	1.68−01	1.18+00	−0.298	A	LS
				711.74	11 369 887–11 510 387	3–1	2.21+01	5.60−02	3.94−01	−0.775	A	LS
151		$^{1}\mathrm{S}-{}^{1}\mathrm{P}^{\circ}$		726.55	11 374 868–11 512 505	1–3	2.24+01	5.31−01	1.27+00	−0.275	A	1
152	$1s5s-1s7p$	$^{3}\mathrm{S}-{}^{3}\mathrm{P}^{\circ}$		450.38	11 369 887–11 591 920	3–9	1.49+01	1.36−01	6.05−01	−0.389	A	1
				450.384	11 369 887–11 591 920	3–5	1.49+01	7.55−02	3.36−01	−0.645	A	LS
				450.384	11 369 887–11 591 920	3–3	1.49+01	4.53−02	2.02−01	−0.867	A	LS
				450.384	11 369 887–11 591 920	3–1	1.49+01	1.51−02	6.72−02	−1.344	A	LS
153		$^{1}\mathrm{S}-{}^{1}\mathrm{P}^{\circ}$		457.917	11 374 868–11 593 248	1–3	1.50+01	1.41−01	2.13−01	−0.851	A	1
154	$1s5s-1s8p$	$^{3}\mathrm{S}-{}^{3}\mathrm{P}^{\circ}$		*363.78*	11 369 887–*11 644 781*	3–9	1.01+01	6.04−02	2.17−01	−0.742	A	1
				363.777	11 369 887–11 644 781	3–5	1.02+01	3.36−02	1.21−01	−0.997	A	LS
				363.777	11 369 887–11 644 781	3–3	1.01+01	2.01−02	7.22−02	−1.220	A	LS
				363.777	11 369 887–11 644 781	3–1	1.01+01	6.71−03	2.41−02	−1.696	A	LS
155		$^{1}\mathrm{S}-{}^{1}\mathrm{P}^{\circ}$		369.278	11 374 868–11 645 667	1–3	1.02+01	6.23−02	7.57−02	−1.206	A	1
156	$1s5s-1s9p$	$^{3}\mathrm{S}-{}^{3}\mathrm{P}^{\circ}$		*321.44*	11 369 887–*11 680 991*	3–9	7.17+00	3.33−02	1.06−01	−1.000	A	1
				321.436	11 369 887–11 680 991	3–5	7.17+00	1.85−02	5.87−02	−1.256	A	LS
				321.436	11 369 887–11 680 991	3–3	7.17+00	1.11−02	3.52−02	−1.478	A	LS
				321.436	11 369 887–11 680 991	3–1	7.17+00	3.70−03	1.17−02	−1.955	A	LS
157		$^{1}\mathrm{S}-{}^{1}\mathrm{P}^{\circ}$		326.005	11 374 868–11 681 612	1–3	7.15+00	3.42−02	3.67−02	−1.466	A	1

TABLE 38. Transition probabilities of allowed lines for Na X (reference for this table are as follows: 1=Fernely *et al.*[27] and 2=Khan *et al.*[50])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
158	$1s5s-1s10p$	$^{3}\mathrm{S}-{}^{3}\mathrm{P}^{\circ}$		*296.75*	11 369 887–*11 706 875*	3–9	5.23+00	2.07−02	6.07−02	−1.207	A	1
				296.746	11 369 887–11 706 875	3–5	5.23+00	1.15−02	3.37−02	−1.462	A	LS
				296.746	11 369 887–11 706 875	3–3	5.23+00	6.91−03	2.03−02	−1.683	A	LS
				296.746	11 369 887–11 706 875	3–1	5.23+00	2.30−03	6.74−03	−2.161	A	LS
159		$^{1}\mathrm{S}-{}^{1}\mathrm{P}^{\circ}$		300.789	11 374 868–11 707 327	1–3	5.23+00	2.13−02	2.11−02	−1.672	A	1
160	$1s5p-1s5d$	$^{3}\mathrm{P}^{\circ}-{}^{3}\mathrm{D}$		*2 807* cm^{-1}	*11 374 960–11 377 767*	9–15	2.15−03	6.80−02	7.18+01	−0.213	A	1
				2 735 cm^{-1}	11 375 032–11 377 767	5–7	1.99−03	5.57−02	3.35+01	−0.555	A	LS
				2 888 cm^{-1}	11 374 879–11 377 767	3–5	1.75−03	5.25−02	1.80+01	−0.803	A	LS
				2 925 cm^{-1}	11 374 842–11 377 767	1–3	1.35−03	7.09−02	7.98+00	−1.149	A	LS
				2 735 cm^{-1}	11 375 032–11 377 767	5–5	4.96−04	9.95−03	5.99+00	−1.303	A	LS
				2 888 cm^{-1}	11 374 879–11 377 767	3–3	9.74−04	1.75−02	5.98+00	−1.280	A	LS
				2 735 cm^{-1}	11 375 032–11 377 767	5–3	5.51−05	6.63−04	3.99−01	−2.480	A	LS
161	$1s5p-1s6s$	$^{3}\mathrm{P}^{\circ}-{}^{3}\mathrm{S}$		*754.7*	*11 374 960*–11 507 469	9–3	3.30+01	9.39−02	2.10+00	−0.073	A	1
				755.08	11 375 032–11 507 469	5–3	1.83+01	9.38−02	1.17+00	−0.329	A	LS
				754.20	11 374 879–11 507 469	3–3	1.10+01	9.39−02	6.99−01	−0.550	A	LS
				753.99	11 374 842–11 507 469	1–3	3.68+00	9.40−02	2.33−01	−1.027	A	LS
162		$^{1}\mathrm{P}^{\circ}-{}^{1}\mathrm{S}$		759.45	11 378 646–11 510 320	3–1	3.10+01	8.93−02	6.70−01	−0.572	A	1
163	$1s5p-1s6d$	$^{3}\mathrm{P}^{\circ}-{}^{3}\mathrm{D}$		*729.7*	*11 374 960–11 512 003*	9–15	4.34+01	5.77−01	1.25+01	0.715	A	1
				730.08	11 375 032–11 512 003	5–7	4.34+01	4.85−01	5.83+00	0.385	A	LS
				729.27	11 374 879–11 512 003	3–5	3.26+01	4.33−01	3.12+00	0.114	A	LS
				729.07	11 374 842–11 512 003	1–3	2.42+01	5.78−01	1.39+00	−0.238	A	LS
				730.08	11 375 032–11 512 003	5–5	1.08+01	8.66−02	1.04+00	−0.364	A	LS
				729.27	11 374 879–11 512 003	3–3	1.81+01	1.44−01	1.04+00	−0.365	A	LS
				730.08	11 375 032–11 512 003	5–3	1.20+00	5.77−03	6.93−02	−1.540	A	LS
164		$^{1}\mathrm{P}^{\circ}-{}^{1}\mathrm{D}$		749.11	11 378 646–11 512 137	3–5	4.57+01	6.41−01	4.74+00	0.284	A	1
165	$1s5p-1s7s$	$^{3}\mathrm{P}^{\circ}-{}^{3}\mathrm{S}$		*464.83*	*11 374 960*–11 590 091	9–3	1.95+01	2.11−02	2.91−01	−0.721	A	1
				464.989	11 375 032–11 590 091	5–3	1.08+01	2.11−02	1.61−01	−0.977	A	LS
				464.658	11 374 879–11 590 091	3–3	6.52+00	2.11−02	9.68−02	−1.199	A	LS
				464.578	11 374 842–11 590 091	1–3	2.17+00	2.11−02	3.23−02	−1.676	A	LS
166		$^{1}\mathrm{P}^{\circ}-{}^{1}\mathrm{S}$		468.982	11 378 646–11 591 874	3–1	1.85+01	2.03−02	9.40−02	−1.215	A	1
167	$1s5p-1s8s$	$^{3}\mathrm{P}^{\circ}-{}^{3}\mathrm{S}$		*372.30*	*11 374 960*–11 643 558	9–3	1.25+01	8.65−03	9.54−02	−1.109	A	1
				372.403	11 375 032–11 643 558	5–3	6.93+00	8.65−03	5.30−02	−1.364	A	LS
				372.191	11 374 879–11 643 558	3–3	4.17+00	8.65−03	3.18−02	−1.586	A	LS
				372.140	11 374 842–11 643 558	1–3	1.39+00	8.65−03	1.06−02	−2.063	A	LS
168		$^{1}\mathrm{P}^{\circ}-{}^{1}\mathrm{S}$		375.797	11 378 646–11 644 747	3–1	1.19+01	8.37−03	3.11−02	−1.600	A	1
169	$1s5p-1s9s$	$^{3}\mathrm{P}^{\circ}-{}^{3}\mathrm{S}$		*327.68*	*11 374 960*–11 680 134	9–3	8.48+00	4.55−03	4.42−02	−1.388	A	1
				327.759	11 375 032–11 680 134	5–3	4.71+00	4.55−03	2.45−02	−1.643	A	LS
				327.595	11 374 879–11 680 134	3–3	2.83+00	4.55−03	1.47−02	−1.865	A	LS
				327.555	11 374 842–11 680 134	1–3	9.43−01	4.55−03	4.91−03	−2.342	A	LS
170		$^{1}\mathrm{P}^{\circ}-{}^{1}\mathrm{S}$		330.775	11 378 646–11 680 966	3–1	8.05+00	4.40−03	1.44−02	−1.879	A	1
171	$1s5p-1s10s$	$^{3}\mathrm{P}^{\circ}-{}^{3}\mathrm{S}$		*301.85*	*11 374 960*–11 706 251	9–3	6.04+00	2.75−03	2.46−02	−1.606	A	1
				301.915	11 375 032–11 706 251	5–3	3.35+00	2.75−03	1.37−02	−1.862	A	LS
				301.776	11 374 879–11 706 251	3–3	2.01+00	2.75−03	8.20−03	−2.084	A	LS
				301.742	11 374 842–11 706 251	1–3	6.72−01	2.75−03	2.73−03	−2.561	A	LS

TABLE 38. Transition probabilities of allowed lines for Na X (reference for this table are as follows: 1=Fernely *et al.*[27] and 2=Khan *et al.*[50])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
172		^{1}P$^\circ$–^{1}S		304.683	11 378 646–11 706 856	3–1	5.76+00	2.67−03	8.03−03	−2.096	A	1
173	1s5d–1s5p	^{1}D–^{1}P$^\circ$		662 cm^{-1}	11 377 984–11 378 646	5–3	4.62−05	9.49−03	2.36+01	−1.324	A	1
174	1s5d–1s6p	^{3}D–^{3}P$^\circ$		*754.0*	*11 377 767–11 510 387*	15–9	1.10+01	5.62−02	2.09+00	−0.074	A	1
				754.03	11 377 767–11 510 387	7–5	9.23+00	5.62−02	9.77−01	−0.405	A	LS
				754.03	11 377 767–11 510 387	5–3	8.23+00	4.21−02	5.23−01	−0.677	A	LS
				754.03	11 377 767–11 510 387	3–1	1.10+01	3.12−02	2.32−01	−1.029	A	LS
				754.03	11 377 767–11 510 387	5–5	1.64+00	1.40−02	1.74−01	−1.155	A	LS
				754.03	11 377 767–11 510 387	3–3	2.75+00	2.34−02	1.74−01	−1.154	A	LS
				754.03	11 377 767–11 510 387	3–5	1.10−01	1.56−03	1.16−02	−2.330	A	LS
175		^{1}D–^{1}P$^\circ$		743.38	11 377 984–11 512 505	5–3	9.17+00	4.56−02	5.58−01	−0.642	A	1
176	1s5d–1s7p	^{3}D–^{3}P$^\circ$		*466.96*	*11 377 767–11 591 920*	15–9	6.06+00	1.19−02	2.74−01	−0.748	A	1
				466.956	11 377 767–11 591 920	7–5	5.10+00	1.19−02	1.28−01	−1.079	A	LS
				466.956	11 377 767–11 591 920	5–3	4.54+00	8.90−03	6.84−02	−1.352	A	LS
				466.956	11 377 767–11 591 920	3–1	6.05+00	6.59−03	3.04−02	−1.704	A	LS
				466.956	11 377 767–11 591 920	5–5	9.09−01	2.97−03	2.28−02	−1.828	A	LS
				466.956	11 377 767–11 591 920	3–3	1.51+00	4.94−03	2.28−02	−1.829	A	LS
				466.956	11 377 767–11 591 920	3–5	6.06−02	3.30−04	1.52−03	−3.004	A	LS
177		^{1}D–^{1}P$^\circ$		464.546	11 377 984–11 593 248	5–3	5.09+00	9.88−03	7.55−02	−1.306	A	1
178	1s5d–1s8p	^{3}D–^{3}P$^\circ$		*374.51*	*11 377 767–11 644 781*	15–9	3.69+00	4.65−03	8.60−02	−1.156	A	1
				374.512	11 377 767–11 644 781	7–5	3.10+00	4.65−03	4.01−02	−1.487	A	LS
				374.512	11 377 767–11 644 781	5–3	2.77+00	3.49−03	2.15−02	−1.758	A	LS
				374.512	11 377 767–11 644 781	3–1	3.70+00	2.59−03	9.58−03	−2.110	A	LS
				374.512	11 377 767–11 644 781	5–5	5.52−01	1.16−03	7.15−03	−2.237	A	LS
				374.512	11 377 767–11 644 781	3–3	9.23−01	1.94−03	7.18−03	−2.235	A	LS
				374.512	11 377 767–11 644 781	3–5	3.68−02	1.29−04	4.77−04	−3.412	A	LS
179		^{1}D–^{1}P$^\circ$		373.576	11 377 984–11 645 667	5–3	3.12+00	3.92−03	2.41−02	−1.708	A	1
180	1s5d–1s9p	^{3}D–^{3}P$^\circ$		*329.79*	*11 377 767–11 680 991*	15–9	2.43+00	2.38−03	3.88−02	−1.447	A	1
				329.789	11 377 767–11 680 991	7–5	2.04+00	2.38−03	1.81−02	−1.778	A	LS
				329.789	11 377 767–11 680 991	5–3	1.83+00	1.79−03	9.72−03	−2.048	A	LS
				329.789	11 377 767–11 680 991	3–1	2.43+00	1.32−03	4.30−03	−2.402	A	LS
				329.789	11 377 767–11 680 991	5–5	3.65−01	5.95−04	3.23−03	−2.527	A	LS
				329.789	11 377 767–11 680 991	3–3	6.08−01	9.92−04	3.23−03	−2.526	A	LS
				329.789	11 377 767–11 680 991	3–5	2.43−02	6.61−05	2.15−04	−3.703	A	LS
181		^{1}D–^{1}P$^\circ$		329.350	11 377 984–11 681 612	5–3	2.05+00	2.00−03	1.08−02	−2.000	A	1
182	1s5d–1s10p	^{3}D–^{3}P$^\circ$		*303.85*	*11 377 767–11 706 875*	15–9	1.70+00	1.41−03	2.12−02	−1.675	A	1
				303.852	11 377 767–11 706 875	7–5	1.43+00	1.41−03	9.87−03	−2.006	A	LS
				303.852	11 377 767–11 706 875	5–3	1.28+00	1.06−03	5.30−03	−2.276	A	LS
				303.852	11 377 767–11 706 875	3–1	1.70+00	7.85−04	2.36−03	−2.628	A	LS
				303.852	11 377 767–11 706 875	5–5	2.55−01	3.53−04	1.77−03	−2.753	A	LS
				303.852	11 377 767–11 706 875	3–3	4.26−01	5.89−04	1.77−03	−2.753	A	LS
				303.852	11 377 767–11 706 875	3–5	1.70−02	3.93−05	1.18−04	−3.928	A	LS
183		^{1}D–^{1}P$^\circ$		303.635	11 377 984–11 707 327	5–3	1.43+00	1.19−03	5.95−03	−2.225	A	1
184	1s6s–1s6p	^{3}S–^{3}P$^\circ$		*2 918 cm*$^{-1}$	11 507 469–*11 510 387*	3–9	4.73−03	2.50−01	8.46+01	−0.125	A	1
				2 918 cm^{-1}	11 507 469–11 510 387	3–5	4.74−03	1.39−01	4.70+01	−0.380	A	LS
				2 918 cm^{-1}	11 507 469–11 510 387	3–3	4.73−03	8.32−02	2.82+01	−0.603	A	LS

TABLE 38. Transition probabilities of allowed lines for Na X (reference for this table are as follows: 1=Fernely *et al.*[27] and 2=Khan *et al.*[50])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				2 918 cm^{-1}	11 507 469–11 510 387	3–1	4.72−03	2.77−02	9.38+00	−1.080	A	LS
185		^{1}S$-^1$P$^\circ$		2 185 cm^{-1}	11 510 320–11 512 505	1–3	2.00−03	1.88−01	2.83+01	−0.726	A	1
186	$1s6s-1s7p$	^{3}S$-^3$P$^\circ$		*1 184.1*	11 507 469–*11 591 920*	3–9	8.79+00	5.55−01	6.49+00	0.221	A	1
				1 184.12	11 507 469–11 591 920	3–5	8.79+00	3.08−01	3.60+00	−0.034	A	LS
				1 184.12	11 507 469–11 591 920	3–3	8.80+00	1.85−01	2.16+00	−0.256	A	LS
				1 184.12	11507 469–11591 920	3–1	8.79+00	6.16−02	7.20−01	−0.733	A	LS
187		^{1}S$-^1$P$^\circ$		1 205.87	11 510 320–11 593 248	1–3	8.96+00	5.86−01	2.33+00	−0.232	A	1
188	$1s6s-1s8p$	^{3}S$-^3$P$^\circ$		*728.3*	11 507 469–*11 644 781*	3–9	6.29+00	1.50−01	1.08+00	−0.347	A	1
				728.27	11 507 469–11 644 781	3–5	6.29+00	8.33−02	5.99−01	−0.602	A	LS
				728.27	11 507 469–11 644 781	3–3	6.29+00	5.00−02	3.60−01	−0.824	A	LS
				728.27	11 507 469–11 644 781	3–1	6.30+00	1.67−02	1.20−01	−1.300	A	LS
189		^{1}S$-^1$P$^\circ$		738.84	11 510 320–11 645 667	1–3	6.31+00	1.55−01	3.77−01	−0.810	A	1
190	$1s6s-1s9p$	^{3}S$-^3$P$^\circ$		*576.3*	11 507 469–*11 680 991*	3–9	4.47+00	6.68−02	3.80−01	−0.698	A	1
				576.30	11 507 469–11 680 991	3–5	4.47+00	3.71−02	2.11−01	−0.954	A	LS
				576.30	11 507 469–11 680 991	3–3	4.48+00	2.23−02	1.27−01	−1.175	A	LS
				576.30	11 507 469–11 680 991	3–1	4.47+00	7.42−03	4.22−02	−1.652	A	LS
191		^{1}S$-^1$P$^\circ$		583.80	11 510 320–11 681 612	1–3	4.49+00	6.89−02	1.32−01	−1.162	A	1
192	$1s6s-1s10p$	^{3}S$-^3$P$^\circ$		*501.49*	11 507 469–*11 706 875*	3–9	3.27+00	3.70−02	1.83−01	−0.955	A	1
				501.489	11 507 469–11 706 875	3–5	3.28+00	2.06−02	1.02−01	−1.209	A	LS
				501.489	11 507 469–11 706 875	3–3	3.26+00	1.23−02	6.09−02	−1.433	A	LS
				501.489	11 507 469–11 706 875	3–1	3.28+00	4.12−03	2.04−02	−1.908	A	LS
193		^{1}S$-^1$P$^\circ$		507.596	11 510 320–11 707 327	1–3	3.28+00	3.80−02	6.35−02	−1.420	A	1
194	$1s6p-1s6d$	^{3}P$^\circ-^3$D		*1 616 cm*$^{-1}$	*11 510 387–11 512 003*	9–15	8.89−04	8.51−02	1.56+02	−0.116	A	1
				1 616 cm^{-1}	11 510 387–11 512 003	5–7	8.88−04	7.14−02	7.27+01	−0.447	A	LS
				1 616 cm^{-1}	11 510 387–11 512 003	3–5	6.67−04	6.38−02	3.90+01	−0.718	A	LS
				1 616 cm^{-1}	11 510 387–11 512 003	1–3	4.94−04	8.50−02	1.73+01	−1.071	A	LS
				1 616 cm^{-1}	11 510 387–11 512 003	5–5	2.23−04	1.28−02	1.30+01	−1.194	A	LS
				1 616 cm^{-1}	11 510 387–11 512 003	3–3	3.71−04	2.13−02	1.30+01	−1.194	A	LS
				1 616 cm^{-1}	11 510 387–11 512 003	5–3	2.47−05	8.50−04	8.66−01	−2.372	A	LS
195	$1s6p-1s7s$	^{3}P$^\circ-^3$S		*1 254.6*	*11 510 387*–11 590 091	9–3	1.54+01	1.21−01	4.50+00	0.037	A	1
				1 254.64	11 510 387–11 590 091	5–3	8.55+00	1.21−01	2.50+00	−0.218	A	LS
				1 254.64	11 510 387–11590 091	3–3	5.13+00	1.21−01	1.50+00	−0.440	A	LS
				1 254.64	11 510 387–11 590 091	1–3	1.71+00	1.21−01	5.00−01	−0.917	A	LS
196		^{1}P$^\circ-^1$S		1 259.94	11 512 505–11 591 874	3–1	1.45+01	1.15−01	1.43+00	−0.462	A	1
197	$1s6p-1s8s$	^{3}P$^\circ-^3$S		*750.9*	*11 510 387*–11 643 558	9–3	9.69+00	2.73−02	6.07−01	−0.610	A	1
				750.91	11 510 387–11 643 558	5–3	5.38+00	2.73−02	3.37−01	−0.865	A	LS
				750.91	11 510 387–11 643 558	3–3	3.23+00	2.73−02	2.02−01	−1.087	A	LS
				750.91	11 510 387–11 643 558	1–3	1.08+00	2.73−02	6.75−02	−1.564	A	LS
198		^{1}P$^\circ-^1$S		756.19	11 512 505–11 644 747	3–1	9.20+00	2.63−02	1.96−01	−1.103	A	1
199	$1s6p-1s9s$	^{3}P$^\circ-^3$S		*589.1*	*11 510 387*–11 680 134	9–3	6.46+00	1.12−02	1.95−01	−0.997	A	1
				589.11	11 510 387–11 680 134	5–3	3.59+00	1.12−02	1.09−01	−1.252	A	LS
				589.11	11 510 387–11 680 134	3–3	2.15+00	1.12−02	6.52−02	−1.474	A	LS

TABLE 38. Transition probabilities of allowed lines for Na X (reference for this table are as follows: 1=Fernely *et al.*[27] and 2=Khan *et al.*[50])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				589.11	11 510 387–11 680 134	1–3	7.18−01	1.12−02	2.17−02	−1.951	A	LS
200		^{1}P°–^{1}S		593.61	11 512 505–11 680 966	3–1	6.13+00	1.08−02	6.33−02	−1.489	A	1
201	1*s*6*p*–1*s*10*s*	^{3}P°–^{3}S		*510.56*	*11 510 387*–11 706 251	9–3	4.56+00	5.94−03	8.99−02	−1.272	A	1
				510.558	11 510 387–11 706 251	5–3	2.53+00	5.94−03	4.99−02	−1.527	A	LS
				510.558	11 510 387–11 706 251	3–3	1.52+00	5.94−03	3.00−02	−1.749	A	LS
				510.558	11 510 387–11 706 251	1–3	5.07−01	5.94−03	9.98−03	−2.226	A	LS
202		^{1}P°–^{1}S		514.533	11 512 505–11 706 856	3–1	4.34+00	5.74−03	2.92−02	−1.764	A	1
203	1*s*6*d*–1*s*6*p*	^{1}D–^{1}P°		368 cm^{-1}	11 512 137–11 512 505	5–3	1.75−05	1.16−02	5.19+01	−1.237	A	1
204	1*s*6*d*–1*s*7*p*	^{3}D–^{3}P°		*1 251.3*	*11 512 003–11 591 920*	15–9	5.77+00	8.13−02	5.02+00	0.086	A	1
				1 251.30	11 512 003–11 591 920	7–5	4.85+00	8.13−02	2.34+00	−0.245	A	LS
				1 251.30	11 512 003–11 591 920	5–3	4.33+00	6.10−02	1.26+00	−0.516	A	LS
				1 251.30	11 512 003–11 591 920	3–1	5.78+00	4.52−02	5.59−01	−0.868	A	LS
				1 251.30	11 512 003–11 591 920	5–5	8.65−01	2.03−02	4.18−01	−0.994	A	LS
				1 251.30	11 512 003–11 591 920	3–3	1.44+00	3.39−02	4.19−01	−0.993	A	LS
				1 251.30	11 512 003–11 591 920	3–5	5.78−02	2.26−03	2.79−02	−2.169	A	LS
205		^{1}D–^{1}P°		1 232.88	11 512 137–11 593 248	5–3	4.90+00	6.70−02	1.36+00	−0.475	A	1
206	1*s*6*d*–1*s*8*p*	^{3}D–^{3}P°		*753.1*	*11 512 003–11 644 781*	15–9	3.43+00	1.75−02	6.50−01	−0.581	A	1
				753.14	11 512 003–11 644 781	7–5	2.88+00	1.75−02	3.04−01	−0.912	A	LS
				753.14	11 512 003–11 644 781	5–3	2.57+00	1.31−02	1.62−01	−1.184	A	LS
				753.14	11 512 003–11 644 781	3–1	3.42+00	9.70−03	7.22−02	−1.536	A	LS
				753.14	11 512 003–11 644 781	5–5	5.14−01	4.37−03	5.42−02	−1.661	A	LS
				753.14	11 512 003–11 644 781	3–3	8.56−01	7.28−03	5.42−02	−1.661	A	LS
				753.14	11 512 003–11 644 781	3–5	3.42−02	4.85−04	3.61−03	−2.837	A	LS
207		^{1}D–^{1}P°		748.90	11 512 137–11 645 667	5–3	2.93+00	1.48−02	1.82−01	−1.131	A	1
208	1*s*6*d*–1*s*9*p*	^{3}D–^{3}P°		*591.8*	*11 512 003–11 680 991*	15–9	2.20+00	6.93−03	2.03−01	−0.983	A	1
				591.76	11 512 003–11 680 991	7–5	1.85+00	6.93−03	9.45−02	−1.314	A	LS
				591.76	11 512 003–11 680 991	5–3	1.65+00	5.20−03	5.07−02	−1.585	A	LS
				591.76	11 512 003–11 680 991	3–1	2.20+00	3.85−03	2.25−02	−1.937	A	LS
				591.76	11 512 003–11 680 991	5–5	3.30−01	1.73−03	1.69−02	−2.063	A	LS
				591.76	11 512 003–11 680 991	3–3	5.50−01	2.89−03	1.69−02	−2.062	A	LS
				591.76	11 512 003–11 680 991	3–5	2.21−02	1.93−04	1.13−03	−3.237	A	LS
209		^{1}D–^{1}P°		590.06	11 512 137–11 681 612	5–3	1.88+00	5.90−03	5.73−02	−1.530	A	1
210	1*s*6*d*–1*s*10*p*	^{3}D–^{3}P°		*513.16*	*11 512 003–11 706 875*	15–9	1.51+00	3.57−03	9.05−02	−1.271	A	1
				513.157	11 512 003–11 706 875	7–5	1.27+00	3.57−03	4.22−02	−1.602	A	LS
				513.157	11 512 003–11 706 875	5–3	1.13+00	2.68−03	2.26−02	−1.873	A	LS
				513.157	11 512 003–11 706 875	3–1	1.51+00	1.99−03	1.01−02	−2.224	A	LS
				513.157	11 512 003–11 706 875	5–5	2.26−01	8.93−04	7.54−03	−2.350	A	LS
				513.157	11 512 003–11 706 875	3–3	3.77−01	1.49−03	7.55−03	−2.350	A	LS
				513.157	11 512 003–11 706 875	3–5	1.51−02	9.93−05	5.03−04	−3.526	A	LS
211		^{1}D–^{1}P°		512.321	11 512 137–11 707 327	5–3	1.30+00	3.06−03	2.58−02	−1.815	A	1
212	1*s*7*s*–1*s*7*p*	^{3}S–^{3}P°		*1 829 cm^{-1}*	11 590 091–11 591 920	3–9	2.16−03	2.90−01	1.57+02	−0.060	A	1
				1 829 cm^{-1}	11 590 091–11 591 920	3–5	2.16−03	1.61−01	8.69+01	−0.316	A	LS
				1 829 cm^{-1}	11 590 091–11 591 920	3–3	2.16−03	9.69−02	5.23+01	−0.537	A	LS
				1 829 cm^{-1}	11 590 091–11 591 920	3–1	2.16−03	3.23−02	1.74+01	−1.014	A	LS

TABLE 38. Transition probabilities of allowed lines for Na X (reference for this table are as follows: 1=Fernely *et al.*[27] and 2=Khan *et al.*[50])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
213		$^{1}\mathrm{S}-^{1}\mathrm{P}^{\circ}$		1 374 cm^{-1}	11 591 874–11 593 248	1–3	9.28−04	2.21−01	5.30+01	−0.656	A	1
214	$1s7s-1s8p$	$^{3}\mathrm{S}-^{3}\mathrm{P}^{\circ}$		*1 828*	11 590 091–*11 644 781*	3–9	4.05+00	6.09−01	1.10+01	0.262	A	1
				1 828.5	11 590 091–11 644 781	3–5	4.05+00	3.38−01	6.10+00	0.006	A	LS
				1 828.5	11 590 091–11 644 781	3–3	4.05+00	2.03−01	3.67+00	−0.215	A	LS
				1 828.5	11 590 091–11 644 781	3–1	4.04+00	6.75−02	1.22+00	−0.694	A	LS
215		$^{1}\mathrm{S}-^{1}\mathrm{P}^{\circ}$		1 859.0	11 591 874–11 645 667	1–3	4.13+00	6.42−01	3.93+00	−0.192	A	1
216	$1s7s-1s9p$	$^{3}\mathrm{S}-^{3}\mathrm{P}^{\circ}$		*1 100.1*	11 590 091–*11 680 991*	3–9	3.01+00	1.64−01	1.78+00	−0.308	A	1
				1 100.11	11 590 091–11 680 991	3–5	3.01+00	9.09−02	9.88−01	−0.564	A	LS
				1 100.11	11 590 091–11 680 991	3–3	3.00+00	5.45−02	5.92−01	−0.786	A	LS
				1 100.11	11 590 091–11 680 991	3–1	3.01+00	1.82−02	1.98−01	−1.263	A	LS
217		$^{1}\mathrm{S}-^{1}\mathrm{P}^{\circ}$		1 114.36	11 591 874–11 681 612	1–3	3.04+00	1.70−01	6.24−01	−0.770	A	1
218	$1s7s-1s10p$	$^{3}\mathrm{S}-^{3}\mathrm{P}^{\circ}$		*856.3*	11 590 091–*11 706 875*	3–9	2.22+00	7.31−02	6.18−01	−0.659	A	1
				856.28	11 590 091–11 706 875	3–5	2.22+00	4.06−02	3.43−01	−0.914	A	LS
				856.28	11 590 091–11 706 875	3–3	2.22+00	2.44−02	2.06−01	−1.135	A	LS
				856.28	11 590 091–11 706 875	3–1	2.22+00	8.12−03	6.87−02	−1.613	A	LS
219		$^{1}\mathrm{S}-^{1}\mathrm{P}^{\circ}$		866.15	11 591 874–11 707 327	1–3	2.23+00	7.54−02	2.15−01	−1.123	A	1
220	$1s7p-1s8s$	$^{3}\mathrm{P}^{\circ}-^{3}\mathrm{S}$		*1 937*	*11 591 920*–11 643 558	9–3	7.95+00	1.49−01	8.55+00	0.127	A	1
				1 936.6	11 591 920–11 643 558	5–3	4.42+00	1.49−01	4.75+00	−0.128	A	LS
				1 936.6	11 591 920–11 643 558	3–3	2.65+00	1.49−01	2.85+00	−0.350	A	LS
				1 936.6	11 591 920–11 643 558	1–3	8.83−01	1.49−01	9.50−01	−0.827	A	LS
221		$^{1}\mathrm{P}^{\circ}-^{1}\mathrm{S}$		1 941.8	11 593 248–11 644 747	3–1	7.54+00	1.42−01	2.72+00	−0.371	A	1
222	$1s7p-1s9s$	$^{3}\mathrm{P}^{\circ}-^{3}\mathrm{S}$		*1 133.6*	*11 591 920*–11 680 134	9–3	5.23+00	3.36−02	1.13+00	−0.519	A	1
				1 133.61	11 591 920–11 680 134	5–3	2.91+00	3.36−02	6.27−01	−0.775	A	LS
				1 133.61	11 591 920–11 680 134	3–3	1.74+00	3.36−02	3.76−01	−0.997	A	LS
				1 133.61	11 591 920–11 680 134	1–3	5.81−01	3.36−02	1.25−01	−1.474	A	LS
223		$^{1}\mathrm{P}^{\circ}-^{1}\mathrm{S}$		1 140.02	11 593 248–11 680 966	3–1	4.99+00	3.24−02	3.65−01	−1.012	A	1
224	$1s7p-1s10s$	$^{3}\mathrm{P}^{\circ}-^{3}\mathrm{S}$		*874.7*	*11 591 920*–11 706 251	9–3	3.61+00	1.38−02	3.58−01	−0.906	A	1
				874.65	11 591 920–11 706 251	5–3	2.01+00	1.38−02	1.99−01	−1.161	A	LS
				874.65	11 591 920–11 706 251	3–3	1.20+00	1.38−02	1.19−01	−1.383	A	LS
				874.65	11 591 920–11 706 251	1–3	4.01−01	1.38−02	3.97−02	−1.860	A	LS
225		$^{1}\mathrm{P}^{\circ}-^{1}\mathrm{S}$		880.22	11 593 248–11 706 856	3–1	3.46+00	1.34−02	1.16−01	−1.396	A	1
226	$1s8s-1s8p$	$^{3}\mathrm{S}-^{3}\mathrm{P}^{\circ}$		*1 223 cm^{-1}*	11 643 558–*11 644 781*	3–9	1.11−03	3.33−01	2.69+02	−0.000	A	1
				1 223 cm^{-1}	11 643 558–11 644 781	3–5	1.11−03	1.85−01	1.49+02	−0.256	A	LS
				1 223 cm^{-1}	11 643 558–11 644 781	3–3	1.11−03	1.11−01	8.96+01	−0.478	A	LS
				1 223 cm^{-1}	11 643 558–11 644 781	3–1	1.11−03	3.70−02	2.99+01	−0.955	A	LS
227		$^{1}\mathrm{S}-^{1}\mathrm{P}^{\circ}$		920 cm^{-1}	11 644 747–11 645 667	1–3	4.78−04	2.54−01	9.09+01	−0.595	A	1
228	$1s8s-1s9p$	$^{3}\mathrm{S}-^{3}\mathrm{P}^{\circ}$	*2 671*	*2 671*	11 643 558–*11 680 991*	3–9	2.07+00	6.65−01	1.75+01	0.300	A	1
			2 670.6	2 671.4	11 643 558–11 680 991	3–5	2.07+00	3.69−01	9.74+00	0.044	A	LS
			2 670.6	2 671.4	11 643 558–11 680 991	3–3	2.07+00	2.22−01	5.86+00	−0.177	A	LS
			2 670.6	2 671.4	11 643 558–11 680 991	3–1	2.07+00	7.39−02	1.95+00	−0.654	A	LS
229		$^{1}\mathrm{S}-^{1}\mathrm{P}^{\circ}$	2 711.8	2 712.6	11 644 747–11 681 612	1–3	2.11+00	6.99−01	6.24+00	−0.156	A	1
230	$1s8s-1s10p$	$^{3}\mathrm{S}-^{3}\mathrm{P}^{\circ}$		*1 579.4*	11 643 558–*11 706 875*	3–9	1.58+00	1.77−01	2.77+00	−0.275	A	1

TABLE 38. Transition probabilities of allowed lines for Na X (reference for this table are as follows: 1=Fernely *et al.*[27] and 2=Khan *et al.*[50])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				1 579.35	11 643 558–11 706 875	3–5	1.58+00	9.86−02	1.54+00	−0.529	A	LS
				1 579.35	11 643 558–11 706 875	3–3	1.58+00	5.92−02	9.23−01	−0.751	A	LS
				1 579.35	11 643 558–11 706 875	3–1	1.58+00	1.97−02	3.07−01	−1.228	A	LS
231		^{1}S$-^1$P$^\circ$		1 597.95	11 644 747–11 707 327	1–3	1.60+00	1.84−01	9.68−01	−0.735	A	1
232	$1s8p-1s9s$	^{3}P$^\circ-^3$S	*2 828*	*2 829*	*11 644 781*–11 680 134	9–3	4.43+00	1.77−01	1.48+01	0.202	A	1
			2 827.8	2 828.6	11 644 781–11 680 134	5–3	2.46+00	1.77−01	8.24+00	−0.053	A	LS
			2 827.8	2 828.6	11 644 781–11 680 134	3–3	1.48+00	1.77−01	4.94+00	−0.275	A	LS
			2 827.8	2 828.6	11 644 781–11 680 134	1–3	4.92−01	1.77−01	1.65+00	−0.752	A	LS
233		^{1}P$^\circ-^1$S	2 832.1	2 832.9	11 645 667–11 680 966	3–1	4.19+00	1.68−01	4.70+00	−0.298	A	1
234	$1s8p-1s10s$	^{3}P$^\circ-^3$S		*1 626.8*	*11 644 781*–11706 251	9–3	3.02+00	3.99−02	1.92+00	−0.445	A	1
				1 626.81	11 644 781–11 706 251	5–3	1.68+00	3.99−02	1.07+00	−0.700	A	LS
				1 626.81	11 644 781–11 706 251	3–3	1.01+00	3.99−02	6.41−01	−0.922	A	LS
				1 626.81	11 644 781–11 706 251	1–3	3.35−01	3.99−02	2.14−01	−1.399	A	LS
235		^{1}P$^\circ-^1$S		1 634.28	11 645 667–11 706 856	3–1	2.88+00	3.84−02	6.20−01	−0.939	A	1
236	$1s9s-1s9p$	^{3}S$-^3$P$^\circ$		*857 cm^{-1}*	11 680 134–*11 680 991*	3–9	6.15−04	3.77−01	4.34+02	0.053	A	1
				857 cm^{-1}	11 680 134–11 680 991	3–5	6.14−04	2.09−01	2.41+02	−0.203	A	LS
				857 cm^{-1}	11 680 134–11 680 991	3–3	6.17−04	1.26−01	1.45+02	−0.423	A	LS
				857 cm^{-1}	11 680 134–11 680 991	3–1	6.16−04	4.19−02	4.83+01	−0.901	A	LS
237		^{1}S$-^1$P$^\circ$		646 cm^{-1}	11 680 966–11 681 612	1–3	2.64−04	2.85−01	1.45+02	−0.545	A	1
238	$1s9s-1s10p$	^{3}S$-^3$P$^\circ$	*3 739*	*3 740*	11 680 134–*11 706 875*	3–9	1.14+00	7.18−01	2.65+01	0.333	A	1
			3 738.5	3 739.6	11 680 134–11 706 875	3–5	1.14+00	3.99−01	1.47+01	0.078	A	LS
			3 738.5	3 739.6	11 680 134–11 706 875	3–3	1.14+00	2.39−01	8.83+00	−0.144	A	LS
			3 738.5	3 739.6	11 680 134–11 706 875	3–1	1.14+00	7.98−02	2.95+00	−0.621	A	LS
239		^{1}S$-^1$P$^\circ$	3 792.4	3 793.5	11 680 966–11 707 327	1–3	1.17+00	7.57−01	9.45+00	−0.121	A	1
240	$1s9p-1s10s$	^{3}P$^\circ-^3$S	*3 958*	*3 959*	*11 680 991*–11 706 251	9–3	2.62+00	2.05−01	2.40+01	0.266	A	1
			3 957.7	3 958.8	11 680 991–11 706 251	5–3	1.45+00	2.05−01	1.34+01	0.011	A	LS
			3 957.7	3 958.8	11 680 991–11 706 251	3–3	8.72−01	2.05−01	8.02+00	−0.211	A	LS
			3 957.7	3 958.8	11 680 991–11 706 251	1–3	2.91−01	2.05−01	2.67+00	−0.688	A	LS
241		^{1}P$^\circ-^1$S	3 960.2	3 961.3	11 681 612–11 706 856	3–1	2.49+00	1.95−01	7.63+00	−0.233	A	1
242	$1s10s-1s10p$	^{3}S$-^3$P$^\circ$		*624 cm^{-1}*	11 706 251–*11 706 875*	3–9	3.63−04	4.20−01	6.64+02	0.100	A	1
				624 cm^{-1}	11 706 251–11 706 875	3–5	3.63−04	2.33−01	3.69+02	−0.156	A	LS
				624 cm^{-1}	11 706 251–11 706 875	3–3	3.64−04	1.40−01	2.22+02	−0.377	A	LS
				624 cm^{-1}	11 706 251–11 706 875	3–1	3.63−04	4.66−02	7.38+01	−0.854	A	LS
243		^{1}S$-^1$P$^\circ$		471 cm^{-1}	11 706 856–11 707 327	1–3	1.58−04	3.20−01	2.24+02	−0.495	A	1

[a] Wavelengths (Å) are always given unless cm^{-1} is indicated.

11. Mg

11.1. Mg I

Ground state: $1s^22s^22p^63s^2\ {}^1S_0$
Ionization energy: 7.646 232 eV=61 671.02 cm^{-1}

11.1.1. Allowed Transitions for Mg I

The large majority of the compiled transition rates for this spectrum has been taken from the R-matrix calculations of the OP.[13] Only OP results were available for energy levels above the $3s4p$. Wherever available we have used the data of Tachiev and Froese Fischer,[99] which result from extensive MCHF calculations with Breit-Pauli corrections to order α^2, with energy corrections. Experimental values of Ueda *et al.*[114] were determined by the hook method. A substantial number of oscillator strengths were also calculated by Chang and Tang,[17] who used a simple CI approach with a basis constructed from B splines. Weiss[123] used an extensive CI approach.

To estimate accuracies, we pooled the relative standard deviation of the mean (RSDM) for each of the lines with transition rates published in two or more of the references,[13,17,99,114,123] as described in the general introduction. For this purpose the spin-allowed (non-OP) and intercombination data were treated separately. The pooling fit parameters of the intercombination lines of Tachiev and Froese Fischer[99] were assumed to be the same as for the allowed lines (in which case the estimated accuracies are still generally lower, due to smaller line strengths). OP lines constituted a third group. The energy level labeled $3s3d\ ^1D_2$ also has some $3p^2\ ^1D_2$ character, and as a result associated transition rates generally fell outside the cluster of RSDM's for the other transitions. Transitions with upper levels labeled $5d/6d\ ^1D$ tended to be outliers.

11.1.2. References for Allowed Transitions for Mg I

[13] K. Butler, C. Mendoza, and C. J. Zeippen, J. Phys. B **26**, 4409 (1993). http://legacy.gsfc.nasa.gov/topbase, downloaded on July 28, 1995 (Opacity Project).

[17] T. N. Chang and X. Tang, J. Quant. Spectrosc. Radiat. Transf. **43**, 207 (1990).

[99] G. Tachiev and C. Froese Fischer, http://www.vuse.vanderbilt.edu/~cff/mchf_collection/ (MCHF, energy adjusted, downloaded on Dec. 10, 2003).

[114] K. Ueda, M. Karasawa, and K. Fukuda, J. Phys. Soc. Jpn. **51**, 2267 (1982).

[123] A. W. Weiss (private communication).

TABLE 39. Wavelength finding list for allowed lines for Mg I

Wavelength (vac) (Å)	Mult. No.
1 683.412	7
1 707.061	6
1 747.794	5
1 827.935	4
Wavelength (air) (Å)	**Mult. No.**
2 025.824	3
2 731.994	21
2 733.493	21
2 733.494	21
2 736.539	21
2 736.541	21
2 776.690	20
2 778.271	20
2 779.820	20
2 779.834	20
2 781.416	20
2 782.971	20
2 809.755	54
2 809.756	54
2 811.048	54
2 811.050	54
2 811.051	54
2 811.777	54
2 811.780	54
2 846.717	18
2 848.344	18
2 848.346	18
2 851.652	18
2 851.654	18
2 851.656	18
2 852.126	2
2 915.453	53
2 936.741	16
2 938.473	16
2 941.994	16
3 091.064	14
3 092.982	14
3 092.986	14
3 096.884	14
3 096.887	14
3 096.891	14
3 329.919	12
3 332.146	12
3 336.674	12
3 627.628	105
3 829.355	10
3 832.299	10
3 832.304	10
3 838.290	10
3 838.292	10
3 838.295	10
3 890.178	207
3 891.906	207

TABLE 39. Wavelength finding list for allowed lines for Mg I—Continued

Wavelength (air) (Å)	Mult. No.
3 893.304	207
3 895.572	207
3 898.059	207
3 899.460	207
3 938.400	26
3 986.753	25
4 057.505	24
4 099.787	168
4 167.271	23
4 351.906	22
4 409.923	231
4 571.096	1
4 702.991	19
4 730.029	17
5 167.321	8
5 172.684	8
5 183.604	8
5 528.405	15
5 711.088	13
6 318.717	31
6 319.237	31
6 319.495	31
7 060.414	51
7 193.184	49
7 291.055	32
7 387.689	47
7 657.603	29
7 659.152	29
7 659.901	29
7 691.553	45
7 875.43	75
7 877.48	75
7 881.67	75
7 930.794	52
7 930.806	52
7 930.814	52
7 947.10	74
7 949.18	74
7 953.45	74
8 047.720	73
8 049.855	73
8 054.231	73
8 098.707	50
8 098.719	50
8 098.727	50
8 209.84	42
8 213.041	43
8 303.313	71
8 305.586	71
8 305.596	71
8 310.244	71
8 310.255	71
8 310.264	71
8 346.106	48
8 346.119	48

TABLE 39. Wavelength finding list for allowed lines for Mg I—Continued

Wavelength (air) (Å)	Mult. No.
8 346.128	48
8 710.174	69
8 712.676	69
8 712.689	69
8 717.803	69
8 717.816	69
8 717.825	69
8 736.006	46
8 736.020	46
8 736.029	46
8 806.756	11
8 923.569	30
9 246.508	38
9 255.778	40
9 414.943	44
9 414.959	44
9 414.970	44
9 429.814	66
9 432.745	66
9 432.764	66
9 438.755	66
9 438.774	66
9 438.783	66
9 665.479	72
9 983.188	64
9 986.474	64
9 993.210	64
10 299.24	68
10 312.524	70
10 811.053	41
10 811.076	41
10 811.097	41
10 811.122	41
10 811.143	41
10 811.158	41
10 953.320	62
10 957.276	62
10 957.304	62
10 965.386	62
10 965.414	62
10 965.450	62
11 032.073	39
11 032.095	39
11 032.110	39
11 033.657	39
11 033.694	39
11 034.481	39
11 522.208	67
11 540.61	65
11 828.185	9
12 039.861	34
12 083.662	36
12 417.91	60
12 423.00	60
12 433.42	60

TABLE 39. Wavelength finding list for allowed lines for Mg I—Continued

Wavelength (air) (Å)	Mult. No.
13 457.61	104
13 458.903	102
13 949.725	100
14 360.481	63
14 601.00	82
14 615.580	61
14 700.290	98
14 877.529	37
14 877.608	37
14 877.648	37
14 877.712	37
14 877.752	37
14 877.781	37
15 024.992	27
15 040.246	27
15 047.705	27
15 135.373	80
15 137.069	80
15 137.827	80
15 693.360	103
15 693.454	103
15 693.555	103
15 740.716	58
15 748.886	58
15 748.988	58
15 765.645	58
15 765.747	58
15 765.842	58
15 879.521	35
15 879.567	35
15 879.599	35
15 886.183	35
15 886.261	35
15 889.485	35
15 902.68	123
15 905.91	123
15 912.59	123
15 948.33	94
15 954.477	96
16 197.62	122
16 200.97	122
16 207.90	122
16 364.748	101
16 364.850	101
16 364.960	101
16 595.67	81
16 621.188	121
16 624.718	121
16 632.020	121
17 074.20	120
17 077.92	120
17 085.63	120
17 108.663	28
17 407.402	99
17 407.518	99
17 407.642	99
17 749.615	119
17 753.640	119
17 753.687	119
17 761.967	119
17 762.014	119
17 762.055	119
18 358.5	90
18 374.51	92
18 512.3	117
18 516.7	117
18 525.7	117
18 954.2	137
18 955.2	138
18 955.4	138
19 194.12	97
19 194.26	97
19 194.41	97
19 411.2	95
19 411.4	95
19 411.5	95
19 425.38	78
19 430.29	78
19 432.73	78
19 718.54	116
19 723.51	116
19 723.58	116
19 733.79	116
19 733.86	116
19 733.90	116
19 940.49	136
19 992.2	118
Wavenumber (cm^{-1})	**Mult. No.**
4 747.099	134
4 746.883	135
4 746.836	135
4 746.782	135
4 713.930	114
4 712.653	114
4 710.013	114
4 658.786	79
4 642.139	133
4 642.121	133
4 642.110	133
4 642.074	133
4 642.063	133
4 642.009	133
4 383.271	93
4 383.233	93
4 383.192	93
4 376.48	146
4 364.581	132
4 346.98	115

TABLE 39. Wavelength finding list for allowed lines for Mg I—Continued

Wavenumber (cm^{-1})	Mult. No.
4 285.504	91
4 285.466	91
4 285.425	91
4 284.726	91
4 284.685	91
4 284.354	91
4 254.97	167
4 254.256	165
4 194.065	112
4 192.788	112
4 192.767	112
4 190.148	112
4 190.127	112
4 190.117	112
4 080.350	86
4 069.521	88
4 031.407	56
4 028.112	56
4 021.364	56
4 006.06	145
3 993.92	164
3 992.902	162
3 934.357	130
3 934.141	131
3 934.094	131
3 934.040	131
3 787.913	59
3 766.220	129
3 766.199	129
3 766.189	129
3 766.152	129
3 766.142	129
3 766.088	129
3 628.25	158
3 626.989	160
3 606.405	110
3 605.128	110
3 602.488	110
3 594.419	166
3 594.389	166
3 594.366	166
3 518.26	184
3 517.62	184
3 516.31	184
3 450.71	143
3 403.79	183
3 403.15	183
3 401.85	183
3 346.808	128
3 333.065	163
3 333.035	163
3 333.012	163
3 331.11	200
3 331.07	200
3 331.03	200
3 316.710	113
3 302.87	111
3 246.505	182
3 245.859	182
3 244.558	182
3 230.936	199
3 216.31	144
3 209.477	57
3 094.80	154
3 092.382	156
3 086.92	180
3 086.28	180
3 084.97	180
3 059.355	198
3 059.316	198
3 059.278	198
3 012.049	89
3 012.011	89
3 011.973	89
3 011.972	89
3 011.934	89
3 011.893	89
2 967.152	161
2 967.122	161
2 967.099	161
2 943.664	33
2 929.64	159
2 929.61	159
2 929.59	159
2 928.24	181
2 923.076	197
2 864.118	179
2 863.472	179
2 863.457	179
2 862.171	179
2 862.156	179
2 862.143	179
2 826.769	87
2 826.731	87
2 826.690	87
2 825.430	87
2 825.389	87
2 824.743	87
2 746.71	195
2 746.60	196
2 746.57	196
2 719.462	108
2 718.185	108
2 718.162	108
2 715.545	108
2 715.522	108
2 715.492	108
2 676.968	194
2 676.953	194
2 676.940	194

TABLE 39. Wavelength finding list for allowed lines for Mg I—Continued

Wavenumber (cm^{-1})	Mult. No.
2 676.914	194
2 676.901	194
2 676.863	194
2 672.610	206
2 632.07	177
2 631.43	177
2 630.13	177
2 586.322	126
2 586.106	127
2 586.059	127
2 586.005	127
2 585.96	141
2 585.22	141
2 584.89	141
2 540.10	230
2 539.391	228
2 492.12	178
2 485.828	193
2 432.545	157
2 432.515	157
2 432.492	157
2 393.36	142
2 380.200	76
2 377.560	76
2 376.283	76
2 374.29	155
2 374.26	155
2 374.24	155
2 301.715	175
2 301.069	175
2 301.051	175
2 299.768	175
2 299.750	175
2 299.739	175
2 292.89	214
2 291.617	125
2 291.594	125
2 291.564	125
2 291.547	125
2 291.517	125
2 291.463	125
2 279.05	227
2 278.037	225
2 271.85	150
2 267.096	152
2 219.374	191
2 219.309	192
2 219.270	192
2 219.232	192
2 150.330	77
2 138.003	204
2 119.794	229
2 119.784	229
2 119.763	229
2 114.565	190

TABLE 39. Wavelength finding list for allowed lines for Mg I—Continued

Wavenumber (cm^{-1})	Mult. No.
2 114.547	190
2 114.536	190
2 114.508	190
2 114.497	190
2 114.459	190
2 058.65	245
2 058.32	245
2 057.58	245
2 042.65	212
1 959.81	257
1 951.842	265
1 945.661	173
1 945.015	173
1 944.18	244
1 943.85	244
1 943.714	173
1 943.11	244
1 927.22	213
1 913.38	222
1 859.622	256
1 858.440	226
1 858.430	226
1 858.409	226
1 838.53	174
1 836.856	189
1 826.027	176
1 786.894	242
1 786.563	242
1 785.823	242
1 690.488	263
1 688.056	255
1 642.99	106
1 641.71	106
1 639.07	106
1 631.943	124
1 627.31	240
1 626.98	240
1 626.24	240
1 607.309	153
1 607.279	153
1 607.256	153
1 601.845	109
1 571.894	83
1 563.00	241
1 551.762	254
1 547.01	243
1 541.796	84
1 522.33	282
1 509.83	271
1 509.542	151
1 509.512	151
1 509.489	151
1 508.772	151
1 508.749	151
1 508.418	151

TABLE 39. Wavelength finding list for allowed lines for Mg I—Continued

Wavenumber (cm^{-1})	Mult. No.
1 492.527	224
1 492.517	224
1 492.496	224
1 487.30	210
1 480.337	107
1 455.02	223
1 454.99	223
1 425.796	171
1 425.150	171
1 425.129	171
1 423.849	171
1 423.828	171
1 423.818	171
1 406.632	187
1 406.567	188
1 406.528	188
1 406.490	188
1 404.507	238
1 404.176	238
1 404.161	238
1 403.436	238
1 403.421	238
1 403.408	238
1 393.77	211
1 379.93	218
1 377.517	220
1 375.39	252
1 375.34	253
1 324.575	261
1 312.767	202
1 312.717	201
1 305.669	251
1 305.654	251
1 305.641	251
1 261.28	280
1 260.264	278
1 248.78	270
1 243.873	281
1 243.862	281
1 243.844	281
1 238.646	186
1 238.625	186
1 238.615	186
1 238.586	186
1 238.576	186
1 238.538	186
1 192.83	292
1 172.46	236
1 172.13	236
1 171.39	236
1 139.100	307
1 134.58	301
1 127.22	139
1 126.88	237
1 125.92	139
1 125.28	139
1 114.514	250
1 109.76	239
1 078.36	291
1 034.336	300
1 031.92	293
1 028.119	140
982.519	279
982.508	279
982.490	279
957.920	221
957.910	221
957.889	221
935.12	268
921.07	289
906.611	147
899.67	219
899.66	219
899.64	219
895.782	148
895.61	274
894.351	276
883.11	269
877.746	305
873.36	319
872.646	317
862.820	299
856.24	311
848.060	248
848.010	249
842.104	234
841.773	234
841.755	234
841.033	234
841.015	234
841.004	234
838.136	169
837.490	169
836.189	169
819.083	185
808.254	172
794.42	170
789.968	259
761.49	287
743.266	247
743.248	247
743.237	247
740.05	288
726.476	298
724.06	290
681.469	318
681.456	318
681.441	318
637.48	325
622.546	208

TABLE 39. Wavelength finding list for allowed lines for Mg I—Continued

Wavenumber (cm^{-1})	Mult. No.
621.806	208
621.475	208
616.606	277
616.595	277
616.577	277
612.31	316
611.77	334
611.292	314
599.97	330
595.19	310
579.10	275
579.08	275
579.07	275
570.82	209
556.98	215
552.231	216
550.11	297
538.69	285
538.67	285
538.66	285
523.01	324
511.833	303
499.729	329
498.47	326
486.050	232
485.719	232
484.979	232
484.499	85
484.445	85
484.407	85
484.398	85
484.360	85
484.319	85
480.433	295
480.418	295
480.405	295
473.29	233
465.542	246
460.79	235
436.11	341
435.398	339
420.12	336
420.115	315
420.102	315
420.087	315
379.77	266
365.72	322
362.16	272
359.744	273
350.41	332
349.66	267
328.213	328
306.64	283
303.93	284
299.054	340
289.228	294
286.81	286
248.71	308
246.64	312
245.379	313
236.087	149
236.049	149
236.019	149
236.010	149
235.980	149
235.957	149
234.06	343
229.52	309
206.60	321
206.14	320
191.869	327
190.61	323
175.06	338
174.044	337
159.07	335
133.816	342
132.80	344
132.684	217
132.674	217
132.653	217
128.25	346
127.538	345
115.939	55
112.644	55
112.613	55
105.896	55
105.883	55
105.865	55

TABLE 40. Transition probabilities of allowed lines for Mg I (references for this table are as follows: 1=Butler *et al.*,[13] 2=Tachiev and Froese Fischer,[99] 3 =Ueda *et al.*,[114] 4=Chang, Tang[17], and 5=Weiss[123])

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
1	$3s^2-3s3p$	$^1S-^3P^\circ$										
			4 571.096	4 572.377	0.000–21 870.464	1–3	2.54−06	2.38−06	3.59−05	−5.623	D	2
2		$^1S-^1P^\circ$	2 852.126	2 852.964	0.000–35 051.264	1–3	4.91+00	1.80+00	1.69+01	0.255	A	5

TABLE 40. Transition probabilities of allowed lines for Mg I (references for this table are as follows: 1=Butler *et al.*,[13] 2=Tachiev and Froese Fischer,[99] 3=Ueda *et al.*,[114] 4=Chang, Tang[17], and 5=Weiss[123])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
3	$3s^2-3s4p$	^{1}S$-^1$P$^\circ$	2 025.824	2 026.477	0.000–49 346.729	1–3	6.12−01	1.13−01	7.54−01	−0.947	B+	2
4	$3s^2-3s5p$	^{1}S$-^1$P$^\circ$		1 827.935	0.000–54 706.536	1–3	1.60−01	2.40−02	1.44−01	−1.620	B	4
5	$3s^2-3s6p$	^{1}S$-^1$P$^\circ$		1 747.794	0.000–57 214.992	1–3	6.62−02	9.10−03	5.24−02	−2.041	C+	4
6	$3s^2-3s7p$	^{1}S$-^1$P$^\circ$		1 707.061	0.000–58 580.23	1–3	3.28−02	4.30−03	2.42−02	−2.367	D+	4
7	$3s^2-3s8p$	^{1}S$-^1$P$^\circ$		1 683.412	0.000–59 403.18	1–3	1.88−02	2.40−03	1.33−02	−2.620	D+	4
8	$3s3p-3s4s$	^{3}P$^\circ-^3$S	*5 178.15*	*5 179.59*	*21 890.85–41 197.403*	9–3	1.01+00	1.36−01	2.08+01	0.088	B+	2
			5 183.604	5 185.048	21 911.178–41 197.403	5–3	5.61−01	1.36−01	1.16+01	−0.167	A	2
			5 172.684	5 174.125	21 870.464–41 197.403	3–3	3.37−01	1.35−01	6.92+00	−0.393	B+	2
			5 167.321	5 168.761	21 850.405–41 197.403	1–3	1.13−01	1.35−01	2.30+00	−0.870	B+	2
9		^{1}P$^\circ-^1$S	11 828.185	11 831.423	35 051.264–43 503.333	3–1	2.22−01	1.55−01	1.81+01	−0.333	A	2
10	$3s3p-3s3d$	^{3}P$^\circ-^3$D	*3 835.30*	*3 836.39*	*21 890.85–47 957.04*	9–15	1.62+00	5.94−01	6.75+01	0.728	B+	2
			3 838.292	3 839.381	21 911.178–47 957.045	5–7	1.61+00	4.99−01	3.16+01	0.397	B+	2
			3 832.304	3 833.391	21 870.464–47 957.027	3–5	1.21+00	4.45−01	1.69+01	0.125	B+	2
			3 829.355	3 830.441	21 850.405–47 957.058	1–3	8.99−01	5.93−01	7.48+00	−0.227	B+	2
			3 838.295	3 839.383	21 911.178–47 957.027	5–5	4.03−01	8.91−02	5.63+00	−0.351	B+	2
			3 832.299	3 833.387	21 870.464–47 957.058	3–3	6.74−01	1.48−01	5.62+00	−0.353	B+	2
			3 838.290	3 839.379	21 911.178–47 957.058	5–3	4.48−02	5.94−03	3.75−01	−1.527	B	2
11		^{1}P$^\circ-^1$D	8 806.756	8 809.175	35 051.264–46 403.065	3–5	1.27−01	2.45−01	2.14+01	−0.134	A	2
12	$3s3p-3s5s$	^{3}P$^\circ-^3$S	*3 334.41*	*3 335.37*	*21 890.85–51 872.526*	9–3	2.89−01	1.61−02	1.59+00	−0.839	C	1,3
			3 336.674	3 337.634	21 911.178–51 872.526	5–3	1.70−01	1.70−02	9.34−01	−1.071	B	3
			3 332.146	3 333.104	21 870.464–51 872.526	3–3	1.02−01	1.70−02	5.60−01	−1.292	B	3
			3 329.919	3 330.877	21 850.405–51 872.526	1–3	3.09−02	1.54−02	1.69−01	−1.812	D+	LS
13		^{1}P$^\circ-^1$S	5 711.088	5 712.672	35 051.264–52 556.206	3–1	3.86−02	6.30−03	3.55−01	−1.724	B	4
14	$3s3p-3s4d$	^{3}P$^\circ-^3$D	*3 094.94*	*3 095.84*	*21 890.85–54 192.28*	9–15	5.01−01	1.20−01	1.10+01	0.033	C+	1,3
			3 096.891	3 097.790	21 911.178–54 192.256	5–7	4.96−01	1.00−01	5.10+00	−0.301	C+	LS
			3 092.986	3 093.884	21 870.464–54 192.294	3–5	3.74−01	8.94−02	2.73+00	−0.572	C	LS
			3 091.064	3 091.961	21 850.405–54 192.335	1–3	3.09−01	1.33−01	1.35+00	−0.876	B	3
			3 096.887	3 097.786	21 911.178–54 192.294	5–5	1.24−01	1.79−02	9.13−01	−1.048	C	LS
			3 092.982	3 093.880	21 870.464–54 192.335	3–3	2.08−01	2.98−02	9.11−01	−1.049	C	LS
			3 096.884	3 097.782	21 911.178–54 192.335	5–3	1.38−02	1.19−03	6.07−02	−2.225	D	LS
15		^{1}P$^\circ-^1$D	5 528.405	5 529.940	35 051.264–53 134.642	3–5	1.39−01	1.06−01	5.79+00	−0.498	B+	4
16	$3s3p-3s6s$	^{3}P$^\circ-^3$S	*2 940.23*	*2 941.09*	*21 890.85–55 891.80*	9–3	1.23−01	5.32−03	4.64−01	−1.320	D+	1
			2 941.994	2 942.854	21 911.178–55 891.80	5–3	6.83−02	5.32−03	2.58−01	−1.575	D+	LS
			2 938.473	2 939.332	21 870.464–55 891.80	3–3	4.12−02	5.33−03	1.55−01	−1.796	D	LS
			2 936.741	2 937.600	21 850.405–55 891.80	1–3	1.37−02	5.33−03	5.15−02	−2.273	D	LS
17		^{1}P$^\circ-^1$S	4 730.029	4 731.352	35 051.264–56 186.873	3–1	1.34−02	1.50−03	7.01−02	−2.347	C+	4
18	$3s3p-3s5d$	^{3}P$^\circ-^3$D	*2 850.00*	*2 850.84*	*21 890.85–56 968.24*	9–15	2.36−01	4.79−02	4.04+00	−0.365	C	1
			2 851.656	2 852.494	21 911.178–56 968.218	5–7	2.35−01	4.02−02	1.89+00	−0.697	C	LS
			2 848.346	2 849.183	21 870.464–56 968.248	3–5	1.77−01	3.59−02	1.01+00	−0.968	C	LS
			2 846.717	2 847.553	21 850.405–56 968.271	1–3	1.31−01	4.79−02	4.49−01	−1.320	D+	LS
			2 851.654	2 852.492	21 911.178–56 968.248	5–5	5.88−02	7.17−03	3.37−01	−1.446	D+	LS
			2 848.344	2 849.181	21 870.464–56 968.271	3–3	9.86−02	1.20−02	3.38−01	−1.444	D+	LS
			2 851.652	2 852.490	21 911.178–56 968.271	5–3	6.53−03	4.78−04	2.24−02	−2.622	E+	LS

TABLE 40. Transition probabilities of allowed lines for Mg I (references for this table are as follows: 1=Butler *et al.*,[13] 2=Tachiev and Froese Fischer,[99] 3 =Ueda *et al.*,[114] 4=Chang, Tang[17], and 5=Weiss[123])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
19		$^1\mathrm{P}^\circ-{}^1\mathrm{D}$	4 702.991	4 704.307	35 051.264–56 308.381	3–5	2.19−01	1.21−01	5.62+00	−0.440	B+	4
20	$3s3p-3p^2$	$^3\mathrm{P}^\circ-{}^3\mathrm{P}$	*2 779.83*	*2 780.65*	*21 890.85–57 853.6*	9–9	5.41+00	6.28−01	5.17+01	0.752	B	1,3
			2 779.834	2 780.654	21 911.178–57 873.94	5–5	4.09+00	4.74−01	2.17+01	0.375	B	LS
			2 779.820	2 780.641	21 870.464–57 833.40	3–3	1.36+00	1.58−01	4.34+00	−0.324	C+	LS
			2 782.971	2 783.792	21 911.178–57 833.40	5–3	2.14+00	1.49−01	6.83+00	−0.128	B+	3
			2 781.416	2 782.237	21 870.464–57 812.77	3–1	5.43+00	2.10−01	5.77+00	−0.201	C+	LS
			2 776.690	2 777.510	21 870.464–57 873.94	3–5	1.32+00	2.54−01	6.97+00	−0.118	B+	3
			2 778.271	2 779.091	21 850.405–57 833.40	1–3	1.82+00	6.32−01	5.78+00	−0.199	C+	LS
21	$3s3p-3s6d$	$^3\mathrm{P}^\circ-{}^3\mathrm{D}$	*2 735.02*	*2 735.83*	*21 890.85–58 442.85*	9–15	1.25−01	2.33−02	1.89+00	−0.678	D+	1
			2 736.541	2 737.351	21 911.178–58 442.843	5–7	1.25−01	1.96−02	8.83−01	−1.009	C	LS
			2 733.494	2 734.303	21 870.464–58 442.853	3–5	9.37−02	1.75−02	4.73−01	−1.280	D+	LS
			2 731.994	2 732.803	21 850.405–58 442.874	1–3	6.97−02	2.34−02	2.11−01	−1.631	D+	LS
			2 736.541	2 737.351	21 911.178–58 442.853	5–5	3.12−02	3.50−03	1.58−01	−1.757	D	LS
			2 733.493	2 734.302	21 870.464–58 442.874	3–3	5.21−02	5.84−03	1.58−01	−1.756	D	LS
			2 736.539	2 737.349	21 911.178–58 442.874	5–3	3.46−03	2.33−04	1.05−02	−2.934	E+	LS
22		$^1\mathrm{P}^\circ-{}^1\mathrm{D}$	4 351.906	4 353.129	35 051.264–58 023.246	3–5	1.84−01	8.70−02	3.74+00	−0.583	B+	4
23	$3s3p-3s7d$	$^1\mathrm{P}^\circ-{}^1\mathrm{D}$	4 167.271	4 168.446	35 051.264–59 041.019	3–5	1.38−01	6.00−02	2.47+00	−0.745	C+	4
24	$3s3p-3s8d$	$^1\mathrm{P}^\circ-{}^1\mathrm{D}$	4 057.505	4 058.651	35 051.264–59 689.991	3–5	1.02−01	4.20−02	1.68+00	−0.900	C+	4
25	$3s3p-3s9d$	$^1\mathrm{P}^\circ-{}^1\mathrm{D}$	3 986.753	3 987.881	35 051.264–60 127.239	3–5	7.30−02	2.90−02	1.14+00	−1.060	D	1
26	$3s3p-3s10d$	$^1\mathrm{P}^\circ-{}^1\mathrm{D}$	3 938.400	3 939.515	35 051.264–60 435.099	3–5	5.47−02	2.12−02	8.25−01	−1.197	D	1
27	$3s4s-3s4p$	$^3\mathrm{S}-{}^3\mathrm{P}^\circ$	*15 032.60*	*15 036.70*	*41 197.403–47 847.80*	3–9	1.34−01	1.37+00	2.03+02	0.614	A	2
			15 024.992	15 029.099	41 197.403–47 851.162	3–5	1.35−01	7.59−01	1.13+02	0.357	A	2
			15 040.246	15 044.356	41 197.403–47 844.414	3–3	1.34−01	4.55−01	6.76+01	0.135	A	2
			15 047.705	15 051.817	41 197.403–47 841.119	3–1	1.34−01	1.52−01	2.26+01	−0.341	B+	2
28		$^1\mathrm{S}-{}^1\mathrm{P}^\circ$	17 108.663	17 113.336	43 503.333–49 346.729	1–3	8.81−02	1.16+00	6.54+01	0.064	A	2
29	$3s4s-3s5p$	$^3\mathrm{S}-{}^3\mathrm{P}^\circ$	*7 658.37*	*7 660.48*	*41 197.403–54 251.41*	3–9	1.23−02	3.24−02	2.45+00	−1.012	C	1
			7 657.603	7 659.711	41 197.403–54 252.726	3–5	1.23−02	1.80−02	1.36+00	−1.268	C	LS
			7 659.152	7 661.260	41 197.403–54 250.086	3–3	1.23−02	1.08−02	8.17−01	−1.489	C	LS
			7 659.901	7 662.010	41 197.403–54 248.809	3–1	1.23−02	3.61−03	2.73−01	−1.965	D+	LS
30		$^1\mathrm{S}-{}^1\mathrm{P}^\circ$	8 923.569	8 926.019	43 503.333–54 706.536	1–3	5.86−03	2.10−02	6.17−01	−1.678	B	4
31	$3s4s-3s6p$	$^3\mathrm{S}-{}^3\mathrm{P}^\circ$	*6 318.98*	*6 320.72*	*41 197.403–57 018.38*	3–9	2.64−03	4.74−03	2.96−01	−1.847	D	1
			6 318.717	6 320.464	41 197.403–57 019.025	3–5	2.63−03	2.63−03	1.64−01	−2.103	D+	LS
			6 319.237	6 320.984	41 197.403–57 017.724	3–3	2.64−03	1.58−03	9.86−02	−2.324	D	LS
			6 319.495	6 321.242	41 197.403–57 017.078	3–1	2.63−03	5.25−04	3.28−02	−2.803	E+	LS
32		$^1\mathrm{S}-{}^1\mathrm{P}^\circ$	7 291.055	7 293.064	43 503.333–57 214.992	1–3	6.27−04	1.50−03	3.60−02	−2.824	C+	4
33	$3s3d-3s4p$	$^1\mathrm{D}-{}^1\mathrm{P}^\circ$		2 943.664 cm^{-1}	46 403.065–49 346.729	5–3	1.41−02	1.46−01	8.19+01	−0.137	A	2
34	$3s3d-3s5p$	$^1\mathrm{D}-{}^1\mathrm{P}^\circ$	12 039.861	12 043.156	46 403.065–54 706.536	5–3	4.52−03	5.90−03	1.17+00	−1.530	B	4
35		$^3\mathrm{D}-{}^3\mathrm{P}^\circ$	*15 882.88*	*15 887.21*	*47 957.04–54 251.41*	15–9	3.54−03	8.04−03	6.31+00	−0.919	C	1
			15 879.567	15 883.905	47 957.045–54 252.726	7–5	2.98−03	8.04−03	2.94+00	−1.250	C+	LS
			15 886.183	15 890.523	47 957.027–54 250.086	5–3	2.65−03	6.03−03	1.58+00	−1.521	C	LS
			15 889.485	15 893.827	47 957.058–54 248.809	3–1	3.54−03	4.47−03	7.02−01	−1.873	C	LS
			15 879.521	15 883.860	47 957.027–54 252.726	5–5	5.31−04	2.01−03	5.26−01	−1.998	D+	LS

TABLE 40. Transition probabilities of allowed lines for Mg I (references for this table are as follows: 1=Butler *et al.*,[13] 2=Tachiev and Froese Fischer,[99] 3 =Ueda *et al.*,[114] 4=Chang, Tang[17], and 5=Weiss[123])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^{a}	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
			15 886.261	15 890.601	47 957.058–54 250.086	3–3	8.85−04	3.35−03	5.26−01	−1.998	D+	LS
			15 879.599	15 883.938	47 957.058–54 252.726	3–5	3.54−05	2.23−04	3.50−02	−3.175	E+	LS
36	$3s3d-3s4f$	$^{1}\mathrm{D}-{}^{1}\mathrm{F}^{\circ}$	12 083.662	12 086.969	46 403.065–54 676.438	5–7	1.68−01	5.14−01	1.02+02	0.410	A	4
37		$^{3}\mathrm{D}-{}^{3}\mathrm{F}^{\circ}$	*14 877.61*	*14 881.68*	*47 957.04–54 676.71*	15–21	1.67−01	7.76−01	5.70+02	1.066	B+	1
			14 877.529	14 881.595	47 957.045–54 676.755	7–9	1.67−01	7.12−01	2.44+02	0.698	B+	LS
			14 877.608	14 881.674	47 957.027–54 676.701	5–7	1.48−01	6.89−01	1.69+02	0.537	B+	LS
			14 877.781	14 881.847	47 957.058–54 676.654	3–5	1.40−01	7.76−01	1.14+02	0.367	B+	LS
			14 877.648	14 881.714	47 957.045–54 676.701	7–7	1.86−02	6.17−02	2.12+01	−0.365	B	LS
			14 877.712	14 881.778	47 957.027–54 676.654	5–5	2.60−02	8.64−02	2.12+01	−0.365	B	LS
			14 877.752	14 881.818	47 957.045–54 676.654	7–5	7.34−04	1.74−03	5.97−01	−1.914	C	LS
38	$3s3d-3s6p$	$^{1}\mathrm{D}-{}^{1}\mathrm{P}^{\circ}$	9 246.508	9 249.045	46 403.065–57 214.992	5–3	2.99−03	2.30−03	3.50−01	−1.939	B	4
39		$^{3}\mathrm{D}-{}^{3}\mathrm{P}^{\circ}$	*11 032.88*	*11 035.90*	*47 957.04–57 018.38*	15–9	2.06−03	2.26−03	1.23+00	−1.470	D+	1
			11 032.095	11 035.116	47 957.045–57 019.025	7–5	1.73−03	2.26−03	5.75−01	−1.801	C	LS
			11 033.657	11 036.679	47 957.027–57 017.724	5–3	1.54−03	1.69−03	3.07−01	−2.073	D+	LS
			11 034.481	11 037.503	47 957.058–57 017.078	3–1	2.05−03	1.25−03	1.36−01	−2.426	D	LS
			11 032.073	11 035.094	47 957.027–57 019.025	5–5	3.09−04	5.65−04	1.03−01	−2.549	D	LS
			11 033.694	11 036.716	47 957.058–57 017.724	3–3	5.15−04	9.41−04	1.03−01	−2.549	D	LS
			11 032.110	11 035.132	47 957.058–57 019.025	3–5	2.06−05	6.28−05	6.84−03	−3.725	E+	LS
40	$3s3d-3s5f$	$^{1}\mathrm{D}-{}^{1}\mathrm{F}^{\circ}$	9 255.778	9 258.318	46 403.065–57 204.163	5–7	7.95−02	1.43−01	2.18+01	−0.146	B+	4
41		$^{3}\mathrm{D}-{}^{3}\mathrm{F}^{\circ}$	*10 811.08*	*10 814.05*	*47 957.04–57 204.27*	15–21	6.70−02	1.65−01	8.79+01	0.394	B	1
			10 811.053	10 814.014	47 957.045–57 204.305	7–9	6.70−02	1.51−01	3.76+01	0.024	B	LS
			10 811.076	10 814.037	47 957.027–57 204.267	5–7	5.95−02	1.46−01	2.60+01	−0.137	B	LS
			10 811.158	10 814.119	47 957.058–57 204.228	3–5	5.65−02	1.65−01	1.76+01	−0.305	B	LS
			10 811.097	10 814.059	47 957.045–57 204.267	7–7	7.47−03	1.31−02	3.26+00	−1.038	C+	LS
			10 811.122	10 814.083	47 957.027–57 204.228	5–5	1.05−02	1.84−02	3.28+00	−1.036	C+	LS
			10 811.143	10 814.104	47 957.045–57 204.228	7–5	2.95−04	3.70−04	9.22−02	−2.587	D	LS
42	$3s3d-3s7p$	$^{1}\mathrm{D}-{}^{1}\mathrm{P}^{\circ}$	8 209.84	8 212.09	46 403.065–58 580.23	5–3	1.81−03	1.10−03	1.49−01	−2.260	C	4
43	$3s3d-3s6f$	$^{1}\mathrm{D}-{}^{1}\mathrm{F}^{\circ}$	8 213.041	8 215.299	46 403.065–58 575.477	5–7	4.38−02	6.20−02	8.38+00	−0.509	B+	4
44		$^{3}\mathrm{D}-{}^{3}\mathrm{F}^{\circ}$	*9 414.96*	*9 417.53*	*47 957.04–58 575.53*	15–21	3.24−02	6.03−02	2.81+01	−0.044	C+	1
			9 414.959	9 417.542	47 957.045–58 575.527	7–9	3.24−02	5.54−02	1.20+01	−0.411	B	LS
			9 414.943	9 417.526	47 957.027–58 575.527	5–7	2.88−02	5.36−02	8.31+00	−0.572	C+	LS
			9 414.970	9 417.554	47 957.058–58 575.527	3–5	2.72−02	6.03−02	5.61+00	−0.743	C+	LS
			9 414.959	9 417.542	47 957.045–58 575.527	7–7	3.61−03	4.80−03	1.04+00	−1.474	C	LS
			9 414.943	9 417.526	47 957.027–58 575.527	5–5	5.05−03	6.72−03	1.04+00	−1.474	C	LS
			9 414.959	9 417.542	47 957.045–58 575.527	7–5	1.42−04	1.35−04	2.93−02	−3.025	E+	LS
45	$3s3d-3s7f$	$^{1}\mathrm{D}-{}^{1}\mathrm{F}^{\circ}$	7 691.553	7 693.670	46 403.065–59 400.763	5–7	2.66−02	3.30−02	4.18+00	−0.783	B	4
46		$^{3}\mathrm{D}-{}^{3}\mathrm{F}^{\circ}$	*8 736.02*	*8 738.42*	*47 957.04–59 400.76*	15–21	1.83−02	2.93−02	1.26+01	−0.357	D+	1
			8 736.020	8 738.419	47 957.045–59 400.763	7–9	1.83−02	2.69−02	5.42+00	−0.725	C	LS
			8 736.006	8 738.405	47 957.027–59 400.763	5–7	1.62−02	2.60−02	3.74+00	−0.886	D+	LS
			8 736.029	8 738.429	47 957.058–59 400.763	3–5	1.54−02	2.93−02	2.53+00	−1.056	D+	LS
			8 736.020	8 738.419	47 957.045–59 400.763	7–7	2.04−03	2.33−03	4.69−01	−1.788	E+	LS
			8 736.006	8 738.405	47 957.027–59 400.763	5–5	2.86−03	3.27−03	4.70−01	−1.786	E+	LS
			8 736.020	8 738.419	47 957.045–59 400.763	7–5	8.05−05	6.58−05	1.33−02	−3.337	E	LS
47	$3s3d-3s8f$	$^{1}\mathrm{D}-{}^{1}\mathrm{F}^{\circ}$	7 387.689	7 389.724	46 403.065–59 935.370	5–7	1.74−02	2.00−02	2.43+00	−1.000	C+	4
48		$^{3}\mathrm{D}-{}^{3}\mathrm{F}^{\circ}$	*8 346.12*	*8 348.41*	*47 957.04–59 935.37*	15–21	1.15−02	1.68−02	6.91+00	−0.599	D+	1

TABLE 40. Transition probabilities of allowed lines for Mg I (references for this table are as follows: 1=Butler *et al.*,[13] 2=Tachiev and Froese Fischer,[99] 3=Ueda *et al.*,[114] 4=Chang, Tang[17], and 5=Weiss[123])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
			8 346.119	8 348.413	47 957.045–59 935.370	7–9	1.15−02	1.54−02	2.96+00	−0.967	D+	LS
			8 346.106	8 348.400	47 957.027–59 935.370	5–7	1.02−02	1.49−02	2.05+00	−1.128	D+	LS
			8 346.128	8 348.422	47 957.058–59 935.370	3–5	9.59−03	1.67−02	1.38+00	−1.300	D	LS
			8 346.119	8 348.413	47 957.045–59 935.370	7–7	1.27−03	1.33−03	2.56−01	−2.031	E+	LS
			8 346.106	8 348.400	47 957.027–59 935.370	5–5	1.79−03	1.87−03	2.57−01	−2.029	E+	LS
			8 346.119	8 348.413	47 957.045–59 935.370	7–5	5.04−05	3.76−05	7.23−03	−3.580	E	LS
49	$3s3d-3s9f$	$^1D-^1F^\circ$	7 193.184	7 195.167	46 403.065–60 301.283	5–7	1.18−02	1.28−02	1.52+00	−1.194	D	1
50		$^3D-^3F^\circ$	*8 098.72*	*8 100.94*	*47 957.04–60 301.28*	15–21	7.68−03	1.06−02	4.23+00	−0.799	D	1
			8 098.719	8 100.946	47 957.045–60 301.283	7–9	7.68−03	9.71−03	1.81+00	−1.168	D+	LS
			8 098.707	8 100.934	47 957.027–60 301.283	5–7	6.82−03	9.39−03	1.25+00	−1.328	D	LS
			8 098.727	8 100.954	47 957.058–60 301.283	3–5	6.46−03	1.06−02	8.48−01	−1.498	D	LS
			8 098.719	8 100.946	47 957.045–60 301.283	7–7	8.55−04	8.41−04	1.57−01	−2.230	E	LS
			8 098.707	8 100.934	47 957.027–60 301.283	5–5	1.20−03	1.18−03	1.57−01	−2.229	E	LS
			8 098.719	8 100.946	47 957.045–60 301.283	7–5	3.37−05	2.37−05	4.42−03	−3.780	E	LS
51	$3s3d-3s10f$	$^1D-^1F^\circ$	7 060.414	7 062.360	46 403.065–60 562.637	5–7	8.51−03	8.91−03	1.04+00	−1.351	D	1
52		$^3D-^3F^\circ$	*7 930.80*	*7 932.98*	*47 957.04–60 562.64*	15–21	5.38−03	7.11−03	2.79+00	−0.972	D	1
			7 930.806	7 932.987	47 957.045–60 562.637	7–9	5.38−03	6.53−03	1.19+00	−1.340	D	LS
			7 930.794	7 932.976	47 957.027–60 562.637	5–7	4.78−03	6.32−03	8.25−01	−1.500	D	LS
			7 930.814	7 932.995	47 957.058–60 562.637	3–5	4.52−03	7.11−03	5.57−01	−1.671	D	LS
			7 930.806	7 932.987	47 957.045–60 562.637	7–7	6.00−04	5.66−04	1.03−01	−2.402	E	LS
			7 930.794	7 932.976	47 957.027–60 562.637	5–5	8.41−04	7.93−04	1.04−01	−2.402	E	LS
			7 930.806	7 932.987	47 957.045–60 562.637	7–5	2.37−05	1.60−05	2.93−03	−3.951	E	LS
53	$3s3d-3p3d$	$^1D-^1D^\circ$	2 915.453	2 916.307	46 403.065–80 693.01	5–5	4.09+00	5.21−01	2.50+01	0.416	B	1
54		$^3D-^3D^\circ$	*2 810.59*	*2 811.42*	*47 957.04–83 526.3*	15–15	2.81+00	3.33−01	4.63+01	0.699	C+	1
			2 809.756	2 810.584	47 957.045–83 536.84	7–7	2.50+00	2.96−01	1.92+01	0.316	B	LS
			2 811.048	2 811.876	47 957.027–83 520.47	5–5	1.96+00	2.32−01	1.07+01	0.064	B	LS
			2 811.780	2 812.608	47 957.058–83 511.25	3–3	2.11+00	2.50−01	6.94+00	−0.125	C+	LS
			2 811.050	2 811.878	47 957.045–83 520.47	7–5	4.38−01	3.71−02	2.40+00	−0.586	C	LS
			2 811.777	2 812.605	47 957.027–83 511.25	5–3	7.03−01	5.00−02	2.31+00	−0.602	C	LS
			2 809.755	2 810.583	47 957.027–83 536.84	5–7	3.14−01	5.20−02	2.41+00	−0.585	C	LS
			2 811.051	2 811.879	47 957.058–83 520.47	3–5	4.22−01	8.33−02	2.31+00	−0.602	C	LS
55	$3s4p-3s3d$	$^3P^\circ-^3D$		109.24 cm^{-1}	47 847.80–47 957.04	9–15	8.26−07	1.73−02	4.69+02	−0.808	A	2
				105.883 cm^{-1}	47 851.162–47 957.045	5–7	7.52−07	1.41−02	2.19+02	−1.152	A	2
				112.613 cm^{-1}	47 844.414–47 957.027	3–5	6.79−07	1.34−02	1.17+02	−1.396	A	2
				115.939 cm^{-1}	47 841.119–47 957.058	1–3	5.49−07	1.84−02	5.21+01	−1.735	A	2
				105.865 cm^{-1}	47 851.162–47 957.027	5–5	1.88−07	2.51−03	3.91+01	−1.901	B+	2
				112.644 cm^{-1}	47 844.414–47 957.058	3–3	3.77−07	4.46−03	3.91+01	−1.874	B+	2
				105.896 cm^{-1}	47 851.162–47 957.058	5–3	2.09−08	1.68−04	2.61+00	−3.076	B+	2
56	$3s4p-3s5s$	$^3P^\circ-^3S$		*4 024.73 cm^{-1}*	*47 847.80–51 872.526*	9–3	8.99−02	2.77−01	2.04+02	0.397	B+	1
				4 021.364 cm^{-1}	47 851.162–51 872.526	5–3	4.98−02	2.77−01	1.13+02	0.141	B+	LS
				4 028.112 cm^{-1}	47 844.414–51 872.526	3–3	3.01−02	2.78−01	6.82+01	−0.079	B+	LS
				4 031.407 cm^{-1}	47 841.119–51 872.526	1–3	1.00−02	2.78−01	2.27+01	−0.556	B	LS
57		$^1P^\circ-^1S$		3 209.477 cm^{-1}	49 346.729–52 556.206	3–1	6.10−02	2.96−01	9.11+01	−0.052	A	4
58	$3s4p-3s4d$	$^3P^\circ-^3D$	*15 757.41*	*15 761.73*	*47 847.80–54 192.28*	9–15	9.88−02	6.13−01	2.86+02	0.742	B+	1
			15 765.842	15 770.149	47 851.162–54 192.256	5–7	9.87−02	5.15−01	1.34+02	0.411	B+	LS
			15 748.988	15 753.291	47 844.414–54 192.294	3–5	7.42−02	4.60−01	7.16+01	0.140	B+	LS

TABLE 40. Transition probabilities of allowed lines for Mg I (references for this table are as follows: 1=Butler *et al.*,[13] 2=Tachiev and Froese Fischer,[99] 3=Ueda *et al.*,[114] 4=Chang, Tang[17], and 5=Weiss[123])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
			15 740.716	15 745.016	47 841.119–54 192.335	1–3	5.51−02	6.14−01	3.18+01	−0.212	B	LS
			15 765.747	15 770.055	47 851.162–54 192.294	5–5	2.47−02	9.20−02	2.39+01	−0.337	B	LS
			15 748.886	15 753.189	47 844.414–54 192.335	3–3	4.11−02	1.53−01	2.38+01	−0.338	B	LS
			15 765.645	15 769.953	47 851.162–54 192.335	5–3	2.74−03	6.13−03	1.59+00	−1.514	C	LS
59		$^{1}P^{\circ}-{}^{1}D$		3 787.913 cm^{-1}	49 346.729–53 134.642	3–5	5.36−02	9.34−01	2.44+02	0.447	A	4
60	3*s*4*p*−3*s*6*s*	$^{3}P^{\circ}-{}^{3}S$	*12 428.2*	*12 431.6*	*47 847.80–55 891.80*	9–3	2.80−02	2.16−02	7.96+00	−0.711	C+	1
			12 433.42	12 436.82	47 851.162–55 891.80	5–3	1.55−02	2.16−02	4.42+00	−0.967	C+	LS
			12 423.00	12 426.40	47 844.414–55 891.80	3–3	9.33−03	2.16−02	2.65+00	−1.188	C	LS
			12 417.91	12 421.31	47 841.119–55 891.80	1–3	3.13−03	2.17−02	8.87−01	−1.664	C	LS
61		$^{1}P^{\circ}-{}^{1}S$	14 615.580	14 619.575	49 346.729–56 186.873	3–1	1.87−02	2.00−02	2.89+00	−1.222	B+	4
62	3*s*4*p*−3*s*5*d*	$^{3}P^{\circ}-{}^{3}D$	*10 961.38*	*10 964.38*	*47 847.80–56 968.24*	9–15	4.56−02	1.37−01	4.45+01	0.091	B	1
			10 965.450	10 968.453	47 851.162–56 968.218	5–7	4.55−02	1.15−01	2.08+01	−0.240	B	LS
			10 957.304	10 960.305	47 844.414–56 968.248	3–5	3.43−02	1.03−01	1.11+01	−0.510	B	LS
			10 953.320	10 956.320	47 841.119–56 968.271	1–3	2.54−02	1.37−01	4.94+00	−0.863	C+	LS
			10 965.414	10 968.417	47 851.162–56 968.248	5–5	1.14−02	2.05−02	3.70+00	−0.989	C+	LS
			10 957.276	10 960.277	47 844.414–56 968.271	3–3	1.90−02	3.42−02	3.70+00	−0.989	C+	LS
			10 965.386	10 968.389	47 851.162–56 968.271	5–3	1.27−03	1.37−03	2.47−01	−2.164	D+	LS
63		$^{1}P^{\circ}-{}^{1}D$	14 360.481	14 364.407	49 346.729–56 308.381	3–5	2.91−04	1.50−03	2.13−01	−2.347	B	4
64	3*s*4*p*−3*s*7*s*	$^{3}P^{\circ}-{}^{3}S$	*9 989.85*	*9 992.59*	*47 847.80–57 855.214*	9–3	1.41−02	7.02−03	2.08+00	−1.199	D	1
			9 993.210	9 995.950	47 851.162–57 855.214	5–3	7.81−03	7.02−03	1.16+00	−1.455	D	LS
			9 986.474	9 989.212	47 844.414–57 855.214	3–3	4.70−03	7.03−03	6.94−01	−1.676	D	LS
			9 983.188	9 985.925	47 841.119–57 855.214	1–3	1.57−03	7.03−03	2.31−01	−2.153	E+	LS
65		$^{1}P^{\circ}-{}^{1}S$	11 540.61	11 543.77	49 346.729–58 009.41	3–1	9.61−03	6.40−03	7.30−01	−1.717	C+	4
66	3*s*4*p*−3*s*6*d*	$^{3}P^{\circ}-{}^{3}D$	*9 435.78*	*9 438.37*	*47 847.80–58 442.85*	9–15	2.41−02	5.36−02	1.50+01	−0.317	C+	1
			9 438.783	9 441.372	47 851.162–58 442.843	5–7	2.41−02	4.50−02	6.99+00	−0.648	C+	LS
			9 432.764	9 435.352	47 844.414–58 442.853	3–5	1.81−02	4.02−02	3.75+00	−0.919	C+	LS
			9 429.814	9 432.401	47 841.119–58 442.874	1–3	1.34−02	5.36−02	1.66+00	−1.271	C	LS
			9 438.774	9 441.363	47 851.162–58 442.853	5–5	6.01−03	8.03−03	1.25+00	−1.396	C	LS
			9 432.745	9 435.333	47 844.414–58 442.874	3–3	1.00−02	1.34−02	1.25+00	−1.396	C	LS
			9 438.755	9 441.344	47 851.162–58 442.874	5–3	6.68−04	5.36−04	8.33−02	−2.572	D	LS
67		$^{1}P^{\circ}-{}^{1}D$	11 522.208	11 525.362	49 346.729–58 023.246	3–5	1.24−03	4.10−03	4.67−01	−1.910	B	4
68	3*s*4*p*−3*s*8*s*	$^{1}P^{\circ}-{}^{1}S$	10 299.24	10 302.07	49 346.729–59 053.52	3–1	5.28−03	2.80−03	2.85−01	−2.076	C	4
69	3*s*4*p*−3*s*7*d*	$^{3}P^{\circ}-{}^{3}D$	*8 715.26*	*8 717.66*	*47 847.80–59 318.77*	9–15	1.43−02	2.72−02	7.03+00	−0.611	D	1
			8 717.825	8 720.219	47 851.162–59 318.764	5–7	1.43−02	2.29−02	3.29+00	−0.941	D+	LS
			8 712.689	8 715.082	47 844.414–59 318.775	3–5	1.07−02	2.04−02	1.76+00	−1.213	D+	LS
			8 710.174	8 712.567	47 841.119–59 318.793	1–3	7.97−03	2.72−02	7.80−01	−1.565	D	LS
			8 717.816	8 720.211	47 851.162–59 318.775	5–5	3.58−03	4.08−03	5.86−01	−1.690	D	LS
			8 712.676	8 715.069	47 844.414–59 318.793	3–3	5.98−03	6.81−03	5.86−01	−1.690	D	LS
			8 717.803	8 720.197	47 851.162–59 318.793	5–3	3.98−04	2.72−04	3.90−02	−2.866	E	LS
70		$^{1}P^{\circ}-{}^{1}D$	10 312.524	10 315.351	49 346.729–59 041.019	3–5	2.33−03	6.20−03	6.32−01	−1.730	C+	4
71	3*s*4*p*−3*s*8*d*	$^{3}P^{\circ}-{}^{3}D$	*8 307.93*	*8 310.22*	*47 847.80–59 881.18*	9–15	9.65−03	1.66−02	4.10+00	−0.826	D	1,4
			8 310.264	8 312.548	47 851.162–59 881.168	5–7	9.24−03	1.34−02	1.83+00	−1.174	D+	LS
			8 305.596	8 307.879	47 844.414–59 881.181	3–5	9.28−03	1.60−02	1.31+00	−1.319	C+	4
			8 303.313	8 305.595	47 841.119–59 881.196	1–3	5.16−03	1.60−02	4.37−01	−1.796	E+	LS

TABLE 40. Transition probabilities of allowed lines for Mg I (references for this table are as follows: 1 = Butler *et al.*,[13] 2 = Tachiev and Froese Fischer,[99] 3 = Ueda *et al.*,[114] 4 = Chang, Tang[17], and 5 = Weiss[123])—Continued

No.	Transition array	Mult.	$\lambda_{\rm air}$ (Å)	$\lambda_{\rm vac}$ (Å) or σ (cm^{-1})[a]	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
			8 310.255	8 312.539	47 851.162–59 881.181	5–5	2.32−03	2.40−03	3.28−01	−1.921	E+	LS
			8 305.586	8 307.868	47 844.414–59 881.196	3–3	3.87−03	4.00−03	3.28−01	−1.921	E+	LS
			8 310.244	8 312.528	47 851.162–59 881.196	5–3	2.57−04	1.60−04	2.19−02	−3.097	E	LS
72		^{1}P$^\circ$−^{1}D	9 665.479	9 668.130	49 346.729–59 689.991	3–5	2.44−03	5.70−03	5.44−01	−1.767	C+	4
73	3*s*4*p*−3*s*9*d*	^{3}P$^\circ$−^{3}D	*8 052.05*	*8 054.27*	*47 847.80–60 263.58*	9–15	6.37−03	1.03−02	2.46+00	−1.033	D	1
			8 054.231	8 056.446	47 851.162–60 263.583	5–7	6.36−03	8.67−03	1.15+00	−1.363	D	LS
			8 049.855	8 052.069	47 844.414–60 263.583	3–5	4.78−03	7.74−03	6.16−01	−1.634	D	LS
			8 047.720	8 049.933	47 841.119–60 263.583	1–3	3.53−03	1.03−02	2.73−01	−1.987	E+	LS
			8 054.231	8 056.446	47 851.162–60 263.583	5–5	1.59−03	1.55−03	2.06−01	−2.111	E+	LS
			8 049.855	8 052.069	47 844.414–60 263.583	3–3	2.65−03	2.58−03	2.05−01	−2.111	E+	LS
			8 054.231	8 056.446	47 851.162–60 263.583	5–3	1.76−04	1.03−04	1.37−02	−3.288	E	LS
74	3*s*4*p*−3*s*11*s*	^{3}P$^\circ$−^{3}S	*7 951.3*	*7 953.5*	*47 847.80–60 420.87*	9–3	2.61−03	8.26−04	1.95−01	−2.129	D	1
			7 953.45	7 955.63	47 851.162–60 420.87	5–3	1.45−03	8.26−04	1.08−01	−2.384	D	LS
			7 949.18	7 951.37	47 844.414–60 420.87	3–3	8.71−04	8.26−04	6.49−02	−2.606	D	LS
			7 947.10	7 949.28	47 841.119–60 420.87	1–3	2.91−04	8.26−04	2.16−02	−3.083	E+	LS
75	3*s*4*p*−3*s*10*d*	^{3}P$^\circ$−^{3}D	*7 879.6*	*7 881.8*	47 847.80–60 535.3	9–15	4.56−03	7.08−03	1.65+00	−1.196	E+	1
			7 881.67	7 883.84	47 851.162–60 535.34	5–7	4.56−03	5.95−03	7.72−01	−1.527	D	LS
			7 877.48	7 879.65	47 844.414–60 535.34	3–5	3.43−03	5.32−03	4.14−01	−1.797	E+	LS
			7 875.43	7 877.60	47 841.119–60 535.34	1–3	2.54−03	7.09−03	1.84−01	−2.149	E+	LS
			7 881.67	7 883.84	47 851.162–60 535.34	5–5	1.14−03	1.06−03	1.38−01	−2.276	E	LS
			7 877.48	7 879.65	47 844.414–60 535.34	3–3	1.90−03	1.77−03	1.38−01	−2.275	E	LS
			7 881.67	7 883.84	47 851.162–60 535.34	5–3	1.27−04	7.08−05	9.19−03	−3.451	E	LS
76	3*s*5*s*−3*s*5*p*	^{3}S−^{3}P$^\circ$		*2 378.88 cm^{-1}*	51 872.526–*54 251.41*	3–9	2.25−02	1.79+00	7.41+02	0.730	B+	1
				2 380.200 cm^{-1}	51 872.526–54 252.726	3–5	2.25−02	9.93−01	4.12+02	0.474	B+	LS
				2 377.560 cm^{-1}	51 872.526–54 250.086	3–3	2.24−02	5.95−01	2.47+02	0.252	B+	LS
				2 376.283 cm^{-1}	51 872.526–54 248.809	3–1	2.24−02	1.98−01	8.23+01	−0.226	B+	LS
77		^{1}S−^{1}P$^\circ$		2 150.330 cm^{-1}	52 556.206–54 706.536	1–3	1.81−02	1.76+00	2.69+02	0.246	A	4
78	3*s*5*s*−3*s*6*p*	^{3}S−^{3}P$^\circ$	*19 427.8*	*19 433.1*	51 872.526–*57 018.38*	3–9	3.55−03	6.03−02	1.16+01	−0.743	C+	1
			19 425.38	19 430.68	51 872.526–57 019.025	3–5	3.55−03	3.35−02	6.43+00	−0.998	C+	LS
			19 430.29	19 435.60	51 872.526–57 017.724	3–3	3.55−03	2.01−02	3.86+00	−1.220	C+	LS
			19 432.73	19 438.04	51 872.526–57 017.078	3–1	3.54−03	6.69−03	1.28+00	−1.697	C	LS
79		^{1}S−^{1}P$^\circ$		4 658.786 cm^{-1}	52 556.206–57 214.992	1–3	2.32−03	4.80−02	3.39+00	−1.319	B+	4
80	3*s*5*s*−3*s*7*p*	^{3}S−^{3}P$^\circ$	*15 136.21*	*15 140.36*	51 872.526–*58 477.39*	3–9	1.28−03	1.32−02	1.97+00	−1.402	D	1
			15 135.373	15 139.509	51 872.526–58 477.760	3–5	1.28−03	7.31−03	1.09+00	−1.659	D	LS
			15 137.069	15 141.205	51 872.526–58 477.020	3–3	1.28−03	4.39−03	6.56−01	−1.880	D	LS
			15 137.827	15 141.964	51 872.526–58 476.689	3–1	1.27−03	1.46−03	2.18−01	−2.359	E+	LS
81		^{1}S−^{1}P$^\circ$	16 595.67	16 600.20	52 556.206–58 580.23	1–3	6.54−04	8.10−03	4.43−01	−2.092	C	4
82	3*s*5*s*−3*s*8*p*	^{1}S−^{1}P$^\circ$	14 601.00	14 604.99	52 556.206–59 403.18	1–3	2.61−04	2.50−03	1.20−01	−2.602	C	4
83	3*s*4*d*−3*s*5*p*	^{1}D−^{1}P$^\circ$		1 571.894 cm^{-1}	53 134.642–54 706.536	5–3	7.80−03	2.84−01	2.97+02	0.152	A	4
84	3*s*4*d*−3*s*4*f*	^{1}D−^{1}F$^\circ$		1 541.796 cm^{-1}	53 134.642–54 676.438	5–7	7.43−03	6.56−01	7.00+02	0.516	A	4
85		^{3}D−^{3}F$^\circ$		*484.43 cm^{-1}*	*54 192.28–54 676.71*	15–21	2.54−04	2.28−01	2.32+03	0.534	B+	1
				484.499 cm^{-1}	54 192.256–54 676.755	7–9	2.55−04	2.09−01	9.94+02	0.165	B+	LS
				484.407 cm^{-1}	54 192.294–54 676.701	5–7	2.26−04	2.02−01	6.86+02	0.004	B+	LS

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No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				484.319 cm^{-1}	54 192.335–54 676.654	3–5	2.14−04	2.28−01	4.65+02	−0.165	B+	LS
				484.445 cm^{-1}	54 192.256–54 676.701	7–7	2.83−05	1.81−02	8.61+01	−0.897	B+	LS
				484.360 cm^{-1}	54 192.294–54 676.654	5–5	3.97−05	2.54−02	8.63+01	−0.896	B+	LS
				484.398 cm^{-1}	54 192.256–54 676.654	7–5	1.12−06	5.11−04	2.43+00	−2.446	C	LS
86	$3s4d-3s6p$	$^1D-^1P^\circ$		4 080.350 cm^{-1}	53 134.642–57 214.992	5–3	2.41−03	1.30−02	5.24+00	−1.187	B+	4
87		$^3D-^3P^\circ$		*2 826.10 cm^{-1}*	*54 192.28–57 018.38*	15–9	2.00−03	2.25−02	3.93+01	−0.472	C+	1
				2 826.769 cm^{-1}	54 192.256–57 019.025	7–5	1.68−03	2.25−02	1.83+01	−0.803	B	LS
				2 825.430 cm^{-1}	54 192.294–57 017.724	5–3	1.50−03	1.69−02	9.85+00	−1.073	B	LS
				2 824.743 cm^{-1}	54 192.335–57 017.078	3–1	2.00−03	1.25−02	4.37+00	−1.426	C+	LS
				2 826.731 cm^{-1}	54 192.294–57 019.025	5–5	3.00−04	5.63−03	3.28+00	−1.551	C+	LS
				2 825.389 cm^{-1}	54 192.335–57 017.724	3–3	4.99−04	9.38−03	3.28+00	−1.551	C+	LS
				2 826.690 cm^{-1}	54 192.335–57 019.025	3–5	2.00−05	6.25−04	2.18−01	−2.727	D+	LS
88	$3s4d-3s5f$	$^1D-^1F^\circ$		4 069.521 cm^{-1}	53 134.642–57 204.163	5–7	9.39−03	1.19−01	4.81+01	−0.225	A	4
89		$^3D-^3F^\circ$		*3 011.99 cm^{-1}*	*54 192.28–57 204.27*	15–21	2.59−02	5.99−01	9.82+02	0.954	B+	1
				3 012.049 cm^{-1}	54 192.256–57 204.305	7–9	2.59−02	5.50−01	4.21+02	0.585	B+	LS
				3 011.973 cm^{-1}	54 192.294–57 204.267	5–7	2.30−02	5.32−01	2.91+02	0.425	B+	LS
				3 011.893 cm^{-1}	54 192.335–57 204.228	3–5	2.17−02	5.99−01	1.96+02	0.255	B+	LS
				3 012.011 cm^{-1}	54 192.256–57 204.267	7–7	2.89−03	4.77−02	3.65+01	−0.476	B	LS
				3 011.934 cm^{-1}	54 192.294–57 204.228	5–5	4.04−03	6.68−02	3.65+01	−0.476	B	LS
				3 011.972 cm^{-1}	54 192.256–57 204.228	7–5	1.14−04	1.35−03	1.03+00	−2.025	C	LS
90	$3s4d-3s7p$	$^1D-^1P^\circ$	18 358.5	18 363.5	53 134.642–58 580.23	5–3	1.35−03	4.10−03	1.24+00	−1.688	C+	4
91		$^3D-^3P^\circ$		*4 285.11 cm^{-1}*	*54 192.28–58 477.39*	15–9	9.37−04	4.59−03	5.29+00	−1.162	D	1
				4 285.504 cm^{-1}	54 192.256–58 477.760	7–5	7.87−04	4.59−03	2.47+00	−1.493	D+	LS
				4 284.726 cm^{-1}	54 192.294–58 477.020	5–3	7.02−04	3.44−03	1.32+00	−1.764	D	LS
				4 284.354 cm^{-1}	54 192.335–58 476.689	3–1	9.37−04	2.55−03	5.88−01	−2.116	D	LS
				4 285.466 cm^{-1}	54 192.294–58 477.760	5–5	1.41−04	1.15−03	4.42−01	−2.240	E+	LS
				4 284.685 cm^{-1}	54 192.335–58 477.020	3–3	2.34−04	1.91−03	4.40−01	−2.242	E+	LS
				4 285.425 cm^{-1}	54 192.335–58 477.760	3–5	9.33−06	1.27−04	2.93−02	−3.419	E	LS
92	$3s4d-3s6f$	$^1D-^1F^\circ$	18 374.51	18 379.53	53 134.642–58 575.477	5–7	8.89−03	6.30−02	1.91+01	−0.502	B+	4
93		$^3D-^3F^\circ$		*4 383.25 cm^{-1}*	*54 192.28–58 575.53*	15–21	1.48−02	1.62−01	1.83+02	0.386	B+	1
				4 383.271 cm^{-1}	54 192.256–58 575.527	7–9	1.49−02	1.49−01	7.83+01	0.018	B+	LS
				4 383.233 cm^{-1}	54 192.294–58 575.527	5–7	1.32−02	1.44−01	5.41+01	−0.143	B+	LS
				4 383.192 cm^{-1}	54 192.335–58 575.527	3–5	1.25−02	1.62−01	3.65+01	−0.313	B	LS
				4 383.271 cm^{-1}	54 192.256–58 575.527	7–7	1.65−03	1.29−02	6.78+00	−1.044	C+	LS
				4 383.233 cm^{-1}	54 192.294–58 575.527	5–5	2.31−03	1.80−02	6.76+00	−1.046	C+	LS
				4 383.271 cm^{-1}	54 192.256–58 575.527	7–5	6.51−05	3.63−04	1.91−01	−2.595	D+	LS
94	$3s4d-3s8p$	$^1D-^1P^\circ$	15 948.33	15 952.68	53 134.642–59 403.18	5–3	8.74−04	2.00−03	5.25−01	−2.000	C+	4
95		$^3D-^3P^\circ$	*19 411*	*19 417*	*54 192.28–59 342.5*	15–9	5.26−04	1.78−03	1.71+00	−1.573	E+	1
			19 411.2	19 416.5	54 192.256–59 342.51	7–5	4.41−04	1.78−03	7.96−01	−1.904	D	LS
			19 411.4	19 416.7	54 192.294–59 342.51	5–3	3.95−04	1.34−03	4.28−01	−2.174	E+	LS
			19 411.5	19 416.8	54 192.335–59 342.51	3–1	5.26−04	9.91−04	1.90−01	−2.527	E+	LS
			19 411.4	19 416.7	54 192.294–59 342.51	5–5	7.89−05	4.46−04	1.43−01	−2.652	E	LS
			19 411.5	19 416.8	54 192.335–59 342.51	3–3	1.31−04	7.43−04	1.42−01	−2.652	E	LS
			19 411.5	19 416.8	54 192.335–59 342.51	3–5	5.27−06	4.96−05	9.51−03	−3.827	E	LS
96	$3s4d-3s7f$	$^1D-^1F^\circ$	15 954.477	15 958.836	53 134.642–59 400.763	5–7	6.55−03	3.50−02	9.19+00	−0.757	B	4

TABLE 40. Transition probabilities of allowed lines for Mg I (references for this table are as follows: 1=Butler *et al.*,[13] 2=Tachiev and Froese Fischer,[99] 3=Ueda *et al.*,[114] 4=Chang, Tang[17], and 5=Weiss[123])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
97		$^{3}\mathrm{D}-{}^{3}\mathrm{F}^{\circ}$	*19 194.2*	*19 199.5*	*54 192.28–59 400.76*	15–21	8.96−03	6.93−02	6.57+01	0.017	C	1
			19 194.12	19 199.36	54 192.256–59 400.763	7–9	8.97−03	6.37−02	2.82+01	−0.351	C+	LS
			19 194.26	19 199.50	54 192.294–59 400.763	5–7	7.96−03	6.16−02	1.95+01	−0.511	C	LS
			19 194.41	19 199.65	54 192.335–59 400.763	3–5	7.52−03	6.93−02	1.31+01	−0.682	C	LS
			19 194.12	19 199.36	54 192.256–59 400.763	7–7	9.99−04	5.52−03	2.44+00	−1.413	D+	LS
			19 194.26	19 199.50	54 192.294–59 400.763	5–5	1.40−03	7.72−03	2.44+00	−1.413	D+	LS
			19 194.12	19 199.36	54 192.256–59 400.763	7–5	3.95−05	1.56−04	6.90−02	−2.962	E	LS
98	$3s4d-3s8f$	$^{1}\mathrm{D}-{}^{1}\mathrm{F}^{\circ}$	14 700.290	14 704.308	53 134.642–59 935.370	5–7	4.85−03	2.20−02	5.32+00	−0.959	B	4
99		$^{3}\mathrm{D}-{}^{3}\mathrm{F}^{\circ}$	*17 407.49*	*17 412.23*	*54 192.28–59 935.37*	15–21	5.84−03	3.72−02	3.19+01	−0.253	C	1
			17 407.402	17 412.157	54 192.256–59 935.370	7–9	5.84−03	3.41−02	1.37+01	−0.622	C	LS
			17 407.518	17 412.272	54 192.294–59 935.370	5–7	5.19−03	3.30−02	9.46+00	−0.783	C	LS
			17 407.642	17 412.396	54 192.335–59 935.370	3–5	4.91−03	3.72−02	6.40+00	−0.952	C	LS
			17 407.402	17 412.157	54 192.256–59 935.370	7–7	6.51−04	2.96−03	1.19+00	−1.684	D	LS
			17 407.518	17 412.272	54 192.294–59 935.370	5–5	9.11−04	4.14−03	1.19+00	−1.684	D	LS
			17 407.402	17 412.157	54 192.256–59 935.370	7–5	2.57−05	8.35−05	3.35−02	−3.233	E	LS
100	$3s4d-3s9f$	$^{1}\mathrm{D}-{}^{1}\mathrm{F}^{\circ}$	13 949.725	13 953.538	53 134.642–60 301.283	5–7	3.23−03	1.32−02	3.03+00	−1.180	D+	1
101		$^{3}\mathrm{D}-{}^{3}\mathrm{F}^{\circ}$	*16 364.82*	*16 369.29*	*54 192.28–60 301.28*	15–21	4.02−03	2.26−02	1.83+01	−0.470	D+	1
			16 364.748	16 369.219	54 192.256–60 301.283	7–9	4.01−03	2.07−02	7.81+00	−0.839	C	LS
			16 364.850	16 369.321	54 192.294–60 301.283	5–7	3.57−03	2.01−02	5.42+00	−0.998	C	LS
			16 364.960	16 369.431	54 192.335–60 301.283	3–5	3.38−03	2.26−02	3.65+00	−1.169	D+	LS
			16 364.748	16 369.219	54 192.256–60 301.283	7–7	4.48−04	1.80−03	6.79−01	−1.900	D	LS
			16 364.850	16 369.321	54 192.294–60 301.283	5–5	6.27−04	2.52−03	6.79−01	−1.900	D	LS
			16 364.748	16 369.219	54 192.256–60 301.283	7–5	1.77−05	5.07−05	1.91−02	−3.450	E	LS
102	$3s4d-3s10f$	$^{1}\mathrm{D}-{}^{1}\mathrm{F}^{\circ}$	13 458.903	13 462.583	53 134.642–60 562.637	5–7	2.45−03	9.31−03	2.06+00	−1.332	D+	1
103		$^{3}\mathrm{D}-{}^{3}\mathrm{F}^{\circ}$	*15 693.43*	*15 697.70*	*54 192.28–60 562.64*	15–21	2.88−03	1.49−02	1.15+01	−0.651	D+	1
			15 693.360	15 697.648	54 192.256–60 562.637	7–9	2.88−03	1.37−02	4.96+00	−1.018	C	LS
			15 693.454	15 697.742	54 192.294–60 562.637	5–7	2.55−03	1.32−02	3.41+00	−1.180	D+	LS
			15 693.555	15 697.843	54 192.335–60 562.637	3–5	2.42−03	1.49−02	2.31+00	−1.350	D+	LS
			15 693.360	15 697.648	54 192.256–60 562.637	7–7	3.22−04	1.19−03	4.30−01	−2.079	E+	LS
			15 693.454	15 697.742	54 192.294–60 562.637	5–5	4.49−04	1.66−03	4.29−01	−2.081	E+	LS
			15 693.360	15 697.648	54 192.256–60 562.637	7–5	1.27−05	3.35−05	1.21−02	−3.630	E	LS
104	$3s4d-3s11p$	$^{1}\mathrm{D}-{}^{1}\mathrm{P}^{\circ}$	13 457.61	13 461.29	53 134.642–60 563.35	5–3	3.54−04	5.77−04	1.28−01	−2.540	D	1
105	$3s4d-3p3d$	$^{1}\mathrm{D}-{}^{1}\mathrm{D}^{\circ}$	3 627.628	3 628.662	53 134.642–80 693.01	5–5	5.62−02	1.11−02	6.63−01	−1.256	C	1
106	$3s5p-3s6s$	$^{3}\mathrm{P}^{\circ}-{}^{3}\mathrm{S}$		*1 640.39 cm^{-1}*	*54 251.41–55 891.80*	9–3	2.23−02	4.14−01	7.48+02	0.571	B+	1
				1 639.07 cm^{-1}	54 252.726–55 891.80	5–3	1.24−02	4.14−01	4.16+02	0.316	B+	LS
				1 641.71 cm^{-1}	54 250.086–55 891.80	3–3	7.44−03	4.14−01	2.49+02	0.094	B+	LS
				1 642.99 cm^{-1}	54 248.809–55 891.80	1–3	2.49−03	4.15−01	8.32+01	−0.382	B+	LS
107		$^{1}\mathrm{P}^{\circ}-{}^{1}\mathrm{S}$		1 480.337 cm^{-1}	54 706.536–56 186.873	3–1	1.88−02	4.29−01	2.86+02	0.110	A	4
108	$3s5p-3s5d$	$^{3}\mathrm{P}^{\circ}-{}^{3}\mathrm{D}$		*2 716.83 cm^{-1}*	*54 251.41–56 968.24*	9–15	1.85−02	6.25−01	6.82+02	0.750	B+	1
				2 715.492 cm^{-1}	54 252.726–56 968.218	5–7	1.84−02	5.25−01	3.18+02	0.419	B+	LS
				2 718.162 cm^{-1}	54 250.086–56 968.248	3–5	1.39−02	4.69−01	1.70+02	0.148	B+	LS
				2 719.462 cm^{-1}	54 248.809–56 968.271	1–3	1.03−02	6.26−01	7.58+01	−0.203	B+	LS
				2 715.522 cm^{-1}	54 252.726–56 968.248	5–5	4.61−03	9.38−02	5.69+01	−0.329	B+	LS
				2 718.185 cm^{-1}	54 250.086–56 968.271	3–3	7.69−03	1.56−01	5.67+01	−0.330	B+	LS
				2 715.545 cm^{-1}	54 252.726–56 968.271	5–3	5.12−04	6.25−03	3.79+00	−1.505	C+	LS

TABLE 40. Transition probabilities of allowed lines for Mg I (references for this table are as follows: 1=Butler *et al.*,[13] 2=Tachiev and Froese Fischer,[99] 3 =Ueda *et al.*,[114] 4=Chang, Tang[17], and 5=Weiss[123])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
109		^{1}P°–^{1}D		1 601.845 cm^{-1}	54 706.536–56 308.381	3–5	1.39–02	1.35+00	8.32+02	0.607	A	4
110	$3s5p$–$3s7s$	^{3}P°–^{3}S		*3 603.80 cm^{-1}*	*54 251.41*–57 855.214	9–3	7.52–03	2.89–02	2.38+01	–0.585	C	1
				3 602.488 cm^{-1}	54 252.726–57 855.214	5–3	4.17–03	2.89–02	1.32+01	–0.840	C	LS
				3 605.128 cm^{-1}	54 250.086–57 855.214	3–3	2.51–03	2.90–02	7.94+00	–1.060	C	LS
				3 606.405 cm^{-1}	54 248.809–57 855.214	1–3	8.39–04	2.90–02	2.65+00	–1.538	D+	LS
111		^{1}P°–^{1}S		3 302.87 cm^{-1}	54 706.536–58 009.41	3–1	6.77–03	3.10–02	9.27+00	–1.032	B	4
112	$3s5p$–$3s6d$	^{3}P°–^{3}D		*4 191.44 cm^{-1}*	*54 251.41–58 442.85*	9–15	1.03–02	1.47–01	1.04+02	0.122	B	1
				4 190.117 cm^{-1}	54 252.726–58 442.843	5–7	1.03–02	1.23–01	4.83+01	–0.211	B+	LS
				4 192.767 cm^{-1}	54 250.086–58 442.853	3–5	7.74–03	1.10–01	2.59+01	–0.481	B	LS
				4 194.065 cm^{-1}	54 248.809–58 442.874	1–3	5.75–03	1.47–01	1.15+01	–0.833	B	LS
				4 190.127 cm^{-1}	54 252.726–58 442.853	5–5	2.58–03	2.20–02	8.64+00	–0.959	C+	LS
				4 192.788 cm^{-1}	54 250.086–58 442.874	3–3	4.32–03	3.68–02	8.67+00	–0.957	C+	LS
				4 190.148 cm^{-1}	54 252.726–58 442.874	5–3	2.87–04	1.47–03	5.77–01	–2.134	C	LS
113		^{1}P°–^{1}D		3 316.710 cm^{-1}	54 706.536–58 023.246	3–5	7.04–04	1.60–02	4.76+00	–1.319	B+	4
114	$3s5p$–$3s8s$	^{3}P°–^{3}S		*4 711.33 cm^{-1}*	*54 251.41*–58 962.739	9–3	4.09–03	9.20–03	5.79+00	–1.082	D+	1
				4 710.013 cm^{-1}	54 252.726–58 962.739	5–3	2.27–03	9.20–03	3.22+00	–1.337	D+	LS
				4 712.653 cm^{-1}	54 250.086–58 962.739	3–3	1.36–03	9.21–03	1.93+00	–1.559	D+	LS
				4 713.930 cm^{-1}	54 248.809–58 962.739	1–3	4.55–04	9.21–03	6.43–01	–2.036	D	LS
115		^{1}P°–^{1}S		4 346.98 cm^{-1}	54 706.536–59 053.52	3–1	3.44–03	9.10–03	2.07+00	–1.564	C+	4
116	$3s5p$–$3s7d$	^{3}P°–^{3}D	*19 728.7*	*19 734.1*	*54 251.41–59 318.77*	9–15	6.24–03	6.08–02	3.55+01	–0.262	C	1
			19 733.90	19 739.29	54 252.726–59 318.764	5–7	6.24–03	5.10–02	1.66+01	–0.593	C	LS
			19 723.58	19 728.97	54 250.086–59 318.775	3–5	4.69–03	4.56–02	8.89+00	–0.864	C	LS
			19 718.54	19 723.93	54 248.809–59 318.793	1–3	3.47–03	6.08–02	3.95+00	–1.216	D+	LS
			19 733.86	19 739.25	54 252.726–59 318.775	5–5	1.56–03	9.11–03	2.96+00	–1.342	D+	LS
			19 723.51	19 728.90	54 250.086–59 318.793	3–3	2.60–03	1.52–02	2.96+00	–1.341	D+	LS
			19 733.79	19 739.18	54 252.726–59 318.793	5–3	1.73–04	6.07–04	1.97–01	–2.518	E+	LS
117	$3s5p$–$3s9s$	^{3}P°–^{3}S	*18 521*	*18 526*	*54 251.41*–59 649.15	9–3	2.54–03	4.35–03	2.39+00	–1.407	D	1
			18 525.7	18 530.8	54 252.726–59 649.15	5–3	1.41–03	4.35–03	1.33+00	–1.663	D	LS
			18 516.7	18 521.7	54 250.086–59 649.15	3–3	8.46–04	4.35–03	7.96–01	–1.884	D	LS
			18 512.3	18 517.3	54 248.809–59 649.15	1–3	2.82–04	4.35–03	2.65–01	–2.362	E+	LS
118		^{1}P°–^{1}S	19 992.2	19 997.7	54 706.536–59 707.11	3–1	1.92–03	3.83–03	7.56–01	–1.940	D	1
119	$3s5p$–$3s8d$	^{3}P°–^{3}D	*17 757.87*	*17 762.71*	*54 251.41–59 881.18*	9–15	4.06–03	3.20–02	1.68+01	–0.541	D+	1
			17 762.055	17 766.906	54 252.726–59 881.168	5–7	4.06–03	2.69–02	7.87+00	–0.871	C	LS
			17 753.687	17 758.535	54 250.086–59 881.181	3–5	3.05–03	2.40–02	4.21+00	–1.143	D+	LS
			17 749.615	17 754.462	54 248.809–59 881.196	1–3	2.26–03	3.20–02	1.87+00	–1.495	D+	LS
			17 762.014	17 766.865	54 252.726–59 881.181	5–5	1.01–03	4.80–03	1.40+00	–1.620	D	LS
			17 753.640	17 758.488	54 250.086–59 881.196	3–3	1.69–03	8.00–03	1.40+00	–1.620	D	LS
			17 761.967	17 766.818	54 252.726–59 881.196	5–3	1.13–04	3.20–04	9.36–02	–2.796	E	LS
120	$3s5p$–$3s10s$	^{3}P°–^{3}S	*17 081.8*	*17 086.5*	*54 251.41*–60 104.00	9–3	1.69–03	2.47–03	1.25+00	–1.653	E+	1
			17 085.63	17 090.30	54 252.726–60 104.00	5–3	9.40–04	2.47–03	6.95–01	–1.908	D	LS
			17 077.92	17 082.59	54 250.086–60 104.00	3–3	5.65–04	2.47–03	4.17–01	–2.130	E+	LS
			17 074.20	17 078.86	54 248.809–60 104.00	1–3	1.88–04	2.47–03	1.39–01	–2.607	E	LS
121	$3s5p$–$3s9d$	^{3}P°–^{3}D	*16 628.38*	*16 632.93*	*54 251.41–60 263.58*	9–15	2.79–03	1.93–02	9.51+00	–0.760	D+	1

TABLE 40. Transition probabilities of allowed lines for Mg I (references for this table are as follows: 1=Butler *et al.*,[13] 2=Tachiev and Froese Fischer,[99] 3=Ueda *et al.*,[114] 4=Chang, Tang[17], and 5=Weiss[123])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
			16 632.020	16 636.563	54 252.726–60 263.583	5–7	2.79−03	1.62−02	4.44+00	−1.092	D+	LS
			16 624.718	16 629.259	54 250.086–60 263.583	3–5	2.10−03	1.45−02	2.38+00	−1.362	D+	LS
			16 621.188	16 625.729	54 248.809–60 263.583	1–3	1.55−03	1.93−02	1.06+00	−1.714	D	LS
			16 632.020	16 636.563	54 252.726–60 263.583	5–5	6.96−04	2.89−03	7.91−01	−1.840	D	LS
			16 624.718	16 629.259	54 250.086–60 263.583	3–3	1.16−03	4.82−03	7.92−01	−1.840	D	LS
			16 632.020	16 636.563	54 252.726–60 263.583	5–3	7.75−05	1.93−04	5.29−02	−3.015	E	LS
122	$3s5p-3s11s$	$^3P^\circ-^3S$	*16 204.4*	*16 208.9*	*54 251.41*–60 420.87	9–3	1.20−03	1.57−03	7.54−01	−1.850	D+	1
			16 207.90	16 212.33	54 252.726–60 420.87	5–3	6.64−04	1.57−03	4.19−01	−2.105	D+	LS
			16 200.97	16 205.40	54 250.086–60 420.87	3–3	3.99−04	1.57−03	2.51−01	−2.327	D+	LS
			16 197.62	16 202.04	54 248.809–60 420.87	1–3	1.33−04	1.57−03	8.37−02	−2.804	D	LS
123	$3s5p-3s10d$	$^3P^\circ-^3D$	*15 909.3*	*15 913.7*	*54 251.41–60 535.3*	9–15	1.99−03	1.26−02	5.95+00	−0.945	D	1
			15 912.59	15 916.94	54 252.726–60 535.34	5–7	1.99−03	1.06−02	2.78+00	−1.276	D+	LS
			15 905.91	15 910.26	54 250.086–60 535.34	3–5	1.50−03	9.47−03	1.49+00	−1.547	D	LS
			15 902.68	15 907.02	54 248.809–60 535.34	1–3	1.11−03	1.26−02	6.60−01	−1.900	D	LS
			15 912.59	15 916.94	54 252.726–60 535.34	5–5	4.98−04	1.89−03	4.95−01	−2.025	E+	LS
			15 905.91	15 910.26	54 250.086–60 535.34	3–3	8.33−04	3.16−03	4.97−01	−2.023	E+	LS
			15 912.59	15 916.94	54 252.726–60 535.34	5–3	5.53−05	1.26−04	3.30−02	−3.201	E	LS
124	$3s4f-3s5d$	$^1F^\circ-^1D$		1 631.943 cm^{-1}	54 676.438–56 308.381	7–5	3.28−03	1.32−01	1.86+02	−0.034	A	4
125		$^3F^\circ-^3D$		*2 291.53 cm^{-1}*	*54 676.71–56 968.24*	21–15	1.39−03	2.83−02	8.53+01	−0.226	B	1
				2 291.463 cm^{-1}	54 676.755–56 968.218	9–7	1.27−03	2.83−02	3.66+01	−0.594	B	LS
				2 291.547 cm^{-1}	54 676.701–56 968.248	7–5	1.23−03	2.51−02	2.52+01	−0.755	B	LS
				2 291.617 cm^{-1}	54 676.654–56 968.271	5–3	1.38−03	2.37−02	1.70+01	−0.926	B	LS
				2 291.517 cm^{-1}	54 676.701–56 968.218	7–7	1.10−04	3.15−03	3.17+00	−1.657	C+	LS
				2 291.594 cm^{-1}	54 676.654–56 968.248	5–5	1.54−04	4.41−03	3.17+00	−1.657	C+	LS
				2 291.564 cm^{-1}	54 676.654–56 968.218	5–7	3.10−06	1.24−04	8.91−02	−3.208	D	LS
126	$3s4f-3s5g$	$^1F^\circ-^1G$		*2 586.322 cm^{-1}*	54 676.438–57 262.760	7–9	4.41−02	1.27+00	1.13+03	0.949	B+	1
127		$^3F^\circ-^3G$				21–27						1
				2 586.059 cm^{-1}	54 676.701–*57 262.760*	7–9	4.13−02	1.19+00	1.06+03	0.921	B+	LS
				2 586.106 cm^{-1}	54 676.654–57 262.760	5–7	4.05−02	1.27+00	8.08+02	0.803	B+	LS
				2 586.005 cm^{-1}	54 676.755–57 262.760	9–9	2.76−03	6.19−02	7.09+01	−0.254	B+	LS
				2 586.059 cm^{-1}	54 676.701–57 262.760	7–7	3.55−03	7.96−02	7.09+01	−0.254	B+	LS
				2 586.005 cm^{-1}	54 676.755–57 262.760	9–7	5.41−05	9.43−04	1.08+00	−2.071	C	LS
128	$3s4f-3s6d$	$^1F^\circ-^1D$		3 346.808 cm^{-1}	54 676.438–58 023.246	7–5	1.15−03	1.10−02	7.57+00	−1.114	C+	1
129		$^3F^\circ-^3D$		*3 766.14 cm^{-1}*	*54 676.71–58 442.85*	21–15	5.70−04	4.30−03	7.89+00	−1.044	C	1
				3 766.088 cm^{-1}	54 676.755–58 442.843	9–7	5.23−04	4.30−03	3.38+00	−1.412	C+	LS
				3 766.152 cm^{-1}	54 676.701–58 442.853	7–5	5.06−04	3.82−03	2.34+00	−1.573	C	LS
				3 766.220 cm^{-1}	54 676.654–58 442.874	5–3	5.69−04	3.61−03	1.58+00	−1.744	C	LS
				3 766.142 cm^{-1}	54 676.701–58 442.843	7–7	4.53−05	4.79−04	2.93−01	−2.475	D+	LS
				3 766.199 cm^{-1}	54 676.654–58 442.853	5–5	6.35−05	6.71−04	2.93−01	−2.474	D+	LS
				3 766.189 cm^{-1}	54 676.654–58 442.843	5–7	1.28−06	1.89−05	8.26−03	−4.025	E+	LS
130	$3s4f-3s6g$	$^1F^\circ-^1G$		3 934.357 cm^{-1}	54 676.438–58 610.795	7–9	1.56−02	1.94−01	1.14+02	0.133	B+	1
131		$^3F^\circ-^3G$		*3 934.08 cm^{-1}*	*54 676.71–58 610.79*	21–27	1.56−02	1.95−01	3.42+02	0.612	B+	1
				3 934.040 cm^{-1}	54 676.755–58 610.795	9–11	1.56−02	1.85−01	1.39+02	0.221	B+	LS
				3 934.094 cm^{-1}	54 676.701–58 610.795	7–9	1.46−02	1.82−01	1.07+02	0.105	B+	LS
				3 934.141 cm^{-1}	54 676.654–58 610.795	5–7	1.44−02	1.95−01	8.16+01	−0.011	B+	LS
				3 934.040 cm^{-1}	54 676.755–58 610.795	9–9	9.78−04	9.47−03	7.13+00	−1.069	C+	LS

TABLE 40. Transition probabilities of allowed lines for Mg I (references for this table are as follows: 1=Butler *et al.*,[13] 2=Tachiev and Froese Fischer,[99] 3=Ueda *et al.*,[114] 4=Chang, Tang[17], and 5=Weiss[123])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})$^{\text{a}}$	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				3 934.094 cm^{-1}	54 676.701–58 610.795	7–7	1.26−03	1.22−02	7.15+00	−1.069	C+	LS
				3 934.040 cm^{-1}	54 676.755–58 610.795	9–7	1.91−05	1.44−04	1.08−01	−2.887	D	LS
132	3*s*4*f*−3*s*7*d*	^{1}F$^\circ$−^{1}D		4 364.581 cm^{-1}	54 676.438–59 041.019	7–5	6.01−04	3.38−03	1.78+00	−1.626	D+	1
133		^{3}F$^\circ$−^{3}D		*4 642.06 cm^{-1}*	*54 676.71–59 318.77*	21–15	3.00−04	1.49−03	2.22+00	−1.505	D	1
				4 642.009 cm^{-1}	54 676.755–59 318.764	9–7	2.75−04	1.49−03	9.51−01	−1.873	D	LS
				4 642.074 cm^{-1}	54 676.701–59 318.775	7–5	2.66−04	1.32−03	6.55−01	−2.034	D	LS
				4 642.139 cm^{-1}	54 676.654–59 318.793	5–3	2.99−04	1.25−03	4.43−01	−2.204	E+	LS
				4 642.063 cm^{-1}	54 676.701–59 318.764	7–7	2.39−05	1.66−04	8.24−02	−2.935	E	LS
				4 642.121 cm^{-1}	54 676.654–59 318.775	5–5	3.35−05	2.33−04	8.26−02	−2.934	E	LS
				4 642.110 cm^{-1}	54 676.654–59 318.764	5–7	6.74−07	6.56−06	2.33−03	−4.484	E	LS
134	3*s*4*f*−3*s*7*g*	^{1}F$^\circ$−^{1}G		4 747.099 cm^{-1}	54 676.438–59 423.537	7–9	7.68−03	6.57−02	3.19+01	−0.337	C+	1
135		^{3}F$^\circ$−^{3}G		*4 746.83 cm^{-1}*	*54 676.71–59 423.54*	21–27	7.67−03	6.56−02	9.56+01	0.139	C+	1
				4 746.782 cm^{-1}	54 676.755–59 423.537	9–11	7.67−03	6.24−02	3.89+01	−0.251	C+	LS
				4 746.836 cm^{-1}	54 676.701–59 423.537	7–9	7.19−03	6.15−02	2.99+01	−0.366	C+	LS
				4 746.883 cm^{-1}	54 676.654–59 423.537	5–7	7.05−03	6.57−02	2.28+01	−0.483	C+	LS
				4 746.782 cm^{-1}	54 676.755–59 423.537	9–9	4.81−04	3.20−03	2.00+00	−1.541	D+	LS
				4 746.836 cm^{-1}	54 676.701–59 423.537	7–7	6.18−04	4.11−03	2.00+00	−1.541	D+	LS
				4 746.782 cm^{-1}	54 676.755–59 423.537	9–7	9.41−06	4.87−05	3.04−02	−3.358	E	LS
136	3*s*4*f*−3*s*8*d*	^{1}F$^\circ$−^{1}D	19 940.49	19 945.93	54 676.438–59 689.991	7–5	3.59−04	1.53−03	7.03−01	−1.970	D	1
137	3*s*4*f*−3*s*8*g*	^{1}F$^\circ$−^{1}G	18 954.2	18 959.4	54 676.438–59 950.87	7–9	4.42−03	3.06−02	1.34+01	−0.669	C	1
138		^{3}F$^\circ$−^{3}G				21–27						1
			18 955.4	18 960.5	54 676.755–59 950.87	9–11	4.42−03	2.91−02	1.63+01	−0.582	C	LS
			18 955.2	18 960.3	54 676.701–59 950.87	7–9	4.14−03	2.87−02	1.25+01	−0.697	C	LS
			18 955.4	18 960.5	54 676.755–59 950.87	9–9	2.76−04	1.49−03	8.37−01	−1.873	D	LS
139	3*s*6*s*−3*s*6*p*	^{3}S−^{3}P$^\circ$		*1 126.58 cm^{-1}*	*55 891.80–57 018.38*	3–9	6.24−03	2.21+00	1.94+03	0.822	B+	1
				1 127.22 cm^{-1}	55 891.80–57 019.025	3–5	6.25−03	1.23+00	1.08+03	0.567	B+	LS
				1 125.92 cm^{-1}	55 891.80–57 017.724	3–3	6.22−03	7.36−01	6.46+02	0.344	B+	LS
				1 125.28 cm^{-1}	55 891.80–57 017.078	3–1	6.21−03	2.45−01	2.15+02	−0.134	B+	LS
140		^{1}S−^{1}P$^\circ$		1 028.119 cm^{-1}	56 186.873–57 214.992	1–3	5.15−03	2.19+00	7.01+02	0.340	B+	1
141	3*s*6*s*−3*s*7*p*	^{3}S−^{3}P$^\circ$		*2 585.59 cm^{-1}*	55 891.80–*58 477.39*	3–9	1.30−03	8.73−02	3.33+01	−0.582	C	1
				2 585.96 cm^{-1}	55 891.80–58 477.760	3–5	1.30−03	4.85−02	1.85+01	−0.837	C	LS
				2 585.22 cm^{-1}	55 891.80–58 477.020	3–3	1.30−03	2.91−02	1.11+01	−1.059	C	LS
				2 584.89 cm^{-1}	55 891.80–58 476.689	3–1	1.30−03	9.69−03	3.70+00	−1.537	D+	LS
142		^{1}S−^{1}P$^\circ$		2 393.36 cm^{-1}	56 186.873–58 580.23	1–3	9.86−04	7.74−02	1.06+01	−1.111	C	1
143	3*s*6*s*−3*s*8*p*	^{3}S−^{3}P$^\circ$		*3 450.7 cm^{-1}*	55 891.80–*59 342.5*	3–9	5.48−04	2.07−02	5.92+00	−1.207	D+	1
				3 450.71 cm^{-1}	55 891.80–59 342.51	3–5	5.48−04	1.15−02	3.29+00	−1.462	D+	LS
				3 450.71 cm^{-1}	55 891.80–59 342.51	3–3	5.47−04	6.89−03	1.97+00	−1.685	D+	LS
				3 450.71 cm^{-1}	55 891.80–59 342.51	3–1	5.48−04	2.30−03	6.58−01	−2.161	D	LS
144		^{1}S−^{1}P$^\circ$		3 216.31 cm^{-1}	56 186.873–59 403.18	1–3	3.70−04	1.61−02	1.65+00	−1.793	D	1
145	3*s*6*s*−3*s*9*p*	^{3}S−^{3}P$^\circ$		*4 006.1 cm^{-1}*	55 891.80–*59 897.9*	3–9	2.91−04	8.17−03	2.01+00	−1.611	D	1
				4 006.06 cm^{-1}	55 891.80–59 897.86	3–5	2.92−04	4.54−03	1.12+00	−1.866	D	LS
				4 006.06 cm^{-1}	55 891.80–59 897.86	3–3	2.91−04	2.72−03	6.71−01	−2.088	D	LS
				4 006.06 cm^{-1}	55 891.80–59 897.86	3–1	2.91−04	9.07−04	2.24−01	−2.565	E+	LS

TABLE 40. Transition probabilities of allowed lines for Mg I (references for this table are as follows: 1=Butler *et al.*,[13] 2=Tachiev and Froese Fischer,[99] 3 =Ueda *et al.*,[114] 4=Chang, Tang[17], and 5=Weiss[123])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
146	$3s6s-3s11p$	^{1}S$-^1$P$^\circ$		4 376.48 cm^{-1}	56 186.873–60 563.35	1–3	6.00−05	1.41−03	1.06−01	−2.851	D	1
147	$3s5d-3s6p$	^{1}D$-^1$P$^\circ$		906.611 cm^{-1}	56 308.381–57 214.992	5–3	3.68−03	4.03−01	7.32+02	0.304	B+	1
148	$3s5d-3s5f$	^{1}D$-^1$F$^\circ$		895.782 cm^{-1}	56 308.381–57 204.163	5–7	4.59−03	1.20+00	2.21+03	0.778	B+	1
149		^{3}D$-^3$F$^\circ$		*236.03 cm^{-1}*	*56 968.24–57 204.27*	15–21	1.03−04	3.87−01	8.09+03	0.764	B+	1
				236.087 cm^{-1}	56 968.218–57 204.305	7–9	1.03−04	3.55−01	3.47−05	0.395	B+	LS
				236.019 cm^{-1}	56 968.248–57 204.267	5–7	9.13−05	3.44−01	2.40+03	0.236	B+	LS
				235.957 cm^{-1}	56 968.271–57 204.228	3–5	8.62−05	3.87−01	1.62+03	0.065	B+	LS
				236.049 cm^{-1}	56 968.218–57 204.267	7–7	1.14−05	3.08−02	3.01+02	−0.666	B+	LS
				235.980 cm^{-1}	56 968.248–57 204.228	5–5	1.60−05	4.31−02	3.01+02	−0.667	B+	LS
				236.010 cm^{-1}	56 968.218–57 204.228	7–5	4.51−07	8.68−04	8.48+00	−2.216	C+	LS
150	$3s5d-3s7p$	^{1}D$-^1$P$^\circ$		2 271.85 cm^{-1}	56 308.381–58 580.23	5–3	1.54−03	2.69−02	1.95+01	−0.871	C	1
151		^{3}D$-^3$P$^\circ$		*1 509.15 cm^{-1}*	*56 968.24–58 477.39*	15–9	8.61−04	3.40−02	1.11+02	−0.292	C+	1
				1 509.542 cm^{-1}	56 968.218–58 477.760	7–5	7.24−04	3.40−02	5.19+01	−0.623	C+	LS
				1 508.772 cm^{-1}	56 968.248–58 477.020	5–3	6.45−04	2.55−02	2.78+01	−0.894	C+	LS
				1 508.418 cm^{-1}	56 968.271–58 476.689	3–1	8.61−04	1.89−02	1.24+01	−1.246	C	LS
				1 509.512 cm^{-1}	56 968.248–58 477.760	5–5	1.29−04	8.51−03	9.28+00	−1.371	C	LS
				1 508.749 cm^{-1}	56 968.271–58 477.020	3–3	2.16−04	1.42−02	9.30+00	−1.371	C	LS
				1 509.489 cm^{-1}	56 968.271–58 477.760	3–5	8.62−06	9.45−04	6.18−01	−2.547	D	LS
152	$3s5d-3s6f$	^{1}D$-^1$F$^\circ$		2 267.096 cm^{-1}	56 308.381–58 575.477	5–7	1.51−04	6.18−03	4.49+00	−1.510	C+	1
153		^{3}D$-^3$F$^\circ$		*1 607.29 cm^{-1}*	*56 968.24–58 575.53*	15–21	6.10−03	4.96−01	1.52+03	0.872	B+	1
				1 607.309 cm^{-1}	56 968.218–58 575.527	7–9	6.10−03	4.55−01	6.52+02	0.503	B+	LS
				1 607.279 cm^{-1}	56 968.248–58 575.527	5–7	5.42−03	4.40−01	4.51+02	0.342	B+	LS
				1 607.256 cm^{-1}	56 968.271–58 575.527	3–5	5.13−03	4.96−01	3.05+02	0.173	B+	LS
				1 607.309 cm^{-1}	56 968.218–58 575.527	7–7	6.79−04	3.94−02	5.65+01	−0.559	B+	LS
				1 607.279 cm^{-1}	56 968.248–58 575.527	5–5	9.51−04	5.52−02	5.65+01	−0.559	B+	LS
				1 607.309 cm^{-1}	56 968.218–58 575.527	7–5	2.68−05	1.11−03	1.59+00	−2.110	C	LS
154	$3s5d-3s8p$	^{1}D$-^1$P$^\circ$		3 094.80 cm^{-1}	56 308.381–59 403.18	5–3	8.99−04	8.44−03	4.49+00	−1.375	D+	1
155		^{3}D$-^3$P$^\circ$		*2 374.3 cm^{-1}*	*56 968.24–59 342.5*	15–9	4.65−04	7.42−03	1.54+01	−0.954	D+	1
				2 374.29 cm^{-1}	56 968.218–59 342.51	7–5	3.91−04	7.42−03	7.20+00	−1.284	C	LS
				2 374.26 cm^{-1}	56 968.248–59 342.51	5–3	3.49−04	5.57−03	3.86+00	−1.555	D+	LS
				2 374.24 cm^{-1}	56 968.271–59 342.51	3–1	4.65−04	4.12−03	1.71+00	−1.908	D	LS
				2 374.26 cm^{-1}	56 968.248–59 342.51	5–5	6.99−05	1.86−03	1.29+00	−2.032	D	LS
				2 374.24 cm^{-1}	56 968.271–59 342.51	3–3	1.16−04	3.09−03	1.29+00	−2.033	D	LS
				2 374.24 cm^{-1}	56 968.271–59 342.51	3–5	4.65−06	2.06−04	8.57−02	−3.209	E	LS
156	$3s5d-3s7f$	^{1}D$-^1$F$^\circ$		3 092.382 cm^{-1}	56 308.381–59 400.763	5–7	5.56−04	1.22−02	6.49+00	−1.215	C	1
157		^{3}D$-^3$F$^\circ$		*2 432.52 cm^{-1}*	*56 968.24–59 400.76*	15–21	4.35−03	1.54−01	3.13+02	0.364	C+	1
				2 432.545 cm^{-1}	56 968.218–59 400.763	7–9	4.36−03	1.42−01	1.35+02	−0.003	B	LS
				2 432.515 cm^{-1}	56 968.248–59 400.763	5–7	3.86−03	1.37−01	9.27+01	−0.164	B	LS
				2 432.492 cm^{-1}	56 968.271–59 400.763	3–5	3.65−03	1.54−01	6.25+01	−0.335	C+	LS
				2 432.545 cm^{-1}	56 968.218–59 400.763	7–7	4.85−04	1.23−02	1.17+01	−1.065	C	LS
				2 432.515 cm^{-1}	56 968.248–59 400.763	5–5	6.79−04	1.72−02	1.16+01	−1.066	C	LS
				2 432.545 cm^{-1}	56 968.218–59 400.763	7–5	1.91−05	3.46−04	3.28−01	−2.616	E+	LS
158	$3s5d-3s9p$	^{1}D$-^1$P$^\circ$		*3 628.25 cm^{-1}*	*56 308.381–59 936.63*	5–3	5.80−04	3.96−03	1.80+00	−1.703	D+	1
159		^{3}D$-^3$P$^\circ$		2 929.7 cm^{-1}	56 968.24–59 897.9	15–9	2.79−04	2.93−03	4.93+00	−1.357	D	1

TABLE 40. Transition probabilities of allowed lines for Mg I (references for this table are as follows: 1 = Butler *et al.*,[13] 2 = Tachiev and Froese Fischer,[99] 3 = Ueda *et al.*,[114] 4 = Chang, Tang[17], and 5 = Weiss[123])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				2 929.64 cm^{-1}	56 968.218–59 897.86	7–5	2.35−04	2.93−03	2.30+00	−1.688	D+	LS
				2 929.61 cm^{-1}	56 968.248–59 897.86	5–3	2.09−04	2.19−03	1.23+00	−1.961	D	LS
				2 929.59 cm^{-1}	56 968.271–59 897.86	3–1	2.80−04	1.63−03	5.50−01	−2.311	D	LS
				2 929.61 cm^{-1}	56 968.248–59 897.86	5–5	4.19−05	7.32−04	4.11−01	−2.437	E+	LS
				2 929.59 cm^{-1}	56 968.271–59 897.86	3–3	6.98−05	1.22−03	4.11−01	−2.437	E+	LS
				2 929.59 cm^{-1}	56 968.271–59 897.86	3–5	2.79−06	8.13−05	2.74−02	−3.613	E	LS
160	$3s5d$–$3s8f$	^{1}D–^{1}F$^\circ$		3 626.989 cm^{-1}	56 308.381–59 935.370	5–7	6.11−04	9.75−03	4.42+00	−1.312	D+	1
161		^{3}D–^{3}F$^\circ$		*2 967.13 cm*$^{-1}$	*56 968.24–59 935.37*	15–21	3.00−03	7.15−02	1.19+02	0.030	C+	1
				2 967.152 cm^{-1}	56 968.218–59 935.370	7–9	3.00−03	6.56−02	5.09+01	−0.338	C+	LS
				2 967.122 cm^{-1}	56 968.248–59 935.370	5–7	2.66−03	6.35−02	3.52+01	−0.498	C+	LS
				2 967.099 cm^{-1}	56 968.271–59 935.370	3–5	2.52−03	7.15−02	2.38+01	−0.669	C+	LS
				2 967.152 cm^{-1}	56 968.218–59 935.370	7–7	3.34−04	5.69−03	4.42+00	−1.400	D+	LS
				2 967.122 cm^{-1}	56 968.248–59 935.370	5–5	4.67−04	7.96−03	4.42+00	−1.400	D+	LS
				2 967.152 cm^{-1}	56 968.218–59 935.370	7–5	1.32−05	1.60−04	1.24−01	−2.951	E	LS
162	$3s5d$–$3s9f$	^{1}D–^{1}F$^\circ$		3 992.902 cm^{-1}	56 308.381–60 301.283	5–7	5.43−04	7.15−03	2.95+00	−1.447	D+	1
163		^{3}D–^{3}F$^\circ$		*3 333.04 cm*$^{-1}$	*56 968.24–60 301.28*	15–21	2.12−03	4.00−02	5.92+01	−0.222	C	1
				3 333.065 cm^{-1}	56 968.218–60 301.283	7–9	2.12−03	3.67−02	2.54+01	−0.590	C+	LS
				3 333.035 cm^{-1}	56 968.248–60 301.283	5–7	1.88−03	3.55−02	1.75+01	−0.751	C	LS
				3 333.012 cm^{-1}	56 968.271–60 301.283	3–5	1.78−03	4.00−02	1.19+01	−0.921	C	LS
				3 333.065 cm^{-1}	56 968.218–60 301.283	7–7	2.36−04	3.18−03	2.20+00	−1.652	D+	LS
				3 333.035 cm^{-1}	56 968.248–60 301.283	5–5	3.30−04	4.46−03	2.20+00	−1.652	D+	LS
				3 333.065 cm^{-1}	56 968.218–60 301.283	7–5	9.32−06	8.98−05	6.21−02	−3.202	E	LS
164	$3s5d$–$3s10p$	^{1}D–^{1}P$^\circ$		3 993.92 cm^{-1}	56 308.381–60 302.30	5–3	3.99−04	2.25−03	9.27−01	−1.949	D	1
165	$3s5d$–$3s10f$	^{1}D–^{1}F$^\circ$		4 254.256 cm^{-1}	56 308.381–60 562.637	5–7	4.55−04	5.28−03	2.04+00	−1.578	D+	1
166		^{3}D–^{3}F$^\circ$		*3 594.40 cm*$^{-1}$	*56 968.24–60 562.64*	15–21	1.55−03	2.51−02	3.45+01	−0.424	C	1
				3 594.419 *cm*$^{-1}$	*56 968.218–60 562.637*	7–9	1.55−03	2.31−02	1.48+01	−0.791	C	LS
				3 594.389 cm^{-1}	56 968.248–60 562.637	5–7	1.37−03	2.23−02	1.02+01	−0.953	C	LS
				3 594.366 cm^{-1}	56 968.271–60 562.637	3–5	1.30−03	2.51−02	6.90+00	−1.123	C	LS
				3 594.419 cm^{-1}	56 968.218–60 562.637	7–7	1.72−04	2.00−03	1.28+00	−1.854	D	LS
				3 594.389 cm^{-1}	56 968.248–60 562.637	5–5	2.41−04	2.80−03	1.28+00	−1.854	D	LS
				3 594.419 cm^{-1}	56 968.218–60 562.637	7–5	6.80−05	5.64−05	3.62−02	−3.404	E	LS
167	$3s5d$–$3s11p$	^{1}D–^{1}P$^\circ$		4 254.97 cm^{-1}	56 308.381–60 563.35	5–3	2.88−04	1.43−03	5.53−01	−2.146	C	1
168	$3s5d$–$3p3d$	^{1}D–^{1}D$^\circ$	4 099.787	4 100.944	56 308.381–80 693.01	5–5	1.71−02	4.32−03	2.92−01	−1.666	D+	1
169	$3s6p$–$3s7s$	^{3}P$^\circ$–^{3}S		*836.83 cm*$^{-1}$	*57 018.38–57 855.214*	9–3	7.77−03	5.54−01	1.96+03	0.698	B	1
				836.189 cm^{-1}	57 019.025–57 855.214	5–3	4.31−03	5.54−01	1.09+03	0.442	B	LS
				837.490 cm^{-1}	57 017.724–57 855.214	3–3	2.60−03	5.55−01	6.55+02	0.221	B	LS
				838.136 cm^{-1}	57 017.078–57 855.214	1–3	8.67−04	5.55−01	2.18+02	−0.256	B	LS
170		^{1}P$^\circ$–^{1}S		794.42 cm^{-1}	*57 214.992–58 009.41*	3–1	7.26−03	5.75−01	7.15+02	0.237	B	1
171	$3s6p$–$3s6d$	^{3}P$^\circ$–^{3}D		*1 424.47 cm*$^{-1}$	*57 018.38–58 442.85*	9–15	5.55−03	6.83−01	1.42+03	0.789	B+	1
				1 423.818 cm^{-1}	57 019.025–58 442.843	5–7	5.54−03	5.74−01	6.64+02	0.458	B+	LS
				1 425.129 cm^{-1}	57 017.724–58 442.853	3–5	4.17−03	5.13−01	3.56+02	0.187	B+	LS
				1 425.796 cm^{-1}	57 017.078–58 442.874	1–3	3.09−03	6.84−01	1.58+02	−0.165	B+	LS
				1 423.828 cm^{-1}	57 019.025–58 442.853	5–5	1.38−03	1.02−01	1.18+02	−0.292	B+	LS
				1 425.150 cm^{-1}	57 017.724–58 442.874	3–3	2.32−03	1.71−01	1.19+02	−0.290	B+	LS
				1 423.849 cm^{-1}	57 019.025–58 442.874	5–3	1.54−04	6.83−03	7.90+00	−1.467	C+	LS

TABLE 40. Transition probabilities of allowed lines for Mg I (references for this table are as follows: 1=Butler *et al.*,[13] 2=Tachiev and Froese Fischer,[99] 3=Ueda *et al.*,[114] 4=Chang, Tang[17], and 5=Weiss[123])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
172		^{1}P$^\circ$–^{1}D		808.254 cm^{-1}	57 214.992–58 023.246	3–5	4.60−03	1.76+00	2.15+03	0.723	B+	1
173	3*s*6*p*–3*s*8*s*	^{3}P$^\circ$–^{3}S		*1 944.36 cm^{-1}*	*57 018.38–58 962.739*	9–3	2.95−03	3.90−02	5.94+01	−0.455	C+	1
				1 943.714 cm^{-1}	57 019.025–58 962.739	5–3	1.64−03	3.90−02	3.30+01	−0.710	C+	LS
				1 945.015 cm^{-1}	57 017.724–58 962.739	3–3	9.84−04	3.90−02	1.98+01	−0.932	C	LS
				1 945.661 cm^{-1}	57 017.078–58 962.739	1–3	3.28−04	3.90−02	6.60+00	−1.409	C	LS
174		^{1}P$^\circ$–^{1}S		1 838.53 cm^{-1}	57 214.992–59 053.52	3–1	2.61−03	3.86−02	2.07+01	−0.936	C	1
175	3*s*6*p*–3*s*7*d*	^{3}P$^\circ$–^{3}D		*2 300.39 cm^{-1}*	*57 018.38–59 318.77*	9–15	3.46−03	1.63−01	2.11+02	0.166	C+	1
				2 299.739 cm^{-1}	57 019.025–59 318.764	5–7	3.45−03	1.37−01	9.81+01	−0.164	B	LS
				2 301.051 cm^{-1}	57 017.724–59 318.775	3–5	2.61−03	1.23−01	5.28+01	−0.433	C+	LS
				2 301.715 cm^{-1}	57 017.078–59 318.793	1–3	1.93−03	1.64−01	2.35+01	−0.785	C+	LS
				2 299.750 cm^{-1}	57 019.025–59 318.775	5–5	8.64−04	2.45−02	1.75+01	−0.912	C	LS
				2 301.069 cm^{-1}	57 017.724–59 318.793	3–3	1.44−03	4.09−02	1.76+01	−0.911	C	LS
				2 299.768 cm^{-1}	57 019.025–59 318.793	5–3	9.64−05	1.64−03	1.17+00	−2.086	D	LS
176		^{1}P$^\circ$–^{1}D		1 826.027 cm^{-1}	57 214.992–59 041.019	3–5	3.30−04	2.47−02	1.34+01	−1.130	C	1
177	3*s*6*p*–3*s*9*s*	^{3}P$^\circ$–^{3}S		*2 630.77 cm^{-1}*	*57 018.38–59 649.15*	9–3	1.72−03	1.24−02	1.40+01	−0.952	C	1
				2 630.13 cm^{-1}	57 019.025–59 649.15	5–3	9.54−04	1.24−02	7.76+00	−1.208	C	LS
				2 631.43 cm^{-1}	57 017.724–59 649.15	3–3	5.73−04	1.24−02	4.65+00	−1.429	D+	LS
				2 632.07 cm^{-1}	57 017.078–59 649.15	1–3	1.91−04	1.24−02	1.55+00	−1.907	D	LS
178		^{1}P$^\circ$–^{1}S		2 492.12 cm^{-1}	57 214.992–59 707.11	3–1	1.49−03	1.20−02	4.76+00	−1.444	C	1
179	3*s*6*p*–3*s*8*d*	^{3}P$^\circ$–^{3}D		*2 862.80 cm^{-1}*	*57 018.38–59 881.18*	9–15	2.27−03	6.93−02	7.17+01	−0.205	C	1
				2 862.143 cm^{-1}	57 019.025–59 881.168	5–7	2.27−03	5.82−02	3.35+01	−0.536	C+	LS
				2 863.457 cm^{-1}	57 017.724–59 881.181	3–5	1.71−03	5.20−02	1.79+01	−0.807	C	LS
				2 864.118 cm^{-1}	57 017.078–59 881.196	1–3	1.26−03	6.93−02	7.97+00	−1.159	C	LS
				2 862.156 cm^{-1}	57 019.025–59 881.181	5–5	5.68−04	1.04−02	5.98+00	−1.284	C	LS
				2 863.472 cm^{-1}	57 017.724–59 881.196	3–3	9.46−04	1.73−02	5.97+00	−1.285	C	LS
				2 862.171 cm^{-1}	57 019.025–59 881.196	5–3	6.31−05	6.93−04	3.99−01	−2.460	E+	LS
180	3*s*6*p*–3*s*10*s*	^{3}P$^\circ$–^{3}S		*3 085.62 cm^{-1}*	*57 018.38*–60 104.00	9–3	1.12−03	5.86−03	5.63+00	−1.278	D+	1
				3 084.97 cm^{-1}	57 019.025–60 104.00	5–3	6.20−04	5.86−03	3.13+00	−1.533	D+	LS
				3 086.28 cm^{-1}	57 017.724–60 104.00	3–3	3.72−04	5.86−03	1.88+00	−1.755	D+	LS
				3 086.92 cm^{-1}	57 017.078–60 104.00	1–3	1.24−04	5.86−03	6.25−01	−2.232	D	LS
181		^{1}P$^\circ$–^{1}S		2 928.24 cm^{-1}	57 214.992–60 143.23	3–1	9.66−04	5.63−03	1.90+00	−1.772	D+	1
182	3*s*6*p*–3*s*9*d*	^{3}P$^\circ$–^{3}D		*3 245.20* cm^{-1}	*57 018.38–60 263.58*	9–15	1.56−03	3.71−02	3.39+01	−0.476	C	1
				3 244.558 cm^{-1}	57 019.025–60 263.583	5–7	1.56−03	3.12−02	1.58+01	−0.807	C	LS
				3 245.859 cm^{-1}	57 017.724–60 263.583	3–5	1.17−03	2.78−02	8.46+00	−1.079	C	LS
				3 246.505 cm^{-1}	57 017.078–60 263.583	1–3	8.69−04	3.71−02	3.76+00	−1.431	D+	LS
				3 244.558 cm^{-1}	57 019.025–60 263.583	5–5	3.91−04	5.57−03	2.83+00	−1.555	D+	LS
				3 245.859 cm^{-1}	57 017.724–60 263.583	3–3	6.52−04	9.28−03	2.82+00	−1.555	D+	LS
				3 244.558 cm^{-1}	57 019.025–60 263.583	5–3	4.34−05	3.71−04	1.88−01	−2.732	E+	LS
183	3*s*6*p*–3*s*11*s*	^{3}P$^\circ$–^{3}S		*3 402.49 cm^{-1}*	*57 018.38–60 420.87*	9–3	7.76−04	3.35−03	2.92+00	−1.521	C	1
				3 401.85 cm^{-1}	57 019.025–60 420.87	5–3	4.31−04	3.35−03	1.62+00	−1.776	C	LS
				3 403.15 cm^{-1}	57 017.724–60 420.87	3–3	2.59−04	3.35−03	9.72−01	−1.998	C	LS
				3 403.79 cm^{-1}	57 017.078–60 420.87	1–3	8.63−05	3.35−03	3.24−01	−2.475	D+	LS
184	3*s*6*p*–3*s*10*d*	^{3}P$^\circ$–^{3}D		*3 516.9 cm^{-1}*	*57 018.38–60 535.3*	9–15	1.12−03	2.27−02	1.91+01	−0.690	D+	1

TABLE 40. Transition probabilities of allowed lines for Mg I (references for this table are as follows: 1=Butler *et al.*,[13] 2=Tachiev and Froese Fischer,[99] 3 =Ueda *et al.*,[114] 4=Chang, Tang[17], and 5=Weiss[123])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				3 516.31 cm^{-1}	57 019.025–60 535.34	5–7	1.13−03	1.91−02	8.94+00	−1.020	C	LS
				3 517.62 cm^{-1}	57 017.724–60 535.34	3–5	8.42−04	1.70−02	4.77+00	−1.292	C	LS
				3 518.26 cm^{-1}	57 017.078–60 535.34	1–3	6.25−04	2.27−02	2.12+00	−1.644	D+	LS
				3 516.31 cm^{-1}	57 019.025–60 535.34	5–5	2.81−04	3.41−03	1.60+00	−1.768	D	LS
				3 517.62 cm^{-1}	57 017.724–60 535.34	3–3	4.69−04	5.68−03	1.59+00	−1.769	D	LS
				3 516.31 cm^{-1}	57 019.025–60 535.34	5–3	3.12−05	2.27−04	1.06−01	−2.945	E	LS
185	$3s5f-3s6d$	$^1F^\circ-^1D$		819.083 cm^{-1}	57 204.163–58 023.246	7–5	2.02−03	3.22−01	9.06+02	0.353	B+	1
186		$^3F^\circ-^3D$		*1 238.58 cm^{-1}*	*57 204.27–58 442.85*	21–15	1.01−03	7.07−02	3.95+02	0.172	B+	1
				1 238.538 cm^{-1}	57 204.305–58 442.843	9–7	9.30−04	7.07−02	1.69+02	−0.196	B+	LS
				1 238.586 cm^{-1}	57 204.267–58 442.853	7–5	9.00−04	6.28−02	1.17+02	−0.357	B+	LS
				1 238.646 cm^{-1}	57 204.228–58 442.874	5–3	1.01−03	5.94−02	7.89+01	−0.527	B+	LS
				1 238.576 cm^{-1}	57 204.267–58 442.843	7–7	8.06−05	7.88−03	1.47+01	−1.258	B	LS
				1 238.625 cm^{-1}	57 204.228–58 442.853	5–5	1.13−04	1.10−02	1.46+01	−1.260	B	LS
				1 238.615 cm^{-1}	57 204.228–58 442.843	5–7	2.27−06	3.11−04	4.13−01	−2.808	D+	LS
187	$3s5f-3s6g$	$^1F^\circ-^1G$		1 406.632 cm^{-1}	57 204.163–58 610.795	7–9	1.08−02	1.05+00	1.72+03	0.866	B+	1
188		$^3F^\circ-^3G$		*1 406.52 cm^{-1}*	*57 204.27–58 610.79*	21–27	1.08−02	1.05+00	5.18+03	1.343	B+	1
				1 406.490 cm^{-1}	57 204.305–58 610.795	9–11	1.08−02	1.00+00	2.11+03	0.954	B+	LS
				1 406.528 cm^{-1}	57 204.267–58 610.795	7–9	1.01−02	9.88−01	1.62+03	0.840	B+	LS
				1 406.567 cm^{-1}	57 204.228–58 610.795	5–7	9.99−03	1.06+00	1.24+03	0.724	B+	LS
				1 406.490 cm^{-1}	57 204.305–58 610.795	9–9	6.77−04	5.13−02	1.08+02	−0.336	B+	LS
				1 406.528 cm^{-1}	57 204.267–58 610.795	7–7	8.71−04	6.60−02	1.08+02	−0.335	B+	LS
				1 406.490 cm^{-1}	57 204.305–58 610.795	9–7	1.33−05	7.82−04	1.65+00	−2.153	C	LS
189	$3s5f-3s7d$	$^1F^\circ-^1D$		1 836.856 cm^{-1}	57 204.163–59 041.019	7–5	7.53−04	2.39−02	3.00+01	−0.777	C+	1
190		$^3F^\circ-^3D$		*2 114.50 cm^{-1}*	*57 204.27–59 318.77*	21–15	4.97−04	1.19−02	3.89+01	−0.602	C	1
				2 114.459 cm^{-1}	57 204.305–59 318.764	9–7	4.56−04	1.19−02	1.67+01	−0.970	C	LS
				2 114.508 cm^{-1}	57 204.267–59 318.775	7–5	4.43−04	1.06−02	1.16+01	−1.130	C	LS
				2 114.565 cm^{-1}	57 204.228–59 318.793	5–3	4.96−04	9.98−03	7.77+00	−1.302	C	LS
				2 114.497 cm^{-1}	57 204.267–59 318.764	7–7	3.94−05	1.32−03	1.44+00	−2.034	D	LS
				2 114.547 cm^{-1}	57 204.228–59 318.775	5–5	5.52−05	1.85−03	1.44+00	−2.034	D	LS
				2 114.536 cm^{-1}	57 204.228–59 318.764	5–7	1.11−06	5.23−05	4.07−02	−3.583	E	LS
191	$3s5f-3s7g$	$^1F^\circ-^1G$		2 219.374 cm^{-1}	57 204.163–59 423.537	7–9	5.90−03	2.31−01	2.40+02	0.209	B	1
192		$^3F^\circ-^3G$		*2 219.27 cm^{-1}*	*57 204.27–59 423.54*	21–27	5.91−03	2.31−01	7.21+02	0.686	B	1
				2 219.232 cm^{-1}	57 204.305–59 423.537	9–11	5.91−03	2.20−01	2.94+02	0.297	B	LS
				2 219.270 cm^{-1}	57 204.267–59 423.537	7–9	5.54−03	2.17−01	2.25+02	0.182	B	LS
				2 219.309 cm^{-1}	57 204.228–59 423.537	5–7	5.42−03	2.31−01	1.71+02	0.063	B	LS
				2 219.232 cm^{-1}	57 204.305–59 423.537	9–9	3.71−04	1.13−02	1.51+01	−0.993	C	LS
				2 219.270 cm^{-1}	57 204.267–59 423.537	7–7	4.76−04	1.45−02	1.51+01	−0.994	C	LS
				2 219.232 cm^{-1}	57 204.305–59 423.537	9–7	7.22−06	1.71−04	2.28−01	−2.813	E+	LS
193	$3s5f-3s8d$	$^1F^\circ-^1D$		2 485.828 cm^{-1}	57 204.163–59 689.991	7–5	4.13−04	7.16−03	6.64+00	−1.300	C	1
194		$^3F^\circ-^3D$		*2 676.91 cm^{-1}*	*57 204.27–59 881.18*	21–15	2.88−04	4.31−03	1.11+01	−1.043	D+	1
				2 676.863 cm^{-1}	57 204.305–59 881.168	9–7	2.65−04	4.31−03	4.77+00	−1.411	C	LS
				2 676.914 cm^{-1}	57 204.267–59 881.181	7–5	2.56−04	3.83−03	3.30+00	−1.572	D+	LS
				2 676.968 cm^{-1}	57 204.228–59 881.196	5–3	2.88−04	3.62−03	2.23+00	−1.742	D+	LS
				2 676.901 cm^{-1}	57 204.267–59 881.168	7–7	2.29−05	4.80−04	4.13−01	−2.474	E+	LS
				2 676.953 cm^{-1}	57 204.228–59 881.181	5–5	3.21−05	6.72−04	4.13−01	−2.474	E+	LS
				2 676.940 cm^{-1}	57 204.228–59 881.168	5–7	6.45−07	1.89−05	1.16−02	−4.025	E	LS

TABLE 40. Transition probabilities of allowed lines for Mg I (references for this table are as follows: 1=Butler *et al.*,[13] 2=Tachiev and Froese Fischer,[99] 3=Ueda *et al.*,[114] 4=Chang, Tang[17], and 5=Weiss[123])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^{a}	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
195	$3s5f-3s8g$	$^1\mathrm{F}^\circ-{}^1\mathrm{G}$		2 746.71 cm^{-1}	57 204.163–59 950.87	7–9	3.53−03	9.02−02	7.57+01	−0.200	C+	1
196		$^3\mathrm{F}^\circ-{}^3\mathrm{G}$				21–27						1
				2 746.57 cm^{-1}	57 204.305–59 950.87	9–11	3.52−03	8.56−02	9.23+01	−0.113	B	LS
				2 746.60 cm^{-1}	57 204.267–59 950.87	7–9	3.30−03	8.44−02	7.08+01	−0.229	C+	LS
				2 746.57 cm^{-1}	57 204.305–59 950.87	9–9	2.20−04	4.38−03	4.73+00	−1.404	C	LS
197	$3s5f-3s9d$	$^1\mathrm{F}^\circ-{}^1\mathrm{D}$		2 923.076 cm^{-1}	57 204.163–60 127.239	7–5	2.57−04	3.22−03	2.54+00	−1.647	D+	1
198		$^3\mathrm{F}^\circ-{}^3\mathrm{D}$		*3 059.31 cm^{-1}*	*57 204.27–60 263.58*	21–15	1.85−04	2.12−03	4.79+00	−1.351	D	1
				3 059.278 cm^{-1}	57 204.305–60 263.583	9–7	1.70−04	2.12−03	2.05+00	−1.719	D+	LS
				3 059.316 cm^{-1}	57 204.267–60 263.583	7–5	1.64−04	1.88−03	1.42+00	−1.881	D	LS
				3 059.355 cm^{-1}	57 204.228–60 263.583	5–3	1.85−04	1.78−03	9.58−01	−2.051	D	LS
				3 059.316 cm^{-1}	57 204.267–60 263.583	7–7	1.47−05	2.36−04	1.78−01	−2.782	E+	LS
				3 059.355 cm^{-1}	57 204.228–60 263.583	5–5	2.06−05	3.30−04	1.78−01	−2.783	E+	LS
				3 059.355 cm^{-1}	57 204.228–60 263.583	5–7	4.15−07	9.31−06	5.01−03	−4.332	E	LS
199	$3s5f-3s10d$	$^1\mathrm{F}^\circ-{}^1\mathrm{D}$		3 230.936 cm^{-1}	57 204.163–60 435.099	7–5	1.73−04	1.77−03	1.26+00	−1.907	D	1
200		$^3\mathrm{F}^\circ-{}^3\mathrm{D}$		*3 331.0 cm^{-1}*	*57 204.27–60 535.3*	21–15	1.27−04	1.22−03	2.54+00	−1.591	D	1
				3 331.03 cm^{-1}	57 204.305–60 535.34	9–7	1.16−04	1.22−03	1.09+00	−1.959	D	LS
				3 331.07 cm^{-1}	57 204.267–60 535.34	7–5	1.13−04	1.09−03	7.54−01	−2.117	D	LS
				3 331.11 cm^{-1}	57 204.228–60 535.34	5–3	1.27−04	1.03−03	5.09−01	−2.288	E+	LS
				3 331.07 cm^{-1}	57 204.267–60 535.34	7–7	1.01−05	1.36−04	9.41−02	−3.021	E	LS
				3 331.11 cm^{-1}	57 204.228–60 535.34	5–5	1.41−05	1.91−04	9.44−02	−3.020	E	LS
				3 331.11 cm^{-1}	57 204.228–60 535.34	5–7	2.85−07	5.39−06	2.66−03	−4.569	E	LS
201	$3s5g-3s6f$	$^1\mathrm{G}-{}^1\mathrm{F}^\circ$		1 312.717 cm^{-1}	57 262.760–58 575.477	9–7	1.95−04	1.32−02	2.98+01	−0.925	B	1
202		$^3\mathrm{G}-{}^3\mathrm{F}^\circ$				27–21						1
				1 312.767 cm^{-1}	57 262.760–58 575.527	9–7	1.83−04	1.24−02	2.80+01	−0.952	B	LS
				1 312.767 cm^{-1}	57 262.760–58 575.527	7–5	1.96−04	1.22−02	2.14+01	−1.069	B	LS
				1 312.767 cm^{-1}	57 262.760–58 575.527	9–9	9.54−06	8.30−04	1.87+00	−2.127	C	LS
				1 312.767 cm^{-1}	57 262.760–58 575.527	7–7	1.23−05	1.07−03	1.88+00	−2.126	C	LS
				1 312.767 cm^{-1}	57 262.760–58 575.527	7–9	1.45−07	1.62−05	2.84−02	−3.945	E+	LS
203	$3s5g-3s7f$	$^3\mathrm{G}-{}^3\mathrm{F}^\circ$				27–21						1
				2 138.003 cm^{-1}	57 262.760–59 400.763	9–7	7.72−05	1.97−03	2.73+00	−1.751	D+	LS
				2 138.003 cm^{-1}	57 262.760–59 400.763	7–5	8.24−05	1.93−03	2.08+00	−1.869	D+	LS
				2 138.003 cm^{-1}	57 262.760–59 400.763	9–9	4.02−06	1.32−04	1.83−01	−2.925	E+	LS
				2 138.003 cm^{-1}	57 262.760–59 400.763	7–7	5.15−06	1.69−04	1.82−01	−2.927	E+	LS
				2 138.003 cm^{-1}	57 262.760–59 400.763	7–9	6.12−08	2.58−06	2.78−03	−4.743	E	LS
204		$^1\mathrm{G}-{}^1\mathrm{F}^\circ$		2 138.003 cm^{-1}	57 262.760–59 400.763	9–7	8.23−05	2.10−03	2.91+00	−1.724	D+	1
205	$3s5g-3s8f$	$^3\mathrm{G}-{}^3\mathrm{F}^\circ$				27–21						1
				2 672.610 cm^{-1}	57 262.760–59 935.370	9–7	4.13−05	6.75−04	7.48−01	−2.216	D	LS
				2 672.610 cm^{-1}	57 262.760–59 935.370	7–5	4.42−05	6.62−04	5.71−01	−2.334	D	LS
				2 672.610 cm^{-1}	57 262.760–59 935.370	9–9	2.15−06	4.51−05	5.00−02	−3.392	E	LS
				2 672.610 cm^{-1}	57 262.760–59 935.370	7–7	2.76−06	5.80−05	5.00−02	−3.391	E	LS
				2 672.610 cm^{-1}	57 262.760–59 935.370	7–9	3.27−08	8.83−07	7.61−04	−5.209	E	LS
206		$^1\mathrm{G}-{}^1\mathrm{F}^\circ$		2 672.610 cm^{-1}	57 262.760–59 935.370	9–7	4.40−05	7.18−04	7.96−01	−2.190	D	1
207	$3p^2-3p3d$	$^3\mathrm{P}-{}^3\mathrm{D}^\circ$	*3 894.09*	*3 895.19*	*57 853.6–83 526.3*	9–15	2.36+00	8.93−01	1.03+02	0.905	B	1

TABLE 40. Transition probabilities of allowed lines for Mg I (references for this table are as follows: 1=Butler *et al.*,[13] 2=Tachiev and Froese Fischer,[99] 3=Ueda *et al.*,[114] 4=Chang, Tang[17], and 5=Weiss[123])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	$E_i - E_k$ (cm^{-1})	$g_i - g_k$	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
			3 895.572	3 896.676	57 873.94–83 536.84	5–7	2.35+00	7.50−01	4.81+01	0.574	B+	LS
			3 891.906	3 893.009	57 833.40–83 520.47	3–5	1.77+00	6.70−01	2.58+01	0.303	B	LS
			3 890.178	3 891.281	57 812.77–83 511.25	1–3	1.31+00	8.94−01	1.15+01	−0.049	B	LS
			3 898.059	3 899.163	57 873.94–83 520.47	5–5	5.88−01	1.34−01	8.60+00	−0.174	C+	LS
			3 893.304	3 894.407	57 833.40–83 511.25	3–3	9.81−01	2.23−01	8.58+00	−0.175	C+	LS
			3 899.460	3 900.565	57 873.94–83 511.25	5–3	6.52−02	8.92−03	5.73−01	−1.351	C	LS
208	$3s7s-3s7p$	^{3}S$-^3$P$^\circ$		*622.18 cm^{-1}*	*57 855.214–58 477.39*	3–9	2.28−03	2.65+00	4.20+03	0.900	B	1
				622.546 cm^{-1}	57 855.214–58 477.760	3–5	2.28−03	1.47+00	2.33+03	0.644	B	LS
				621.806 cm^{-1}	57 855.214–58 477.020	3–3	2.28−03	8.83−01	1.40+03	0.423	B	LS
				621.475 cm^{-1}	57 855.214–58 476.689	3–1	2.27−03	2.94−01	4.67+02	−0.055	B	LS
209		^{1}S$-^1$P$^\circ$		570.82 cm^{-1}	58 009.41–58 580.23	1–3	1.91−03	2.64+00	1.52+03	0.422	B	1
210	$3s7s-3s8p$	^{3}S$-^3$P$^\circ$		*1 487.3 cm^{-1}*	57 855.214–*59 342.5*	3–9	5.14−04	1.04−01	6.94+01	−0.506	C+	1
				1 487.30 cm^{-1}	57 855.214–59 342.51	3–5	5.14−04	5.81−02	3.86+01	−0.759	C+	LS
				1 487.30 cm^{-1}	57 855.214–59 342.51	3–3	5.13−04	3.48−02	2.31+01	−0.981	C+	LS
				1 487.30 cm^{-1}	57 855.214–59 342.51	3–1	5.13−04	1.16−02	7.70+00	−1.458	C	LS
211		^{1}S$-^1$P$^\circ$		1 393.77 cm^{-1}	58 009.41–59 403.18	1–3	4.03−04	9.32−02	2.20+01	−1.031	C+	1
212	$3s7s-3s9p$	^{3}S$-^3$P$^\circ$		*2 042.7 cm^{-1}*	57 855.214–*59 897.9*	3–9	2.35−04	2.54−02	1.23+01	−1.118	D+	1
				2 042.65 cm^{-1}	57 855.214–59 897.86	3–5	2.35−04	1.41−02	6.82+00	−1.374	C	LS
				2 042.65 cm^{-1}	57 855.214–59 897.86	3–3	2.35−04	8.46−03	4.09+00	−1.596	D+	LS
				2 042.65 cm^{-1}	57 855.214–59 897.86	3–1	2.35−04	2.82−03	1.36+00	−2.073	D	LS
213		^{1}S$-^1$P$^\circ$		1 927.22 cm^{-1}	58 009.41–59 936.63	1–3	1.69−04	2.05−02	3.50+00	−1.688	D+	1
214	$3s7s-3s10p$	^{1}S$-^1$P$^\circ$		2 292.89 cm^{-1}	58 009.41–60 302.30	1–3	8.97−05	7.67−03	1.10+00	−2.115	D	1
215	$3s6d-3s7p$	^{1}D$-^1$P$^\circ$		556.98 cm^{-1}	58 023.246–58 580.23	5–3	1.94−03	5.62−01	1.66+03	0.449	B	1
216	$3s6d-3s6f$	^{1}D$-^1$F$^\circ$		552.231 cm^{-1}	58 023.246–58 575.477	5–7	2.38−03	1.64+00	4.89+03	0.914	B+	1
217		^{3}D$-^3$F$^\circ$		*132.68 cm^{-1}*	*58 442.85–58 575.53*	15–21	4.42−05	5.27−01	1.96+04	0.898	B+	1
				132.684 cm^{-1}	58 442.843–58 575.527	7–9	4.42−05	4.84−01	8.41+03	0.530	B+	LS
				132.674 cm^{-1}	58 442.853–58 575.527	5–7	3.92−05	4.68−01	5.81+03	0.369	B+	LS
				132.653 cm^{-1}	58 442.874–58 575.527	3–5	3.71−05	5.27−01	3.92+03	0.199	B+	LS
				132.684 cm^{-1}	58 442.843–58 575.527	7–7	4.93−06	4.20−02	7.29+02	−0.532	B+	LS
				132.674 cm^{-1}	58 442.853–58 575.527	5–5	6.89−06	5.87−02	7.28+02	−0.532	B+	LS
				132.684 cm^{-1}	58 442.843–58 575.527	7–5	1.94−07	1.18−03	2.05+01	−2.083	B	LS
218	$3s6d-3s8p$	^{1}D$-^1$P$^\circ$		1 379.93 cm^{-1}	58 023.246–59 403.18	5–3	8.15−04	3.85−02	4.59+01	−0.716	C+	1
219		^{3}D$-^3$P$^\circ$		*899.7 cm^{-1}*	*58 442.85–59 342.5*	15–9	4.45−04	4.95−02	2.72+02	−0.129	C+	1
				899.67 cm^{-1}	58 442.843–59 342.51	7–5	3.74−04	4.95−02	1.27+02	−0.460	B	LS
				899.66 cm^{-1}	58 442.853–59 342.51	5–3	3.34−04	3.71−02	6.79+01	−0.732	C+	LS
				899.64 cm^{-1}	58 442.874–59 342.51	3–1	4.45−04	2.75−02	3.02+01	−1.084	C+	LS
				899.66 cm^{-1}	58 442.853–59 342.51	5–5	6.69−05	1.24−02	2.27+01	−1.208	C+	LS
				899.64 cm^{-1}	58 442.874–59 342.51	3–3	1.11−04	2.06−02	2.26+01	−1.209	C+	LS
				899.64 cm^{-1}	58 442.874–59 342.51	3–5	4.47−06	1.38−03	1.51+00	−2.383	D	LS
220	$3s6d-3s7f$	^{1}D$-^1$F$^\circ$		1 377.517 cm^{-1}	58 023.246–59 400.763	5–7	3.53−05	3.90−03	4.66+00	−1.710	D+	1
221		^{3}D$-^3$F$^\circ$		*957.91 cm^{-1}*	*58 442.85–59 400.76*	15–21	1.94−03	4.44−01	2.29+03	0.823	B	1
				957.920 cm^{-1}	58 442.843–59 400.763	7–9	1.94−03	4.08−01	9.82+02	0.456	B	LS
				957.910 cm^{-1}	58 442.853–59 400.763	5–7	1.72−03	3.94−01	6.77+02	0.294	B	LS

TABLE 40. Transition probabilities of allowed lines for Mg I (references for this table are as follows: 1=Butler *et al.*,[13] 2=Tachiev and Froese Fischer,[99] 3 =Ueda *et al.*,[114] 4=Chang, Tang[17], and 5=Weiss[123])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				957.889 cm^{-1}	58 442.874–59 400.763	3–5	1.63−03	4.44−01	4.58+02	0.125	B	LS
				957.920 cm^{-1}	58 442.843–59 400.763	7–7	2.16−04	3.53−02	8.49+01	−0.607	C+	LS
				957.910 cm^{-1}	58 442.853–59 400.763	5–5	3.02−04	4.94−02	8.49+01	−0.607	C+	LS
				957.920 cm^{-1}	58 442.843–59 400.763	7–5	8.53−06	9.96−04	2.40+00	−2.157	D+	LS
222	3*s*6*d*−3*s*9*p*	^{1}D−^{1}P$^\circ$		1 913.38 cm^{-1}	58 023.246–59 936.63	5–3	4.88−04	1.20−02	1.03+01	−1.222	C	1
223		^{3}D−^{3}P$^\circ$		*1 455.1 cm^{-1}*	*58 442.85–59 897.9*	15–9	2.59−04	1.10−02	3.74+01	−0.783	C	1
				1 455.02 cm^{-1}	58 442.843–59 897.86	7–5	2.17−04	1.10−02	1.74+01	−1.114	C	LS
				1 455.01 cm^{-1}	58 442.853–59 897.86	5–3	1.95−04	8.28−03	9.37+00	−1.383	C	LS
				1 454.99 cm^{-1}	58 442.874–59 897.86	3–1	2.60−04	6.13−03	4.16+00	−1.735	D+	LS
				1 455.01 cm^{-1}	58 442.853–59 897.86	5–5	3.90−05	2.76−03	3.12+00	−1.860	D+	LS
				1 454.99 cm^{-1}	58 442.874–59 897.86	3–3	6.50−05	4.60−03	3.12+00	−1.860	D+	LS
				1 454.99 cm^{-1}	58 442.874–59 897.86	3–5	2.60−06	3.07−04	2.08−01	−3.036	E+	LS
224	3*s*6*d*−3*s*8*f*	^{3}D−^{3}F$^\circ$		*1 492.52 cm^{-1}*	*58 442.85–59 935.37*	15–21	1.54−03	1.45−01	4.80+02	0.337	B	1
				1 492.527 cm^{-1}	58 442.843–59 935.370	7–9	1.54−03	1.33−01	2.05+02	−0.031	B	LS
				1 492.517 cm^{-1}	58 442.853–59 935.370	5–7	1.37−03	1.29−01	1.42+02	−0.190	B	LS
				1 492.496 cm^{-1}	58 442.874–59 935.370	3–5	1.29−03	1.45−01	9.60+01	−0.362	B	LS
				1 492.527 cm^{-1}	58 442.843–59 935.370	7–7	1.71−04	1.15−02	1.78+01	−1.094	C	LS
				1 492.517 cm^{-1}	58 442.853–59 935.370	5–5	2.41−04	1.62−02	1.79+01	−1.092	C	LS
				1 492.527 cm^{-1}	58 442.843–59 935.370	7–5	6.76−06	3.25−04	5.02−01	−2.643	E+	LS
225	3*s*6*d*−3*s*9*f*	^{1}D−^{1}F$^\circ$		2 278.037 cm^{-1}	58 023.246–60 301.283	5–7	3.71−05	1.50−03	1.08+00	−2.125	D	1
226		^{3}D−^{3}F$^\circ$		*1 858.43 cm^{-1}*	*58 442.85–60 301.28*	15–21	1.13−03	6.88−02	1.83+02	0.014	C+	1
				1 858.440 cm^{-1}	58 442.843–60 301.283	7–9	1.13−03	6.32−02	7.84+01	−0.354	C+	LS
				1 858.430 cm^{-1}	58 442.853–60 301.283	5–7	1.01−03	6.11−02	5.41+01	−0.515	C+	LS
				1 858.409 cm^{-1}	58 442.874–60 301.283	3–5	9.51−04	6.88−02	3.66+01	−0.685	C+	LS
				1 858.440 cm^{-1}	58 442.843–60 301.283	7–7	1.26−04	5.47−03	6.78+00	−1.417	C	LS
				1 858.430 cm^{-1}	58 442.853–60 301.283	5–5	1.76−04	7.66−03	6.78+00	−1.417	C	LS
				1 858.440 cm^{-1}	58 442.843–60 301.283	7–5	4.97−06	1.54−04	1.91−01	−2.967	E+	LS
227	3*s*6*d*−3*s*10*p*	^{1}D−^{1}P$^\circ$		2 279.05 cm^{-1}	58 023.246–60 302.30	5–3	3.25−04	5.62−03	4.06+00	−1.551	D+	1
228	3*s*6*d*−3*s*10*f*	^{1}D−^{1}F$^\circ$		2 539.391 cm^{-1}	58 023.246–60 562.637	5–7	4.82−05	1.57−03	1.02+00	−2.105	D	1
229		^{3}D−^{3}F$^\circ$		*2 119.79 cm^{-1}*	*58 442.85–60 562.64*	15–21	8.46−04	3.95−02	9.21+01	−0.227	C+	1
				2 119.794 cm^{-1}	58 442.843–60 562.637	7–9	8.46−04	3.63−02	3.95+01	−0.595	C+	LS
				2 119.784 cm^{-1}	58 442.853–60 562.637	5–7	7.51−04	3.51−02	2.73+01	−0.756	C+	LS
				2 119.763 cm^{-1}	58 442.874–60 562.637	3–5	7.10−04	3.95−02	1.84+01	−0.926	C	LS
				2 119.794 cm^{-1}	58 442.843–60 562.637	7–7	9.44−05	3.15−03	3.42+00	−1.657	D+	LS
				2 119.784 cm^{-1}	58 442.853–60 562.637	5–5	1.32−04	4.40−03	3.42+00	−1.658	D+	LS
				2 119.794 cm^{-1}	58 442.843–60 562.637	7–5	3.72−06	8.87−05	9.64−02	−3.207	E	LS
230	3*s*6*d*−3*s*11*p*	^{1}D−^{1}P$^\circ$		2 540.10 cm^{-1}	58 023.246–60 563.35	5–3	2.28−04	3.18−03	2.06+00	−1.799	C	1
231	3*s*6*d*−3*p*3*d*	^{1}D−^{1}D$^\circ$	4 409.923	4 411.162	58 023.246–80 693.01	5–5	7.68−03	2.24−03	1.63−01	−1.951	D+	1
232	3*s*7*p*−3*s*8*s*	^{3}P$^\circ$−^{3}S		*485.35 cm^{-1}*	*58 477.39–58 962.739*	9–3	3.23−03	6.84−01	4.18+03	0.789	B	1
				484.979 cm^{-1}	58 477.760–58 962.739	5–3	1.79−03	6.84−01	2.32+03	0.534	B	LS
				485.719 cm^{-1}	58 477.020–58 962.739	3–3	1.08−03	6.85−01	1.39+03	0.313	B	LS
				486.050 cm^{-1}	58 476.689–58 962.739	1–3	3.60−04	6.85−01	4.64+02	−0.164	B	LS
233		^{1}P$^\circ$−^{1}S		473.29 cm^{-1}	58 580.23–59 053.52	3–1	3.16−03	7.04−01	1.47+03	0.325	B	1
234	3*s*7*p*−3*s*7*d*	^{3}P$^\circ$−^{3}D		*841.38 cm^{-1}*	*58 477.39–59 318.77*	9–15	2.07−07	7.32−01	2.58+03	0.819	B	1

TABLE 40. Transition probabilities of allowed lines for Mg I (references for this table are as follows: 1=Butler *et al.*,[13] 2=Tachiev and Froese Fischer,[99] 3 =Ueda *et al.*,[114] 4=Chang, Tang[17], and 5=Weiss[123])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				841.004 cm^{-1}	58 477.760–59 318.764	5–7	2.07−03	6.14−01	1.20+03	0.487	B	LS
				841.755 cm^{-1}	58 477.020–59 318.775	3–5	1.56−03	5.49−01	6.44+02	0.217	B	LS
				842.104 cm^{-1}	58 476.689–59 318.793	1–3	1.15−03	7.32−01	2.86+02	−0.135	B	LS
				841.015 cm^{-1}	58 477.760–59 318.775	5–5	5.19−04	1.10−01	2.15+02	−0.260	B	LS
				841.773 cm^{-1}	58 477.020–59 318.793	3–3	8.65−04	1.83−01	2.15+02	−0.260	B	LS
				841.033 cm^{-1}	58 477.760–59 318.793	5–3	5.75−05	7.31−03	1.43+01	−1.437	C	LS
235		^{1}P$^\circ$–^{1}D		460.79 cm^{-1}	58 580.23–59 041.019	3–5	1.74−03	2.05+00	4.39+03	0.789	B	1
236	$3s7p-3s9s$	^{3}P$^\circ$–^{3}S		*1 171.76 cm^{-1}*	*58 477.39*–59 649.15	9–3	1.29−03	4.68−02	1.18+02	−0.376	C+	1
				1 171.39 cm^{-1}	58 477.760–59 649.15	5–3	7.14−04	4.68−02	6.58+01	−0.631	C+	LS
				1 172.13 cm^{-1}	58 477.020–59 649.15	3–3	4.29−04	4.68−02	3.94+01	−0.853	C+	LS
				1 172.46 cm^{-1}	58 476.689–59 649.15	1–3	1.43−04	4.69−02	1.32+01	−1.329	C	LS
237		^{1}P$^\circ$–^{1}S		1 126.88 cm^{-1}	58 580.23–59 707.11	3–1	1.22−03	4.82−02	4.22+01	−0.840	C+	1
238	$3s7p-3s8d$	^{3}P$^\circ$–^{3}D		*1 403.79 cm^{-1}*	*58 477.39–59 881.18*	9–15	1.40−03	1.77−01	3.74+02	0.202	C+	1
				1 403.408 cm^{-1}	58 477.760–59 881.168	5–7	1.40−03	1.49−01	1.75+02	−0.128	B	LS
				1 404.161 cm^{-1}	58 477.020–59 881.1 81	3–5	1.05−03	1.33−01	9.35+01	−0.399	B	LS
				1 404.507 cm^{-1}	58 476.689–59 881.196	1–3	7.76−04	1.77−01	4.15+01	−0.752	C+	LS
				1 403.421 cm^{-1}	58 477.760–59 881.181	5–5	3.48−04	2.65−02	3.11+01	−0.878	C+	LS
				1 404.176 cm^{-1}	58 477.020–59 881.196	3–3	5.81−04	4.42−02	3.11+01	−0.877	C+	LS
				1 403.436 cm^{-1}	58 477.760–59 881.196	5–3	3.88−05	1.77−03	2.08+00	−2.053	D+	LS
239		^{1}P$^\circ$–^{1}D		1 109.76 cm^{-1}	58 580.23–59 689.991	3–5	1.82−04	3.70−02	3.29+01	−0.955	C+	1
240	$3s7p-3s10s$	^{3}P$^\circ$–^{3}S		*1 626.61 cm^{-1}*	*58 477.39*–60 104.00	9–3	7.73−04	1.46−02	2.66+01	−0.881	C	1
				1 626.24 cm^{-1}	58 477.760–60 104.00	5–3	4.29−04	1.46−02	1.48+01	−1.137	C	LS
				1 626.98 cm^{-1}	58 477.020–60 104.00	3–3	2.58−04	1.46−02	8.86+00	−1.359	C	LS
				1 627.31 cm^{-1}	58 476.689–60 104.00	1–3	8.60−05	1.46−02	2.95+00	−1.836	D+	LS
241		^{1}P$^\circ$–^{1}S		1 563.00 cm^{-1}	58 580.23–60 143.23	3–1	7.28−04	1.49−02	9.42+00	−1.350	C	1
242	$3s7p-3s9d$	^{3}P$^\circ$–^{3}D		*1 786.19 cm^{-1}*	*58 477.39–60 263.58*	9–15	9.61−04	7.53−02	1.25+02	−0.169	C+	1
				1 785.823 cm^{-1}	58 477.760–60 263.583	5–7	9.60−04	6.32−02	5.83+01	−0.500	C+	LS
				1 786.563 cm^{-1}	58 477.020–60 263.583	3–5	7.22−04	5.65−02	3.12+01	−0.771	C+	LS
				1 786.894 cm^{-1}	58 476.689–60 263.583	1–3	5.35−04	7.53−02	1.39+01	−1.123	C	LS
				1 785.823 cm^{-1}	58 477.760–60 263.583	5–5	2.40−04	1.13−02	1.04+01	−1.248	C	LS
				1 786.563 cm^{-1}	58 477.020–60 263.583	3–3	4.00−04	1.88−02	1.04+01	−1.249	C	LS
				1 785.823 cm^{-1}	58 477.760–60 263.583	5–3	2.67−05	7.53−04	6.94−01	−2.424	D	LS
243		^{1}P$^\circ$–^{1}D		1 547.01 cm^{-1}	58 580.23–60 127.239	3–5	3.37−05	3.52−03	2.25+00	−1.976	D+	1
244	$3s7p-3s11s$	^{3}P$^\circ$–^{3}S		*1 943.48 cm^{-1}*	*58 477.39*–60 420.87	9–3	5.20−04	6.88−03	1.05+01	−1.208	D+	1
				1 943.11 cm^{-1}	58 477.760–60 420.87	5–3	2.89−04	6.88−03	5.83+00	−1.463	C	LS
				1 943.85 cm^{-1}	58 477.020–60 420.87	3–3	1.73−04	6.88−03	3.50+00	−1.685	D+	LS
				1 944.18 cm^{-1}	58 476.689–60 420.87	1–3	5.78−05	6.88−03	1.17+00	−2.162	D	LS
245	$3s7p-3s10d$	^{3}P$^\circ$–^{3}D		*2 057.9 cm^{-1}*	*58 477.39–60 535.3*	9–15	6.91−04	4.08−02	5.87+01	−0.435	C	1
				2 057.58 cm^{-1}	58 477.760–60 535.34	5–7	6.90−04	3.42−02	2.74+01	−0.767	C+	LS
				2 058.32 cm^{-1}	58 477.020–60 535.34	3–5	5.19−04	3.06−02	1.47+01	−1.037	C	LS
				2 058.65 cm^{-1}	58 476.689–60 535.34	1–3	3.84−04	4.08−02	6.52+00	−1.389	C	LS
				2 057.58 cm^{-1}	58 477.760–60 535.34	5–5	1.73−04	6.11−03	4.89+00	−1.515	C	LS
				2 058.32 cm^{-1}	58 477.020–60 535.34	3–3	2.88−04	1.02−02	4.89+00	−1.514	C	LS
				2 057.58 cm^{-1}	58 477.760–60 535.34	5–3	1.92−05	4.08−04	3.26−01	−2.690	E+	LS
246	$3s6f-3s7d$	^{1}F$^\circ$–^{1}D		465.542 cm^{-1}	58 575.477–59 041.019	7–5	1.04−03	5.14−01	2.54+03	0.556	B	1

TABLE 40. Transition probabilities of allowed lines for Mg I (references for this table are as follows: 1=Butler *et al.*,[13] 2=Tachiev and Froese Fischer,[99] 3 =Ueda *et al.*,[114] 4=Chang, Tang[17], and 5=Weiss[123])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
247		$^3F^\circ-^3D$		*743.24 cm^{-1}*	*58 575.53–59 318.77*	21–15	6.09−04	1.18−01	1.10+03	0.394	B	1
				743.237 cm^{-1}	58 575.527–59 318.764	9–7	5.59−04	1.18−01	4.70+02	0.026	B	LS
				743.248 cm^{-1}	58 575.527–59 318.775	7–5	5.42−04	1.05−01	3.26+02	−0.134	B	LS
				743.266 cm^{-1}	58 575.527–59 318.793	5–3	6.07−04	9.89−02	2.19+02	−0.306	B	LS
				743.237 cm^{-1}	58 575.527–59 318.764	7–7	4.83−05	1.31−02	4.06+01	−1.038	C+	LS
				743.248 cm^{-1}	58 575.527–59 318.775	5–5	6.78−05	1.84−02	4.08+01	−1.036	C+	LS
				743.237 cm^{-1}	58 575.527–59 318.764	5–7	1.36−06	5.18−04	1.15+00	−2.587	D	LS
248	$3s6f-3s7g$	$^1F^\circ-^1G$		848.060 cm^{-1}	58 575.477–59 423.537	7–9	3.55−03	9.52−01	2.59+03	0.824	B	1
249		$^3F^\circ-^3G$		*848.01 cm^{-1}*	*58 575.53–59 423.54*	21–27	3.54−03	9.49−01	7.74+03	1.299	B	1
				848.010 cm^{-1}	58 575.527–59 423.537	9–11	3.54−03	9.03−01	3.16+03	0.910	B	LS
				848.010 cm^{-1}	58 575.527–59 423.537	7–9	3.32−03	8.89−01	2.42+03	0.794	B	LS
				848.010 cm^{-1}	58 575.527–59 423.537	5–7	3.25−03	9.50−01	1.84+03	0.677	B	LS
				848.010 cm^{-1}	58 575.527–59 423.537	9–9	2.22−04	4.62−02	1.61+02	−0.381	B	LS
				848.010 cm^{-1}	58 575.527–59 423.537	7–7	2.85−04	5.94−02	1.61+02	−0.381	B	LS
				848.010 cm^{-1}	58 575.527–59 423.537	9–7	4.34−06	7.03−04	2.46+00	−2.199	D+	LS
250	$3s6f-3s8d$	$^1F^\circ-^1D$		1 114.514 cm^{-1}	58 575.477–59 689.991	7–5	4.00−04	3.45−02	7.13+01	−0.617	C+	1
251		$^3F^\circ-^3D$		*1 305.65 cm^{-1}*	*58 575.53–59 881.18*	21–15	3.23−04	2.03−02	1.07+02	−0.370	C+	1
				1 305.641 cm^{-1}	58 575.527–59 881.168	9–7	2.97−04	2.03−02	4.61+01	−0.738	C+	LS
				1 305.654 cm^{-1}	58 575.527–59 881.181	7–5	2.87−04	1.80−02	3.18+01	−0.900	C+	LS
				1 305.669 cm^{-1}	58 575.527–59 881.196	5–3	3.22−04	1.70−02	2.14+01	−1.071	C+	LS
				1 305.641 cm^{-1}	58 575.527–59 881.168	7–7	2.57−05	2.26−03	3.99+00	−1.801	D+	LS
				1 305.654 cm^{-1}	58 575.527–59 881.181	5–5	3.59−05	3.16−03	3.98+00	−1.801	D+	LS
				1 305.641 cm^{-1}	58 575.527–59 881.168	5–7	7.24−07	8.92−05	1.12−01	−3.351	E	LS
252	$3s6f-3s8g$	$^1F^\circ-^1G$		1 375.39 cm^{-1}	58 575.477–59 950.87	7–9	2.32−03	2.36−01	3.95+02	0.218	B	1
253		$^3F^\circ-^3G$				21–27						1
				1 375.34 cm^{-1}	58 575.527–59 950.87	9–11	2.32−03	2.25−01	4.85+02	0.306	B	LS
				1 375.34 cm^{-1}	58 575.527–59 950.87	7–9	2.18−03	2.22−01	3.72+02	0.191	B	LS
				1 375.34 cm^{-1}	58 575.527–59 950.87	9–9	1.45−04	1.15−02	2.48+01	−0.985	C+	LS
254	$3s6f-3s9d$	$^1F^\circ-^1D$		1 551.762 cm^{-1}	58 575.477–60 127.239	7–5	2.29−04	1.02−02	1.51+01	−1.146	C	1
255		$^3F^\circ-^3D$		*1 688.05 cm^{-1}*	*58 575.53–60 263.58*	21–15	1.96−04	7.36−03	3.01+01	−0.811	C	1
				1 688.056 cm^{-1}	58 575.527–60 263.583	9–7	1.80−04	7.36−03	1.29+01	−1.179	C	LS
				1 688.056 cm^{-1}	58 575.527–60 263.583	7–5	1.74−04	6.54−03	8.93+00	−1.339	C	LS
				1 688.056 cm^{-1}	58 575.527–60 263.583	5–3	1.96−04	6.18−03	6.03+00	−1.510	C	LS
				1 688.056 cm^{-1}	58 575.527–60 263.583	7–7	1.56−05	8.20−04	1.12+00	−2.241	D	LS
				1 688.056 cm^{-1}	58 575.527–60 263.583	5–5	2.19−05	1.15−03	1.12+00	−2.240	D	LS
				1 688.056 cm^{-1}	58 575.527–60 263.583	5–7	4.40−07	3.24−05	3.16−02	−3.790	E	LS
256	$3s6f-3s10d$	$^1F^\circ-^1D$		1 859.622 cm^{-1}	58 575.477–60 435.099	7–5	1.48−04	4.58−03	5.68+00	−1.494	C	1
257		$^3F^\circ-^3D$		*1 959.8 cm^{-1}*	*58 575.53–60 535.3*	21–15	1.31−04	3.64−03	1.28+01	−1.117	D+	1
				1 959.81 cm^{-1}	58 575.527–60 535.34	9–7	1.20−04	3.64−03	5.50+00	−1.485	C	LS
				1 959.81 cm^{-1}	58 575.527–60 535.34	7–5	1.16−04	3.23−03	3.80+00	−1.646	D+	LS
				1 959.81 cm^{-1}	58 575.527–60 535.34	5–3	1.31−04	3.06−03	2.57+00	−1.815	D+	LS
				1 959.81 cm^{-1}	58 575.527–60 535.34	7–7	1.04−05	4.06−04	4.77−01	−2.546	E+	LS
				1 959.81 cm^{-1}	58 575.527–60 535.34	5–5	1.46−05	5.68−04	4.77−01	−2.547	E+	LS
				1 959.81 cm^{-1}	58 575.527–60 535.34	5–7	2.93−07	1.60−05	1.34−02	−4.097	E	LS
258	$3s6g-3s7f$	$^3G-^3F^\circ$		*789.97 cm^{-1}*	*58 610.79–59 400.76*	27–21	1.76−04	3.29−02	3.70+02	−0.051	B	1

TABLE 40. Transition probabilities of allowed lines for Mg I (references for this table are as follows: 1=Butler *et al.*,[13] 2=Tachiev and Froese Fischer,[99] 3 =Ueda *et al.*,[114] 4=Chang, Tang[17], and 5=Weiss[123])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				789.968 cm^{-1}	58 610.795–59 400.763	11–9	1.67−04	3.29−02	1.51+02	−0.441	B	LS
				789.968 cm^{-1}	58 610.795–59 400.763	9–7	1.65−04	3.08−02	1.16+02	−0.557	B	LS
				789.968 cm^{-1}	58 610.795–59 400.763	7–5	1.76−04	3.02−02	8.81+01	−0.675	B	LS
				789.968 cm^{-1}	58 610.795–59 400.763	9–9	8.57−06	2.06−03	7.73+00	−1.732	C	LS
				789.968 cm^{-1}	58 610.795–59 400.763	7–7	1.10−05	2.65−03	7.73+00	−1.732	C	LS
				789.968 cm^{-1}	58 610.795–59 400.763	7–9	1.30−07	4.03−05	1.18−01	−3.550	E	LS
259		^{1}G$-^1$F$^\circ$		789.968 cm^{-1}	58 610.795–59 400.763	9–7	1.76−04	3.29−02	1.23+02	−0.529	B	1
260	$3s6g-3s8f$	^{3}G$-^3$F$^\circ$		*1 324.58* cm^{-1}	*58 610.79–59 935.37*	27–21	8.29−05	5.51−03	3.70+01	−0.827	C	1
				1 324.575 cm^{-1}	58 610.795–59 935.370	11–9	7.88−05	5.51−03	1.51+01	−1.217	C	LS
				1 324.575 cm^{-1}	58 610.795–59 935.370	9–7	7.76−05	5.16−03	1.15+01	−1.333	C	LS
				1 324.575 cm^{-1}	58 610.795–59 935.370	7–5	8.29−05	5.06−03	8.80+00	−1.451	C	LS
				1 324.575 cm^{-1}	58 610.795–59 935.370	9–9	4.03−06	3.44−04	7.69−01	−2.509	D	LS
				1 324.575 cm^{-1}	58 610.795–59 935.370	7–7	5.18−06	4.43−04	7.71−01	−2.508	D	LS
				1 324.575 cm^{-1}	58 610.795–59 935.370	7–9	6.13−08	6.74−06	1.17−02	−4.326	E	LS
261		^{1}G$-^1$F$^\circ$		1 324.575 cm^{-1}	58 610.795–59 935.370	9–7	8.25−05	5.48−03	1.23+01	−1.307	C	1
262	$3s6g-3s9f$	^{3}G$-^3$F$^\circ$		*1 690.49 cm*$^{-1}$	*58 610.79–60 301.28*	27–21	4.66−05	1.90−03	1.00+01	−1.290	D+	1
				1 690.488 cm^{-1}	58 610.795–60 301.283	11–9	4.43−03	1.90−03	4.07+00	−1.680	D+	LS
				1 690.488 cm^{-1}	58 610.795–60 301.283	9–7	4.36−05	1.78−03	3.12+00	−1.795	D+	LS
				1 690.488 cm^{-1}	58 610.795–60 301.283	7–5	4.67−05	1.75−03	2.39+00	−1.912	D+	LS
				1 690.488 cm^{-1}	58 610.795–60 301.283	9–9	2.27−06	1.19−04	2.09−01	−2.970	E+	LS
				1 690.488 cm^{-1}	58 610.795–60 301.283	7–7	2.92−06	1.53−04	2.09−01	−2.970	E+	LS
				1 690.488 cm^{-1}	58 610.795–60 301.283	7–9	3.45−08	2.33−06	3.18−03	−4.788	E	LS
263		^{1}G$-^1$F$^\circ$		1 690.488 cm^{-1}	58 610.795–60 301.283	9–7	4.66−05	1.90−03	3.33+00	−1.767	D+	1
264	$3s6g-3s10f$	^{3}G$-^3$F$^\circ$		*1 951.85 cm*$^{-1}$	*58 610.79–60 562.64*	27–21	2.94−05	8.99−04	4.09+00	−1.615	D	1
				1 951.842 cm^{-1}	58 610.795–60 562.637	11–9	2.79−05	8.99−04	1.67+00	−2.005	D	LS
				1 951.842 cm^{-1}	58 610.795–60 562.637	9–7	2.75−05	8.42−04	1.28+00	−2.120	D	LS
				1 951.842 cm^{-1}	58 610.795–60 562.637	7–5	2.94−05	8.25−04	9.74−01	−2.238	D	LS
				1 951.842 cm^{-1}	58 610.795–60 562.637	9–9	1.43−06	5.62−05	8.53−02	−3.296	E	LS
				1 951.842 cm^{-1}	58 610.795–60 562.637	7–7	1.84−06	7.23−05	8.54−02	−3.296	E	LS
				1 951.842 cm^{-1}	58 610.795–60 562.637	7–9	2.17−08	1.10−06	1.30−03	−5.114	E	LS
265		^{1}G$-^1$F$^\circ$		1 951.842 cm^{-1}	58 610.795–60 562.637	9–7	2.93−05	8.97−04	1.36+00	−2.093	D	1
266	$3s8s-3s8p$	^{3}S$-^3$P$^\circ$		*379.8 cm*$^{-1}$	*58 962.739–59 342.5*	3–9	9.89−04	3.08+00	8.02+03	0.966	B	1
				379.77 cm^{-1}	58 962.739–59 342.51	3–5	9.87−04	1.71+00	4.45+03	0.710	B	LS
				379.77 cm^{-1}	58 962.739–59 342.51	3–3	9.91−04	1.03+00	2.68+03	0.490	B	LS
				379.77 cm^{-1}	58 962.739–59 342.51	3–1	9.90−04	3.43−01	8.92+02	0.012	B	LS
267		^{1}S$-^1$P$^\circ$		349.66 cm^{-1}	59 053.52–59 403.18	1–3	8.37−04	3.08+00	2.90+03	0.489	B	1
268	$3s8s-3s9p$	^{3}S$-^3$P$^\circ$		*935.2 cm*$^{-1}$	58 962.739–*59 897.9*	3–9	2.41−04	1.24−01	1.31+02	−0.429	C+	1
				935.12 cm^{-1}	58 962.739–59 897.86	3–5	2.41−04	6.90−02	7.29+01	−0.684	C+	LS
				935.12 cm^{-1}	58 962.739–59 897.86	3–3	2.41−04	4.14−02	4.37+01	−0.906	C+	LS
				935.12 cm^{-1}	58 962.739–59 897.86	3–1	2.41−04	1.38−02	1.46+01	−1.383	C	LS
269		^{1}S$-^1$P$^\circ$		883.11 cm^{-1}	59 053.52–59 936.63	1–3	1.89−04	1.09−01	4.06+01	−0.963	C+	1
270	$3s8s-3s10p$	^{1}S$-^1$P$^\circ$		1 248.78 cm^{-1}	59 053.52–60 302.30	1–3	8.63−05	2.49−02	6.56+00	−1.604	C	1
271	$3s8s-3s11p$	^{1}S$-^1$P$^\circ$		1 509.83 cm^{-1}	59 053.52–60 563.35	1–3	4.86−05	9.58−03	2.09+00	−2.019	D+	1
272	$3s7d-3s8p$	^{1}D$-^1$P$^\circ$		362.16 cm^{-1}	59 041.019–59 403.18	5–3	1.05−03	7.21−01	3.28+03	0.557	B	1

TABLE 40. Transition probabilities of allowed lines for Mg I (references for this table are as follows: 1=Butler *et al.*,[13] 2=Tachiev and Froese Fischer,[99] 3 =Ueda *et al.*,[114] 4=Chang, Tang[17], and 5=Weiss[123])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})$^{\text{a}}$	$E_i - E_k$ (cm^{-1})	$g_i - g_k$	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
273	3s7d−3s7f	^{1}D−^{1}F$^\circ$		359.744 cm^{-1}	59 041.019–59 400.763	5–7	1.23−03	2.00+00	9.15+03	1.000	B	1
274	3s7d−3s9p	^{1}D−^{1}P$^\circ$		895.61 cm^{-1}	59 041.019–59 936.63	5–3	4.55−04	5.10−02	9.37+01	−0.593	B	1
275		^{3}D−^{3}P$^\circ$		*579.1 cm^{-1}*	*59 318.77–59 897.9*	15–9	2.48−04	6.66−02	5.68+02	−0.000	B	1
				579.10 cm^{-1}	59 318.764–59 897.86	7–5	2.09−04	6.66−02	2.65+02	−0.331	B	LS
				579.08 cm^{-1}	59 318.775–59 897.86	5–3	1.86−04	5.00−02	1.42+02	−0.602	B	LS
				579.07 cm^{-1}	59 318.793–59 897.86	3–1	2.48−04	3.70−02	6.31+01	−0.955	C+	LS
				579.08 cm^{-1}	59 318.775–59 897.86	5–5	3.74−05	1.67−02	4.75+01	−1.078	C+	LS
				579.07 cm^{-1}	59 318.793–59 897.86	3–3	6.22−05	2.78−02	4.74+01	−1.079	C+	LS
				579.07 cm^{-1}	59 318.793–59 897.86	3–5	2.48−06	1.85−03	3.16+00	−2.256	D+	LS
276	3s7d−3s8f	^{1}D−^{1}F$^\circ$		894.351 cm^{-1}	59 041.019–59 935.370	5–7	9.41−05	2.47−02	4.55+01	−0.908	C+	1
277		^{3}D−^{3}F$^\circ$		*616.60 cm^{-1}*	*59 318.77–59 935.37*	15–21	7.58−04	4.18−01	3.35+03	0.797	B	1
				616.606 cm^{-1}	59 318.764–59 935.370	7–9	7.57−04	3.84−01	1.44+03	0.429	B	LS
				616.595 cm^{-1}	59 318.775–59 935.370	5–7	6.74−04	3.72−01	9.93+02	0.270	B	LS
				616.577 cm^{-1}	59 318.793–59 935.370	3–5	6.36−04	4.18−01	6.70+02	0.098	B	LS
				616.606 cm^{-1}	59 318.764–59 935.370	7–7	8.45−05	3.33−02	1.24+02	−0.632	B	LS
				616.595 cm^{-1}	59 318.775–59 935.370	5–5	1.18−04	4.66−02	1.24+02	−0.633	B	LS
				616.606 cm^{-1}	59 318.764–59 935.370	7–5	3.33−06	9.39−04	3.51+00	−2.182	D+	LS
278	3s7d−3s9f	^{1}D−^{1}F$^\circ$		1 260.264 cm^{-1}	59 041.019–60 301.283	5–7	9.76−06	1.29−03	1.68+00	−2.190	D	1
279		^{3}D−^{3}F$^\circ$		*982.51 cm^{-1}*	*59 318.77–60 301.28*	15–21	6.42−04	1.40−01	7.02+02	0.322	B	1
				982.519 cm^{-1}	59 318.764–60 301.283	7–9	6.41−04	1.28−01	3.00+02	−0.048	B	LS
				982.508 cm^{-1}	59 318.775–60 301.283	5–7	5.70−04	1.24−01	2.08+02	−0.208	B	LS
				982.490 cm^{-1}	59 318.793–60 301.283	3–5	5.41−04	1.40−01	1.41+02	−0.377	B	LS
				982.519 cm^{-1}	59 318.764–60 301.283	7–7	7.15−05	1.11−02	2.60+01	−1.110	C+	LS
				982.508 cm^{-1}	59 318.775–60 301.283	5–5	1.00−04	1.56−02	2.61+01	−1.108	C+	LS
				982.519 cm^{-1}	59 318.764–60 301.283	7–5	2.82−06	3.13−04	7.34−01	−2.659	D	LS
280	3s7d−3s10p	^{1}D−^{1}P$^\circ$		1 261.28 cm^{-1}	59 041.019–60 302.30	5–3	2.81−04	1.59−02	2.08+01	−1.100	C	1
281	3s7d−3s10f	^{3}D−^{3}F$^\circ$		*1 243.87 cm^{-1}*	*59 318.77–60 562.64*	15–21	4.97−04	6.75−02	2.68+02	0.005	C+	1
				1 243.873 cm^{-1}	59 318.764–60 562.637	7–9	4.98−04	6.20−02	1.15+02	−0.363	B	LS
				1 243.862 cm^{-1}	59 318.775–60 562.637	5–7	4.42−04	5.99−02	7.93+01	−0.524	C+	LS
				1 243.844 cm^{-1}	59 318.793–60 562.637	3–5	4.18−04	6.75−02	5.36+01	−0.694	C+	LS
				1 243.873 cm^{-1}	59 318.764–60 562.637	7–7	5.54−05	5.37−03	9.95+00	−1.425	C	LS
				1 243.862 cm^{-1}	59 318.775–60 562.637	5–5	7.76−05	7.52−03	9.95+00	−1.425	C	LS
				1 243.873 cm^{-1}	59 318.764–60 562.637	7–5	2.18−06	1.51−04	2.80−01	−2.976	E+	LS
282	3s7d−3s11p	^{1}D−^{1}P$^\circ$		1 522.33 cm^{-1}	59 041.019–60 563.35	5–3	1.91−04	7.43−03	8.03+00	−1.430	C	1
283	3s8p−3s9s	^{3}P$^\circ$−^{3}S		*306.7 cm^{-1}*	*59 342.5–59 649.15*	9–3	1.54−03	8.16−01	7.88+03	0.866	B	1
				306.64 cm^{-1}	59 342.51–59 649.15	5–3	8.53−04	8.16−01	4.38+03	0.611	B	LS
				306.64 cm^{-1}	59 342.51–59 649.15	3–3	5.12−04	8.16−01	2.63+03	0.389	B	LS
				306.64 cm^{-1}	59 342.51–59 649.15	1–3	1.71−04	8.16−01	8.76+02	−0.088	B	LS
284		^{1}P$^\circ$−^{1}S		303.93 cm^{-1}	59 403.18–59 707.11	3–1	1.53−03	8.30−01	2.70+03	0.396	B	1
285	3s8p−3s8d	^{3}P$^\circ$−^{3}D		*538.7 cm^{-1}*	*59 342.5–59 881.18*	9–15	9.08−04	7.82−01	4.30+03	0.847	B	1
				538.66 cm^{-1}	59 342.51–59 881.168	5–7	9.08−04	6.57−01	2.01+03	0.517	B	LS
				538.67 cm^{-1}	59 342.51–59 881.181	3–5	6.81−04	5.86−01	1.07+03	0.245	B	LS
				538.69 cm^{-1}	59 342.51–59 881.196	1–3	5.05−04	7.82−01	4.78+02	−0.107	B	LS
				538.67 cm^{-1}	59 342.51–59 881.181	5–5	2.26−04	1.17−01	3.58+02	−0.233	B	LS
				538.69 cm^{-1}	59 342.51–59 881.196	3–3	3.77−04	1.95−01	3.58+02	−0.233	B	LS

TABLE 40. Transition probabilities of allowed lines for Mg I (references for this table are as follows: 1=Butler *et al.*,[13] 2=Tachiev and Froese Fischer,[99] 3 =Ueda *et al.*,[114] 4=Chang, Tang[17], and 5=Weiss[123])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				538.69 cm^{-1}	59 342.51–59 881.196	5–3	2.52−05	7.82−03	2.39+01	−1.408	C+	LS
286		^{1}P$^\circ-^1$D		286.81 cm^{-1}	59 403.18–59 689.991	3–5	7.70−04	2.34+00	8.06+03	0.846	B	1
287	$3s8p-3s10s$	^{3}P$^\circ-^3$S		*761.5 cm*$^{-1}$	*59 342.5–60 104.00*	9–3	6.30−04	5.43−02	2.11+02	−0.311	C+	1
				761.49 cm^{-1}	59 342.51–60 104.00	5–3	3.50−04	5.43−02	1.17+02	−0.566	B	LS
				761.49 cm^{-1}	59 342.51–60 104.00	3–3	2.10−04	5.43−02	7.04+01	−0.788	C+	LS
				761.49 cm^{-1}	59 342.51–60 104.00	1–3	7.00−05	5.43−02	2.35+01	−1.265	C+	LS
288		^{1}P$^\circ-^1$S		740.05 cm^{-1}	59 403.18–60 143.23	3–1	6.26−04	5.71−02	7.62+01	−0.766	C+	1
289	$3s8p-3s9d$	^{3}P$^\circ-^3$D		*921.1 cm*$^{-1}$	*59 342.5–60 263.58*	9–15	6.43−04	1.89−01	6.09+02	0.231	B	1
				921.07 cm^{-1}	59 342.51–60 263.583	5–7	6.43−04	1.59−01	2.84+02	−0.100	B	LS
				921.07 cm^{-1}	59 342.51–60 263.583	3–5	4.82−04	1.42−01	1.52+02	−0.371	B	LS
				921.07 cm^{-1}	59 342.51–60 263.583	1–3	3.57−04	1.89−01	6.76+01	−0.724	C+	LS
				921.07 cm^{-1}	59 342.51–60 263.583	5–5	1.61−04	2.84−02	5.08+01	−0.848	C+	LS
				921.07 cm^{-1}	59 342.51–60 263.583	3–3	2.68−04	4.73−02	5.07+01	−0.848	C+	LS
				921.07 cm^{-1}	59 342.51–60 263.583	5–3	1.78−05	1.89−03	3.38+00	−2.025	D+	LS
290		^{1}P$^\circ-^1$D		724.06 cm^{-1}	59 403.18–60 127.239	3–5	9.92−05	4.73−02	6.45+01	−0.848	C+	1
291	$3s8p-3s11s$	^{3}P$^\circ-^3$S		*1 078.4 cm*$^{-1}$	*59 342.5–60 420.87*	9–3	3.89−04	1.67−02	4.59+01	−0.823	C	1
				1 078.36 cm^{-1}	59 342.51–60 420.87	5–3	2.16−04	1.67−02	2.55+01	−1.078	C+	LS
				1 078.36 cm^{-1}	59 342.51–60 420.87	3–3	1.30−04	1.67−02	1.53+01	−1.300	C	LS
				1 078.36 cm^{-1}	59 342.51–60 420.87	1–3	4.32−05	1.67−02	5.10+00	−1.777	C	LS
292	$3s8p-3s10d$	^{3}P$^\circ-^3$D		*1 192.8 cm*$^{-1}$	*59 342.5–60 535.3*	9–15	4.61−04	8.09−02	2.01+02	−0.138	C+	1
				1 192.83 cm^{-1}	59 342.51–60 535.34	5–7	4.61−04	6.80−02	9.38+01	−0.469	B	LS
				1 192.83 cm^{-1}	59 342.51–60 535.34	3–5	3.46−04	6.07−02	5.03+01	−0.740	C+	LS
				1 192.83 cm^{-1}	59 342.51–60 535.34	1–3	2.56−04	8.09−02	2.23+01	−1.092	C+	LS
				1 192.83 cm^{-1}	59 342.51–60 535.34	5–5	1.15−04	1.21−02	1.67+01	−1.218	C	LS
				1 192.83 cm^{-1}	59 342.51–60 535.34	3–3	1.92−04	2.02−02	1.67+01	−1.218	C	LS
				1 192.83 cm^{-1}	59 342.51–60 535.34	5–3	1.28−05	8.09−04	1.12+00	−2.393	D	LS
293		^{1}P$^\circ-^1$D		1 031.92 cm^{-1}	59 403.18–60 435.099	3–5	2.54−05	5.96−03	5.70+00	−1.748	C	1
294	$3s7f-3s8d$	^{1}F$^\circ-^1$D		289.228 cm^{-1}	59 400.763–59 689.991	7–5	5.53−04	7.08−01	5.64+03	0.695	B	1
295		^{3}F$^\circ-^3$D		*480.42 cm*$^{-1}$	*59 400.76–59 881.18*	21–15	3.64−04	1.69−01	2.43+03	0.550	B	1
				480.405 cm^{-1}	59 400.763–59 881.168	9–7	3.34−04	1.69−01	1.04+03	0.182	B	LS
				480.418 cm^{-1}	59 400.763–59 881.181	7–5	3.23−04	1.50−01	7.20+02	0.021	B	LS
				480.433 cm^{-1}	59 400.763–59 881.196	5–3	3.64−04	1.42−01	4.87+02	−0.149	B	LS
				480.405 cm^{-1}	59 400.763–59 881.168	7–7	2.89−05	1.88−02	9.02+01	−0.881	B	LS
				480.418 cm^{-1}	59 400.763–59 881.181	5–5	4.06−05	2.64−02	9.05+01	−0.879	B	LS
				480.405 cm^{-1}	59 400.763–59 881.168	5–7	8.18−07	7.44−04	2.55+00	−2.429	D+	LS
296	$3s7f-3s8g$	^{3}F$^\circ-^3$G				21–27						1
				550.11 cm^{-1}	59 400.763–59 950.87	9–11	1.41−03	8.55−01	4.61+03	0.886	B	LS
				550.11 cm^{-1}	59 400.763–59 950.87	7–9	1.32−03	8.42−01	3.53+03	0.770	B	LS
				550.11 cm^{-1}	59 400.763–59 950.87	9–9	8.82−05	4.37−02	2.35+02	−0.405	B	LS
297		^{1}F$^\circ-^1$G		550.11 cm^{-1}	59 400.763–59 950.87	7–9	1.41−03	9.01−01	3.77+03	0.800	B	1
298	$3s7f-3s9d$	^{1}F$^\circ-^1$D		726.476 cm^{-1}	59 400.763–60 127.239	7–5	2.18−04	4.43−02	1.41+02	−0.508	B	1
299		^{3}F$^\circ-^3$D		*862.82 cm*$^{-1}$	*59 400.76–60 263.58*	21–15	2.05−04	2.95−02	2.37+02	−0.208	C+	1
				862.820 cm^{-1}	59 400.763–60 263.583	9–7	1.88−04	2.95−02	1.01+02	−0.576	B	LS

TABLE 40. Transition probabilities of allowed lines for Mg I (references for this table are as follows: 1=Butler *et al.*,[13] 2=Tachiev and Froese Fischer,[99] 3 =Ueda *et al.*,[114] 4=Chang, Tang[17], and 5=Weiss[123])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	$E_i - E_k$ (cm^{-1})	$g_i - g_k$	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				862.820 cm^{-1}	59 400.763–60 263.583	7–5	1.83−04	2.63−02	7.02+01	−0.735	C+	LS
				862.820 cm^{-1}	59 400.763–60 263.583	5–3	2.05−04	2.48−02	4.73+01	−0.907	C+	LS
				862.820 cm^{-1}	59 400.763–60 263.583	7–7	1.63−03	3.29−03	8.79+00	−1.638	C	LS
				862.820 cm^{-1}	59 400.763–60 263.583	5–5	2.29−05	4.61−03	8.79+00	−1.637	C	LS
				862.820 cm^{-1}	59 400.763–60 263.583	5–7	4.61−07	1.30−04	2.48−01	−3.187	E+	LS
300	$3s7f-3s10d$	^{1}F$^\circ$–^{1}D		1 034.336 cm^{-1}	59 400.763–60 435.099	7–5	1.30−04	1.30−02	2.90+01	−1.041	C+	1
301		^{3}F$^\circ$–^{3}D		*1 134.5 cm^{-1}*	*59 400.76–60 535.3*	21–15	1.31−04	1.09−02	6.64+01	−0.640	C	1
				1 134.58 cm^{-1}	59 400.763–60 535.34	9–7	1.20−04	1.09−02	2.85+01	−1.008	C+	LS
				1 134.58 cm^{-1}	59 400.763–60 535.34	7–5	1.16−04	9.67−03	1.96+01	−1.169	C	LS
				1 134.58 cm^{-1}	59 400.763–60 535.34	5–3	1.31−04	9.15−03	1.33+01	−1.340	C	LS
				1 134.58 cm^{-1}	59 400.763–60 535.34	7–7	1.04−05	1.21−03	2.46+00	−2.072	D+	LS
				1 134.58 cm^{-1}	59 400.763–60 535.34	5–5	1.46−05	1.70−03	2.47+00	−2.071	D+	LS
				1 134.58 cm^{-1}	59 400.763–60 535.34	5–7	2.94−07	4.79−05	6.95−02	−3.621	E	LS
302	$3s7g-3s8f$	^{3}G–^{3}F$^\circ$		*511.83 cm^{-1}*	*59 423.54–59 935.37*	27–21	1.30−04	5.78−02	1.00+03	0.193	B	1
				511.833 cm^{-1}	59 423.537–59 935.370	11–9	1.23−04	5.78−02	4.09+02	−0.197	B	LS
				511.833 cm^{-1}	59 423.537–59 935.370	9–7	1.22−04	5.42−02	3.14+02	−0.312	B	LS
				511.833 cm^{-1}	59 423.537–59 935.370	7–5	1.30−04	5.31−02	2.39+02	−0.430	B	LS
				511.833 cm^{-1}	59 423.537–59 935.370	9–9	6.33−06	3.62−03	2.10+01	−1.487	C	LS
				511.833 cm^{-1}	59 423.537–59 935.370	7–7	8.13−06	4.65−03	2.09+01	−1.487	C	LS
				511.833 cm^{-1}	59 423.537–59 935.370	7–9	9.62−08	7.08−05	3.19−01	−3.305	E+	LS
303		^{1}G–^{1}F$^\circ$		511.833 cm^{-1}	59 423.537–59 935.370	9–7	1.29−04	5.75−02	3.33+02	−0.286	B	1
304	$3s7g-3s9f$	^{3}G–^{3}F$^\circ$		*877.74 cm^{-1}*	*59 423.54–60 301.28*	27–21	6.66−05	1.01−02	1.02+02	−0.564	C+	1
				877.746 cm^{-1}	59 423.537–60 301.283	11–9	6.34−05	1.01−02	4.17+01	−0.954	C+	LS
				877.746 cm^{-1}	59 423.537–60 301.283	9–7	6.24−05	9.44−03	3.19+01	−1.071	C+	LS
				877.746 cm^{-1}	59 423.537–60 301.283	7–5	6.66−05	9.26−03	2.43+01	−1.188	C+	LS
				877.746 cm^{-1}	59 423.537–60 301.283	9–9	3.24−06	6.30−04	2.13+00	−2.246	D+	LS
				877.746 cm^{-1}	59 423.537–60 301.283	7–7	4.16−06	8.10−04	2.13+00	−2.246	D+	LS
				877.746 cm^{-1}	59 423.537–60 301.283	7–9	4.92−08	1.23−05	3.23−02	−4.065	E	LS
305		^{1}G–^{1}F$^\circ$		877.746 cm^{-1}	59 423.537–60 301.283	9–7	6.67−05	1.01−02	3.41+01	−1.041	C+	1
306	$3s7g-3s10f$	^{3}G–^{3}F$^\circ$		*1 139.10 cm^{-1}*	*59 423.54–60 562.64*	27–21	3.98−05	3.58−03	2.79+01	−1.015	C	1
				1 139.100 cm^{-1}	59 423.537–60 562.637	11–9	3.79−05	3.58−03	1.14+01	−1.405	C	LS
				1 139.100 cm^{-1}	59 423.537–60 562.637	9–7	3.73−05	3.35−03	8.71+00	−1.521	C	LS
				1 139.100 cm^{-1}	59 423.537–60 562.637	7–5	3.99−05	3.29−03	6.66+00	−1.638	C	LS
				1 139.100 cm^{-1}	59 423.537–60 562.637	9–9	1.94−06	2.24−04	5.83−01	−2.696	D	LS
				1 139.100 cm^{-1}	59 423.537–60 562.637	7–7	2.49−06	2.88−04	5.83−01	−2.696	D	LS
				1 139.100 cm^{-1}	59 423.537–60 562.637	7–9	2.96−08	4.39−06	8.88−03	−4.512	E	LS
307		^{1}G–^{1}F$^\circ$		1 139.100 cm^{-1}	59 423.537–60 562.637	9–7	3.97−05	3.57−03	9.29+00	−1.493	C	1
308	$3s9s-3s9p$	^{3}S–^{3}P$^\circ$		*248.8 cm^{-1}*	59 649.15–*59 897.9*	3–9	4.86−04	3.53+00	1.40+04	1.025	B	1
				248.71 cm^{-1}	59 649.15–59 897.86	3–5	4.85−04	1.96+00	7.78+03	0.769	B	LS
				248.71 cm^{-1}	59 649.15–59 897.86	3–3	4.87−04	1.18+00	4.69+03	0.549	B	LS
				248.71 cm^{-1}	59 649.15–59 897.86	3–1	4.85−04	3.92−01	1.56+03	0.070	B	LS
309		^{1}S–^{1}P$^\circ$		229.52 cm^{-1}	59 707.11–59 936.63	1–3	4.11−04	3.51+00	5.03+03	0.545	B	1
310	$3s9s-3s10p$	^{1}S–^{1}P$^\circ$		595.19 cm^{-1}	59 707.11–60 302.30	1–3	1.00−04	1.27−01	7.02+01	−0.896	C+	1
311	$3s9s-3s11p$	^{1}S–^{1}P$^\circ$		856.24 cm^{-1}	59 707.11–60 563.35	1–3	4.78−05	2.93−02	1.13+01	−1.533	C	1
312	$3s8d-3s9p$	^{1}D–^{1}P$^\circ$		246.64 cm^{-1}	59 689.991–59 936.63	5–3	5.92−04	8.76−01	5.85+03	0.641	B	1

TABLE 40. Transition probabilities of allowed lines for Mg I (references for this table are as follows: 1=Butler *et al.*,[13] 2=Tachiev and Froese Fischer,[99] 3 =Ueda *et al.*,[114] 4=Chang, Tang[17], and 5=Weiss[123])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
313	$3s8d-3s8f$	$^1\mathrm{D}-^1\mathrm{F}^\circ$		245.379 cm^{-1}	59 689.991–59 935.370	5–7	6.63−04	2.31+00	1.55+04	1.063	B+	1
314	$3s8d-3s9f$	$^1\mathrm{D}-^1\mathrm{F}^\circ$		611.292 cm^{-1}	59 689.991–60 301.283	5–7	9.03−05	5.07−02	1.37+02	−0.596	B	1
315		$^3\mathrm{D}-^3\mathrm{F}^\circ$		*420.10 cm^{-1}*	*59 881.18–60 301.28*	15–21	3.42−04	4.06−01	4.77+03	0.785	B	1
				420.115 cm^{-1}	59 881.168–60 301.283	7–9	3.42−04	3.73−01	2.05+03	0.417	B	LS
				420.102 cm^{-1}	59 881.181–60 301.283	5–7	3.04−04	3.61−01	1.41+03	0.256	B	LS
				420.087 cm^{-1}	59 881.196–60 301.283	3–5	2.87−04	4.06−01	9.55+02	0.086	B	LS
				420.115 cm^{-1}	59 881.168–60 301.283	7–7	3.80−05	3.23−02	1.77+02	−0.646	B	LS
				420.102 cm^{-1}	59 881.181–60 301.283	5–5	5.32−05	4.52−02	1.77+02	−0.646	B	LS
				420.115 cm^{-1}	59 881.168–60 301.283	7–5	1.50−06	9.11−04	5.00+00	−2.195	C	LS
316	$3s8d-3s10p$	$^1\mathrm{D}-^1\mathrm{P}^\circ$		612.31 cm^{-1}	59 689.991–60 302.30	5–3	2.66−04	6.37−02	1.71+02	−0.497	B	1
317	$3s8d-3s10f$	$^1\mathrm{D}-^1\mathrm{F}^\circ$		872.646 cm^{-1}	59 689.991–60 562.637	5–7	2.33−05	6.43−03	1.21+01	−1.493	C	1
318		$^3\mathrm{D}-^3\mathrm{F}^\circ$		*681.46 cm^{-1}*	*59 881.18–60 562.64*	15–21	3.04−04	1.37−01	9.94+02	0.313	B	1
				681.469 cm^{-1}	59 881.168–60 562.637	7–9	3.04−04	1.26−01	4.26+02	−0.055	B	LS
				681.456 cm^{-1}	59 881.181–60 562.637	5–7	2.70−04	1.22−01	2.95+02	−0.215	B	LS
				681.441 cm^{-1}	59 881.196–60 562.637	3–5	2.55−04	1.37−01	1.99+02	−0.386	B	LS
				681.469 cm^{-1}	59 881.168–60 562.637	7–7	3.38−05	1.09−02	3.69+01	−1.117	C+	LS
				681.456 cm^{-1}	59 881.181–60 562.637	5–5	4.74−05	1.53−02	3.70+01	−1.116	C+	LS
				681.469 cm^{-1}	59 881.168–60 562.637	7–5	1.34−06	3.08−04	1.04+00	−2.666	D	LS
319	$3s8d-3s11p$	$^1\mathrm{D}-^1\mathrm{P}^\circ$		873.36 cm^{-1}	59 689.991–60 563.35	5–3	1.69−04	1.99−02	3.75+01	−1.002	C+	1
320	$3s9p-3s10s$	$^3\mathrm{P}^\circ-^3\mathrm{S}$		*206.1 cm^{-1}*	*59 897.9*–60 104.00	9–3	8.07−04	9.49−01	1.36+04	0.932	B	1
				206.14 cm^{-1}	59 897.86–60 104.00	5–3	4.48−04	9.49−01	7.58+03	0.676	B	LS
				206.14 cm^{-1}	59 897.86–60 104.00	3–3	2.69−04	9.49−01	4.55+03	0.454	B	LS
				206.14 cm^{-1}	59 897.86–60 104.00	1–3	8.97−05	9.49−01	1.52+03	−0.023	B	LS
321		$^1\mathrm{P}^\circ-^1\mathrm{S}$		206.60 cm^{-1}	59 936.63–60 143.23	3–1	8.21−04	9.61−01	4.59+03	0.460	B	1
322	$3s9p-3s9d$	$^3\mathrm{P}^\circ-^3\mathrm{D}$		*365.7 cm^{-1}*	*59 897.9–60 263.58*	9–15	4.47−04	8.35−01	6.76+03	0.876	B	1
				365.72 cm^{-1}	59 897.86–60 263.583	5–7	4.47−04	7.01−01	3.16+03	0.545	B	LS
				365.72 cm^{-1}	59 897.86–60 263.583	3–5	3.35−04	6.26−01	1.69+03	0.274	B	LS
				365.72 cm^{-1}	59 897.86–60 263.583	1–3	2.48−04	8.35−01	7.52+02	−0.078	B	LS
				365.72 cm^{-1}	59 897.86–60 263.583	5–5	1.12−04	1.25−01	5.63+02	−0.204	B	LS
				365.72 cm^{-1}	59 897.86–60 263.583	3–3	1.86−04	2.09−01	5.64+02	−0.203	B	LS
				365.72 cm^{-1}	59 897.86–60 263.583	5–3	1.24−05	8.35−03	3.76+01	−1.379	C+	LS
323		$^1\mathrm{P}^\circ-^1\mathrm{D}$		190.61 cm^{-1}	59 936.63–60 127.239	3–5	3.82−04	2.63+00	1.36+04	0.897	B	1
324	$3s9p-3s11s$	$^3\mathrm{P}^\circ-^3\mathrm{S}$		*523.0 cm^{-1}*	*59 897.9*–60 420.87	9–3	3.38−04	6.18−02	3.50+02	−0.255	B	1
				523.01 cm^{-1}	59 897.86–60 420.87	5–3	1.88−04	6.18−02	1.95+02	−0.510	B	LS
				523.01 cm^{-1}	59 897.86–60 420.87	3–3	1.13−04	6.18−02	1.17+02	−0.732	B	LS
				523.01 cm^{-1}	59 897.86–60 420.87	1–3	3.76−05	6.18−02	3.89+01	−1.209	C+	LS
325	$3s9p-3s10d$	$^3\mathrm{P}^\circ-^3D$		*637.4 cm^{-1}*	*59 897.9–60 535.3*	9–15	3.27−04	2.01−01	9.35+02	0.257	B	1
				637.48 cm^{-1}	59 897.86–60 535.34	5–7	3.27−04	1.69−01	4.36+02	−0.073	B	LS
				637.48 cm^{-1}	59 897.86–60 535.34	3–5	2.46−04	1.51−01	2.34+02	−0.344	B	LS
				637.48 cm^{-1}	59 897.86–60 535.34	1–3	1.82−04	2.01−01	1.04+02	−0.697	B	LS
				637.48 cm^{-1}	59 897.86–60 535.34	5–5	8.19−05	3.02−02	7.80+01	−0.821	C+	LS
				637.48 cm^{-1}	59 897.86–60 535.34	3–3	1.36−04	5.03−02	7.79+01	−0.821	C+	LS
				637.48 cm^{-1}	59 897.86–60 535.34	5–3	9.08−06	2.01−03	5.19+00	−1.998	C	LS
326		$^1\mathrm{P}^\circ-^1\mathrm{D}$		498.47 cm^{-1}	59 936.63–60 435.099	3–5	5.66−05	5.69−02	1.13+02	−0.768	B	1
327	$3s8f-3s9d$	$^1\mathrm{F}^\circ-^1\mathrm{D}$		191.869 cm^{-1}	59 935.370–60 127.239	7–5	3.10−04	9.01−01	1.08+04	0.800	B	1

TABLE 40. Transition probabilities of allowed lines for Mg I (references for this table are as follows: 1=Butler *et al.*,[13] 2=Tachiev and Froese Fischer,[99] 3=Ueda *et al.*,[114] 4=Chang, Tang[17], and 5=Weiss[123])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
328		$^3F^\circ-^3D$		*328.21 cm^{-1}*	*59 935.37–60 263.58*	21–15	2.24−04	2.22−01	4.69+03	0.669	B	1
				328.213 cm^{-1}	59 935.370–60 263.583	9–7	2.05−04	2.22−01	2.00+03	0.301	B	LS
				328.213 cm^{-1}	59 935.370–60 263.583	7–5	1.99−04	1.98−01	1.39+03	0.142	B	LS
				328.213 cm^{-1}	59 935.370–60 263.583	5–3	2.24−04	1.87−01	9.38+02	−0.029	B	LS
				328.213 cm^{-1}	59 935.370–60 263.583	7–7	1.78−05	2.48−02	1.74+02	−0.760	B	LS
				328.213 cm^{-1}	59 935.370–60 263.583	5–5	2.49−05	3.47−02	1.74+02	−0.761	B	LS
				328.213 cm^{-1}	59 935.370–60 263.583	5–7	5.02−07	9.78−04	4.90+00	−2.311	C	LS
329	$3s8f-3s10d$	$^1F^\circ-^1D$		499.729 cm^{-1}	59 935.370–60 435.099	7–5	1.24−04	5.31−02	2.45+02	−0.430	B	1
330		$^3F^\circ-^3D$		*599.9 cm^{-1}*	*59 935.37–60 535.3*	21–15	1.32−04	3.94−02	4.54+02	−0.082	B	1
				599.97 cm^{-1}	59 935.370–60 535.34	9–7	1.22−04	3.94−02	1.95+02	−0.450	B	LS
				599.97 cm^{-1}	59 935.370–60 535.34	7–5	1.18−04	3.50−02	1.34+02	−0.611	B	LS
				599.97 cm^{-1}	59 935.370–60 535.34	5–3	1.32−04	3.31−02	9.08+01	−0.781	B	LS
				599.97 cm^{-1}	59 935.370–60 535.34	7–7	1.05−05	4.39−03	1.69+01	−1.512	C	LS
				599.97 cm^{-1}	59 935.370–60 535.34	5–5	1.47−05	6.14−03	1.68+01	−1.513	C	LS
				599.97 cm^{-1}	59 935.370–60 535.34	5–7	2.97−07	1.73−04	4.75−01	−3.063	E+	LS
331	$3s8g-3s9f$	$^3G-^3F^\circ$				27–21						1
				350.41 cm^{-1}	59 950.87–60 301.283	11–9	8.59−05	8.58−02	8.87+02	−0.025	B	LS
				350.41 cm^{-1}	59 950.87–60 301.283	9–7	8.46−05	8.03−02	6.79+02	−0.141	B	LS
				350.41 cm^{-1}	59 950.87–60 301.283	9–9	4.40−06	5.37−03	4.54+01	−1.316	C+	LS
332		$^1G-^1F^\circ$		350.41 cm^{-1}	59 950.87–60 301.283	9–7	9.01−05	8.56−02	7.24+02	−0.113	B	1
333	$3s8g-3s10f$	$^3G-^3F^\circ$				27–21						1
				611.77 cm^{-1}	59 950.87–60 562.637	11–9	4.76−05	1.56−02	9.23+01	−0.765	B	LS
				611.77 cm^{-1}	59 950.87–60 562.637	9–7	4.69−05	1.46−02	7.07+01	−0.881	C+	LS
				611.77 cm^{-1}	59 950.87–60 562.637	9–9	2.43−06	9.74−04	4.72+00	−2.057	C	LS
334		$^1G-^1F^\circ$		611.77 cm^{-1}	59 950.87–60 562.637	9–7	4.97−05	1.55−02	7.51+01	−0.855	C+	1
335	$3s10s-3s10p$	$^1S-^1P^\circ$		159.07 cm^{-1}	60 143.23–60 302.30	1–3	2.22−04	3.94+00	8.15+03	0.595	B	1
336	$3s10s-3s11p$	$^1S-^1P^\circ$		420.12 cm^{-1}	60 143.23–60 563.35	1–3	5.61−05	1.43−01	1.12+02	−0.845	B	1
337	$3s9d-3s9f$	$^1D-^1F^\circ$		174.044 cm^{-1}	60 127.239–60 301.283	5–7	3.74−04	2.59+00	2.45+04	1.112	B+	1
338	$3s9d-3s10p$	$^1D-^1P^\circ$		175.06 cm^{-1}	60 127.239–60 302.30	5–3	3.51−04	1.03+00	9.68+03	0.712	B	1
339	$3s9d-3s10f$	$^1D-^1F^\circ$		435.398 cm^{-1}	60 127.239–60 562.637	5–7	6.96−05	7.71−02	2.91+02	−0.414	B	1
340		$^3D-^3F^\circ$		*299.06 cm^{-1}*	60 263.58–60 562.64	15–21	1.71−04	4.01−01	6.62+03	0.779	B	1
				299.054 cm^{-1}	60 263.583–60 562.637	7–9	1.71−04	3.68−01	2.84+03	0.411	B	LS
				299.054 cm^{-1}	60 263.583–60 562.637	5–7	1.52−04	3.56−01	1.96+03	0.250	B	LS
				299.054 cm^{-1}	60 263.583–60 562.637	3–5	1.44−04	4.01−01	1.32+03	0.080	B	LS
				299.054 cm^{-1}	60 263.583–60 562.637	7–7	1.90−05	3.19−02	2.46+02	−0.651	B	LS
				299.054 cm^{-1}	60 263.583–60 562.637	5–5	2.67−05	4.47−02	2.46+02	−0.651	B	LS
				299.054 cm^{-1}	60 263.583–60 562.637	7–5	7.52−07	9.01−04	6.94+00	−2.200	C	LS
341	$3s9d-3s11p$	$^1D-^1P^\circ$		436.11 cm^{-1}	60 127.239–60 563.35	5–3	1.62−04	7.64−02	2.88+02	−0.418	B	1
342	$3s9f-3s10d$	$^1F^\circ-^1D$		133.816 cm^{-1}	60 301.283–60 435.099	7–5	1.82−04	1.09+00	1.88+04	0.883	B+	1
343		$^3F^\circ-^3D$		*234.0 cm^{-1}*	*60 301.28–60 535.3*	21–15	1.42−04	2.77−01	8.18+03	0.765	B	1
				234.06 cm^{-1}	60 301.283–60 535.34	9–7	1.30−04	2.77−01	3.51+03	0.397	B	LS
				234.06 cm^{-1}	60 301.283–60 535.34	7–5	1.26−04	2.46−01	2.42+03	0.236	B	LS
				234.06 cm^{-1}	60 301.283–60 535.34	5–3	1.42−04	2.33−01	1.64+03	0.066	B	LS

TABLE 40. Transition probabilities of allowed lines for Mg I (references for this table are as follows: 1=Butler *et al.*,[13] 2=Tachiev and Froese Fischer,[99] 3 =Ueda *et al.*,[114] 4=Chang, Tang[17], and 5=Weiss[123])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	$E_i - E_k$ (cm^{-1})	$g_i - g_k$	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				234.06 cm^{-1}	60 301.283–60 535.34	7–7	1.13−05	3.09−02	3.04+02	−0.665	B	LS
				234.06 cm^{-1}	60 301.283–60 535.34	5–5	1.58−05	4.33−02	3.05+02	−0.665	B	LS
				234.06 cm^{-1}	60 301.283–60 535.34	5–7	3.18−07	1.22−03	8.58+00	−2.215	C	LS
344	$3s10p-3s10d$	$^1P^\circ-^1D$		132.80 cm^{-1}	60 302.30–60 435.099	3–5	2.05−04	2.91+00	2.16+04	0.941	B+	1
345	$3s10d-3s10f$	$^1D-^1F^\circ$		127.538 cm^{-1}	60 435.099–60 562.637	5–7	2.22−04	2.86+00	3.69+04	1.155	B+	1
346	$3s10d-3s11p$	$^1D-^1P^\circ$		128.25 cm^{-1}	60 435.099–60 563.35	5–3	2.18−04	1.19+00	1.53+04	0.775	B+	1

[a]Wavelengths (Å) are always given unless cm^{-1} is indicated.

11.1.3. Forbidden Transitions for Mg I

Wherever available we have used the data of Tachiev and Froese Fischer,[95] which result from extensive MCHF calculations with Breit-Pauli corrections to order α^2. The calculations only extend to transitions from energy levels up to the $3s4p$. Godefroid *et al.*[42] calculated the $3s^2\ ^1S$-$3s3d\ ^1D$ E2 transition using a somewhat different MCHF procedure, with better than 2% agreement in the relative standard deviation of the mean (RSDM).

Only one transition was reported in both references. To estimate the accuracy of the forbidden lines from allowed lines, we isoelectronically averaged the logarithmic quality factors (as discussed in Sec. 4.1 in the Introduction) observed for lines from the lower-lying levels of Mg I and Si III and applied the result to forbidden lines of Mg I, as described in the Introduction. The listed accuracies are therefore less well established than for the allowed lines.

11.1.4. References for Forbidden Transitions for Mg I

[42]M. Godefroid, C. E. Magnusson, P. O. Zetterberg, and I. Joelsson, Phys. Scr. **32**, 125 (1985).

[95]G. Tachiev and C. Froese Fischer, http://www.vuse.vanderbilt.edu/~cff/mchf_collection/ (MCHF, *ab initio*, downloaded on Sept. 3, 2003).

TABLE 41. Wavelength finding list for forbidden lines Mg I

Wavelength (air) (Å)	Mult. No.	Wavelength (air) (Å)	Mult. No.	Wavelength (air) (Å)	Mult. No.	Wavelength (air) (Å)	Mult. No.
2 084.535	3	3 838.292	11	4 081.832	10	7 814.533	16
2 084.537	3	3 838.295	11	4 562.602	1	7 816.546	16
2 089.149	4	3 844.951	14	4 630.015	8	8 806.756	12
2 154.353	2	3 845.949	14	5 172.684	7	12 267.597	22
3 635.813	15	3 847.920	14	5 183.604	7	14 789.612	18
3 638.468	15	3 848.920	14	7 573.180	6	14 789.641	18
3 643.867	15	3 849.408	14	7 584.705	6	14 789.680	18
3 829.359	11	3 853.960	14	7 608.206	6	15 024.992	21
3 832.299	11	3 854.962	14	7 746.326	13	15 040.246	21
3 832.301	11	3 855.452	14	7 746.334	13	16 265.934	9
3 832.304	11	4 071.729	10	7 746.345	13	19 204.61	17
3 838.290	11	4 075.058	10	7 810.413	16		
Wavenumber (cm^{-1})	Mult. No.	Wavenumber (cm^{-1})	Mult. No.	Wavenumber (cm^{-1})	Mult. No.	Wavenumber (cm^{-1})	Mult. No.
4 453.725	20	1 505.610	29	1 389.684	26	105.883	27
4 453.694	20	1 502.315	29	1 389.671	26	105.865	27
2 943.664	25	1 495.567	29	115.908	27	60.773	5
2 899.732	19	1 448.097	24	112.644	27	40.714	5
1 553.993	23	1 441.349	24	112.631	27	20.059	5
1 553.980	23	1 438.054	24	112.613	27		
1 553.962	23	1 389.702	26	105.896	27		

TABLE 42. Transition probabilities of forbidden lines for Mg I (references for this table are as follows: 1=Tachiev and Froese Fischer[95] and 2=Godefroid[42])

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	Type	A_{ki} (s^{-1})	S (a.u.)	Acc.	Source
1	$3s^2-3s3p$	$^1\mathrm{S}-{}^3\mathrm{P}^\circ$									
			4 562.602	4 563.881	0.000–21 911.178	1–5	M2	3.98−03	2.64+03	B+	1
2	$3s^2-3s3d$	$^1\mathrm{S}-{}^1\mathrm{D}$									
			2 154.353	2 155.030	0.000–46 403.065	1–5	E2	1.64+03	3.40+02	A	1,2
3		$^1\mathrm{S}-{}^3\mathrm{D}$									
			2 084.537	2 085.200	0.000–47 957.027	1–5	E2	1.06−03	1.87−04	C	1
			2 084.535	2 085.199	0.000–47 957.058	1–3	M1	7.24−12	7.30−15	E	1
4	$3s^2-3s4p$	$^1\mathrm{S}-{}^3\mathrm{P}^\circ$									
			2 089.149	2 089.813	0.000–47 851.162	1–5	M2	2.69+00	3.60+04	B+	1
5	$3s3p-3s3p$	$^3\mathrm{P}^\circ-{}^3\mathrm{P}^\circ$									
				40.714 cm^{-1}	21 870.464–21 911.178	3–5	M1	9.10−07	2.50+00	B+	1
				40.714 cm^{-1}	21 870.464–21 911.178	3–5	E2	9.94−13	3.97+02	A	1
				20.059 cm^{-1}	21 850.405–21 870.464	1–3	M1	1.45−07	2.00+00	B+	1
				60.773 cm^{-1}	21 850.405–21 911.178	1–5	E2	3.27−12	1.76+02	A	1
6		$^3\mathrm{P}^\circ-{}^1\mathrm{P}^\circ$									
			7 584.705	7 586.793	21 870.464–35 051.264	3–3	M1	7.22−05	3.51−06	D+	1
			7 584.705	7 586.793	21 870.464–35 051.264	3–3	E2	3.76−05	2.53−03	C	1
			7 608.206	7 610.300	21 911.178–35 051.264	5–3	M1	1.19−04	5.86−06	D+	1
			7 608.206	7 610.300	21 911.178–35 051.264	5–3	E2	2.65−05	1.81−03	C	1
			7 573.180	7 575.265	21 850.405–35 051.264	1–3	M1	9.67−05	4.68−06	D+	1
7	$3s3p-3s4s$	$^3\mathrm{P}^\circ-{}^3\mathrm{S}$									
			5 183.604	5 185.048	21 911.178–41 197.403	5–3	M2	1.02−04	7.70+01	B	1
			5 172.684	5 174.125	21 870.464–41 197.403	3–3	M2	3.46−05	2.58+01	B	1
8		$^3\mathrm{P}^\circ-{}^1\mathrm{S}$									
			4 630.015	4 631.312	21 911.178–43 503.333	5–1	M2	2.04−03	2.91+02	B+	1
9		$^1\mathrm{P}^\circ-{}^3\mathrm{S}$									
			16 265.934	16 270.377	35 051.264–41 197.403	3–3	M2	3.65−07	8.38+01	B	1
10	$3s3p-3s3d$	$^3\mathrm{P}^\circ-{}^1\mathrm{D}$									
			4 071.729	4 072.878	21 850.405–46 403.065	1–5	M2	4.71−04	1.77+02	B+	1
			4 075.058	4 076.209	21 870.464–46 403.065	3–5	M2	1.05−03	3.96+02	B+	1
			4 081.832	4 082.985	21 911.178–46 403.065	5–5	M2	8.09−04	3.08+02	B+	1
11		$^3\mathrm{P}^\circ-{}^3\mathrm{D}$									
			3 832.301	3 833.389	21 870.464–47 957.045	3–7	M2	2.20−05	8.53+00	B	1
			3 829.359	3 830.446	21 850.405–47 957.027	1–5	M2	2.11−05	5.82+00	B	1
			3 838.292	3 839.381	21 911.178–47 957.045	5–7	M2	2.04−03	8.01+02	B+	1
			3 832.304	3 833.391	21 870.464–47 957.027	3–5	M2	6.36−04	1.77+02	B+	1
			3 838.295	3 839.383	21 911.178–47 957.027	5–5	M2	3.28−04	9.18+01	B	1
			3 832.299	3 833.387	21 870.464–47 957.058	3–3	M2	7.17−05	1.19+01	B	1
			3 838.290	3 839.379	21 911.178–47 957.058	5–3	M2	1.80−06	3.01−01	C	1
12		$^1\mathrm{P}^\circ-{}^1\mathrm{D}$									
			8 806.756	8 809.175	35 051.264–46 403.065	3–5	M2	6.29−06	1.12+02	B	1
13		$^1\mathrm{P}^\circ-{}^3\mathrm{D}$									
			7 746.334	7 748.466	35 051.264–47 957.045	3–7	M2	2.20−05	2.89+02	B+	1
			7 746.345	7 748.476	35 051.264–47 957.027	3–5	M2	5.48−06	5.14+01	B	1

TABLE 42. Transition probabilities of forbidden lines for Mg I (references for this table are as follows: 1 = Tachiev and Froese Fischer[95] and 2 = Godefroid[42])—Continued

No.	Transition array	Mult.	$\lambda_{\rm air}$ (Å)	$\lambda_{\rm vac}$ (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	Type	A_{ki} (s^{-1})	S (a.u.)	Acc.	Source
			7 746.326	7 748.458	35 051.264–47 957.058	3–3	M2	6.09−07	3.42+00	C+	1
14	3*s*3*p*−3*s*4*p*	^{3}P°−^{3}P°									
			3 853.960	3 855.052	21 911.178–47 851.162	5–5	M1	2.89−12	3.07−14	E	1
			3 853.960	3 855.052	21 911.178–47 851.162	5–5	E2	2.55+01	9.70+01	B+	1
			3 848.920	3 850.011	21 870.464–47 844.414	3–3	M1	4.31−10	2.74−12	E	1
			3 848.920	3 850.011	21 870.464–47 844.414	3–3	E2	1.83+01	4.14+01	B+	1
			3 855.452	3 856.546	21 911.178–47 841.119	5–1	E2	7.32+01	5.58+01	B+	1
			3 854.962	3 856.056	21 911.178–47 844.414	5–3	M1	1.59−04	1.01−06	D	1
			3 854.962	3 856.056	21 911.178–47 844.414	5–3	E2	5.48+01	1.25+02	B+	1
			3 849.408	3 850.500	21 870.464–47 841.119	3–1	M1	9.20−05	1.95−07	D	1
			3 847.920	3 849.011	21 870.464–47 851.162	3–5	M1	9.50−05	1.00−06	D	1
			3 847.920	3 849.011	21 870.464–47 851.162	3–5	E2	3.28+01	1.24+02	B+	1
			3 845.949	3 847.040	21 850.405–47 844.414	1–3	M1	3.05−05	1.93−07	D	1
			3 844.951	3 846.042	21 850.405–47 851.162	1–5	E2	1.46+01	5.48+01	B+	1
15		^{3}P°−^{1}P°									
			3 638.468	3 639.505	21 870.464–49 346.729	3–3	M1	7.38−05	3.96−07	D	1
			3 638.468	3 639.505	21 870.464–49 346.729	3–3	E2	2.12−04	3.63−04	C	1
			3 643.867	3 644.906	21 911.178–49 346.729	5–3	M1	1.22−04	6.56−07	D	1
			3 643.867	3 644.906	21 911.178–49 346.729	5–3	E2	2.80−04	4.83−04	C	1
			3 635.813	3 636.850	21 850.405–49 346.729	1–3	M1	9.89−05	5.29−07	D	1
16		^{1}P°−^{3}P°									
			7 814.533	7 816.683	35 051.264–47 844.414	3–3	M1	1.03−05	5.45−07	D	1
			7 814.533	7 816.683	35 051.264–47 844.414	3–3	E2	4.20−04	3.28−02	C+	1
			7 816.546	7 818.697	35 051.264–47 841.119	3–1	M1	4.11−05	7.28−07	D	1
			7 810.413	7 812.562	35 051.264–47 851.162	3–5	M1	1.02−05	9.04−07	D	1
			7 810.413	7 812.562	35 051.264–47 851.162	3–5	E2	3.76−05	4.89−03	C+	1
17	3*s*4*s*−3*s*3*d*	^{3}S−^{1}D									
			19 204.61	19 209.85	41 197.403–46 403.065	3–5	M1	2.31−13	3.04−13	E	1
			19 204.61	19 209.85	41 197.403–46 403.065	3–5	E2	3.12−07	3.65−03	C+	1
18		^{3}S−^{3}D									
			14 789.641	14 793.683	41 197.403–47 957.045	3–7	E2	2.33+00	1.03+04	A	1
			14 789.680	14 793.722	41 197.403–47 957.027	3–5	M1	9.64−11	5.78−11	E	1
			14 789.680	14 793.722	41 197.403–47 957.027	3–5	E2	2.33+00	7.37+03	A	1
			14 789.612	14 793.654	41 197.403–47 957.058	3–3	M1	4.92−10	1.77−10	E	1
			14 789.612	14 793.654	41 197.403–47 957.058	3–3	E2	2.33+00	4.42+03	A	1
19		^{1}S−^{1}D									
				2 899.732 cm^{-1}	43 503.333–46 403.065	1–5	E2	2.46−02	5.35+03	A	1
20		^{1}S−^{3}D									
				4 453.694 cm^{-1}	43 503.333–47 957.027	1–5	E2	2.03−07	5.18−03	C+	1
				4 453.725 cm^{-1}	43 503.333–47 957.058	1–3	M1	2.78−15	3.51−15	E	1
21	3*s*4*s*−3*s*4*p*	^{3}S−^{3}P°									
			15 024.992	15 029.099	41 197.403–47 851.162	3–5	M2	1.02−05	2.62+03	B+	1
			15 040.246	15 044.356	41 197.403–47 844.414	3–3	M2	5.56−06	8.62+02	B+	1
22		^{3}S−^{1}P°									
			12 267.597	12 270.953	41 197.403–49 346.729	3–3	M2	6.23−05	3.49+03	B+	1

TABLE 42. Transition probabilities of forbidden lines for Mg I (references for this table are as follows: 1=Tachiev and Froese Fischer[95] and 2=Godefroid[42])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i–E_k (cm^{-1})	g_i–g_k	Type	A_{ki} (s^{-1})	S (a.u.)	Acc.	Source
23	$3s3d$–$3s3d$	^{1}D–^{3}D									
				1 553.962 cm^{-1}	46 403.065–47 957.027	5–5	M1	9.42−09	4.65−07	D	1
				1 553.962 cm^{-1}	46 403.065–47 957.027	5–5	E2	2.50−10	1.23−03	C	1
				1 553.993 cm^{-1}	46 403.065–47 957.058	5–3	M1	8.47−08	2.51−06	D+	1
				1 553.993 cm^{-1}	46 403.065–47 957.058	5–3	E2	7.19−10	2.13−03	C	1
				1 553.980 cm^{-1}	46 403.065–47 957.045	5–7	M1	3.76−08	2.60−06	D+	1
				1 553.980 cm^{-1}	46 403.065–47 957.045	5–7	E2	3.78−10	2.61−03	C	1
24	$3s3d$–$3s4p$	^{1}D–^{3}P°									
				1 438.054 cm^{-1}	46 403.065–47 841.119	5–1	M2	1.09−09	1.19+02	B	1
				1 441.349 cm^{-1}	46 403.065–47 844.414	5–3	M2	8.22−10	2.66+02	B+	1
				1 448.097 cm^{-1}	46 403.065–47 851.162	5–5	M2	3.97−10	2.09+02	B+	1
25		^{1}D–^{1}P°									
				2 943.664 cm^{-1}	46 403.065–49 346.729	5–3	M2	3.58−08	3.26+02	B+	1
26		^{3}D–^{1}P°									
				1 389.684 cm^{-1}	47 957.045–49 346.729	7–3	M2	3.76−09	1.46+03	B+	1
				1 389.702 cm^{-1}	47 957.027–49 346.729	5–3	M2	6.83−10	2.65+02	B+	1
				1 389.671 cm^{-1}	47 957.058–49 346.729	3–3	M2	4.44−11	1.72+01	B	1
27	$3s4p$–$3s3d$	^{3}P°–^{3}D									
				112.631 cm^{-1}	47 844.414–47 957.045	3–7	M2	2.16−16	5.60+01	B	1
				115.908 cm^{-1}	47 841.119–47 957.027	1–5	M2	2.41−16	3.86+01	B	1
				105.883 cm^{-1}	47 851.162–47 957.045	5–7	M2	9.59−15	3.38+03	B+	1
				112.613 cm^{-1}	47 844.414–47 957.027	3–5	M2	4.09−15	7.58+02	B+	1
				105.865 cm^{-1}	47 851.162–47 957.027	5–5	M2	1.41−15	3.55+02	B+	1
				112.644 cm^{-1}	47 844.414–47 957.058	3–3	M2	3.23−16	3.58+01	B	1
				105.896 cm^{-1}	47 851.162–47 957.058	5–3	M2	1.04−18	1.58−01	C	1
28		^{3}P°–^{3}P°									
				10.043 cm^{-1}	47 841.119–47 851.162	1–5	E2	2.17−14	9.50+03	A	1
29		^{3}P°–^{1}P°									
				1 502.315 cm^{-1}	47 844.414–49 346.729	3–3	M1	5.63−07	1.85−05	D+	1
				1 502.315 cm^{-1}	47 844.414–49 346.729	3–3	E2	2.40−07	8.40−01	B	1
				1 495.567 cm^{-1}	47 851.162–49 346.729	5–3	M1	9.26−07	3.08−05	D+	1
				1 495.567 cm^{-1}	47 851.162–49 346.729	5–3	E2	8.53−08	3.05−01	B	1
				1 505.610 cm^{-1}	47 841.119–49 346.729	1–3	M1	7.55−07	2.46−05	D+	1

[a] Wavelengths (Å) are always given unless cm^{-1} is indicated.

11.2. Mg II

Sodium isoelectronic sequence
Ground state: $1s^22s^22p^63s\ ^2S_{1/2}$
Ionization energy: 15.035 27 eV = 121 267.61 cm^{-1}

11.2.1. Allowed Transitions for Mg II

The large majority of the compiled transition rates has been taken from the R-matrix calculations of the OP.[103] We expect the OP values of this Na-like spectrum to be accurate because spin-orbit interactions are generally unimportant. Also, the "one-electron" spectrum of Mg II is particularly well suited to the R-matrix technique of the OP calculation. Wherever available we have used the data of Froese Fischer,[36] which result from nonorthogonal spline CI computations.

Siegel *et al.*[84] employed a single configuration Dirac-Fock method with a core-polarization model. Ansbacher *et al.*[2] performed accurate lifetime measurements of the 4*p* energy levels. Theodosiou and Federman[106] performed detailed semiempirical calculations. Johnson *et al.*[47] performed relativistic third-order many-body calculations. The 3*s*-4*p* line (and similar transitions) strength is anomalously small, due to cancellations near this "Cooper minimum" region, and therefore particularly difficult to compute accurately. Thus we have assigned it an accuracy that is low for such a low-lying line. Perhaps surprisingly, the between-author discrepancies of most of the stronger Mg II lines generally appear to be significantly greater than for the analogous Na-like transitions of Na, Al, and Si.

To estimate accuracies, we pooled the relative standard deviation of the mean (RSDM) for each of the lines with transition rates published in two or more references,[2,36,47,84,103,106] as described in the general introduction. For this purpose we divided the data into groups with and without OP results. Good agreement was generally found among the different sources including OP ($<10\%$ RSDM for $S>0.01$). We chose the transition rates of Froese Fischer[36] rather than those of Froese Fischer,[37] because the former encompass a much wider range of transitions.

11.2.2. References for Allowed Transitions for Mg II

[2] W. Ansbacher, Y. Li, and E. H. Pinnington, Phys. Lett. A **139**, 165 (1989).

[36] C. Froese Fischer, http://www.vuse.vanderbilt.edu/~cff/mchf_collection/ (nonorthogonal spline CI, downloaded on Nov. 29, 2002).

[37] C. Froese Fischer, http://www.vuse.vanderbilt.edu/~cff/mchf_collection/ (MCHF, *ab initio*, downloaded on Dec. 15, 2003).

[47] W. R. Johnson, Z. W. Liu, and J. Sapirstein, At. Data Nucl. Data Tables **64** 279 (1996).

[84] W. Siegel, J. Migdalek, and Y.-K. Kim, At. Data Nucl. Data Tables **68** 303 (1998).

[103] K. T. Taylor http://legacy.gsfc.nasa.gov/topbase, downloaded on July 28, 1995 (Opacity Project).

[106] C. E. Theodosiou and S. R. Federman, Astrophys. J. **527**, 470 (1999).

TABLE 43. Wavelength finding list for allowed lines for Mg II

Wavelength (vac) (Å)	Mult. No.
870.332	7
870.346	7
884.697	6
884.719	6
907.375	5
907.412	5
946.703	4
946.769	4
1 025.968	3
1 026.113	3
1 239.925	2
1 240.395	2
1 248.048	21
1 248.507	20
1 249.476	21
1 249.477	21
1 249.936	20
1 271.239	19
1 271.940	18
1 272.720	19
1 272.721	19
1 273.423	18
1 306.714	17
1 307.875	16
1 308.279	17
1 308.281	17
1 309.443	16
1 365.544	15
1 367.254	15
1 367.257	15
1 367.708	14
1 369.423	14
1 476.000	13
1 477.997	13
1 478.004	13
1 480.879	12
1 482.890	12
1 734.852	11
1 737.613	11
1 737.628	11
1 750.664	10
1 753.474	10
Wavelength (air) (Å)	Mult. No.
2 216.911	27
2 217.006	27
2 253.869	39
2 253.913	39
2 302.986	38
2 303.032	38

TABLE 43. Wavelength finding list for allowed lines for Mg II—Continued

Wavelength (air) (Å)	Mult. No.
2 303.134	38
2 312.597	26
2 312.749	26
2 329.562	37
2 329.609	37
2 406.418	36
2 406.469	36
2 406.633	36
2 449.561	35
2 449.613	35
2 474.314	25
2 474.584	25
2 582.019	34
2 582.077	34
2 582.371	34
2 660.754	33
2 660.756	33
2 660.817	33
2 790.542	24
2 790.777	9
2 791.117	24
2 795.528	1
2 797.930	9
2 797.998	9
2 802.705	1
2 842.097	51
2 844.479	50
2 844.566	51
2 844.570	51
2 846.952	50
2 928.299	32
2 928.374	32
2 928.633	8
2 929.007	32
2 936.510	8
2 965.328	49
2 968.015	49
2 968.020	49
2 969.148	48
2 971.842	48
3 104.715	31
3 104.721	31
3 104.805	31
3 165.879	47
3 168.941	47
3 168.954	47
3 172.708	46
3 175.784	46
3 534.970	45
3 538.789	45
3 538.812	45
3 549.513	44
3 553.364	44
3 613.780	23
3 615.583	23

TABLE 43. Wavelength finding list for allowed lines for Mg II—Continued

Wavelength (air) (Å)	Mult. No.
3 848.211	30
3 848.340	30
3 850.386	30
4 368.54	68
4 368.64	68
4 368.91	68
4 384.637	43
4 390.514	43
4 390.572	43
4 427.994	42
4 433.988	42
4 436.491	67
4 436.593	67
4 481.126	29
4 481.150	29
4 481.325	29
4 521.938	56
4 522.333	56
4 545.253	73
4 545.263	73
4 545.288	73
4 630.878	66
4 630.990	66
4 631.404	66
4 739.593	65
4 739.709	65
4 868.823	72
4 868.837	72
4 868.866	72
4 938.703	55
4 939.396	55
5 068.938	64
5 069.072	64
5 069.802	64
5 157.628	84
5 161.302	84
5 161.310	84
5 264.220	63
5 264.364	63
5 433.999	71
5 434.034	71
5 434.070	71
5 451.250	83
5 455.355	83
5 455.370	83
5 460.018	82
5 464.136	82
5 739.77	54
5 741.22	54
5 916.43	62
5 916.61	62
5 918.16	62
5 923.36	81
5 928.21	81
5 928.23	81

TABLE 43. Wavelength finding list for allowed lines for Mg II—Continued

Wavelength (air) (Å)	Mult. No.
5 938.63	80
5 943.50	80
6 346.74	61
6 346.75	61
6 346.96	61
6 620.44	70
6 620.52	70
6 620.57	70
6 781.45	79
6 787.80	79
6 787.85	79
6 812.86	78
6 819.27	78
7 603.27	103
7 603.29	103
7 603.32	103
7 786.50	53
7 790.98	53
7 825.4	98
7 825.6	98
7 826.4	98
7 877.05	41
7 896.04	41
7 896.37	41
8 046.14	97
8 046.34	97
8 115.22	60
8 115.57	60
8 120.43	60
8 213.99	40
8 234.64	40
8 259.07	102
8 259.10	102
8 259.14	102
8 543.22	88
8 544.63	88
8 709.15	96
8 709.38	96
8 710.85	96
8 734.98	77
8 745.52	77
8 745.66	77
8 824.32	76
8 835.08	76
8 913.28	112
8 919.14	112
8 919.17	112
9 101.78	95
9 102.03	95
9 218.25	22
9 244.26	22
9 393.38	101
9 393.43	101
9 393.48	101
9 631.89	59
9 631.95	59
9 632.43	59
9 828.12	111
9 835.25	111
9 835.30	111
9 856.65	110
9 863.83	110
10 163.60	87
10 166.53	87
10 391.76	69
10 392.09	69
10 392.22	69
10 399.31	94
10 399.63	94
10 402.71	94
10 914.24	28
10 915.28	28
10 951.77	28
11 255.93	93
11 256.32	93
11 477.39	109
11 487.12	109
11 487.20	109
11 534.83	108
11 544.66	108
11 751.38	100
11 751.55	100
11 751.63	100
12 856.30	127
12 856.35	127
12 856.40	127
13 704.1	123
13 704.5	123
13 707.1	123
14 258.91	86
14 267.89	86
14 395.78	122
14 396.16	122
14 727.23	92
14 727.88	92
14 737.45	92
14 850.10	126
14 850.21	126
14 850.28	126
15 067.70	134
15 077.72	134
15 077.79	134
15 205.36	107
15 222.45	107
15 222.73	107
15 364.20	106
15 381.64	106
16 350.39	115
16 355.56	115
16 665.73	121

TABLE 43. Wavelength finding list for allowed lines for Mg II—Continued

Wavelength (air) (Å)	Mult. No.
16 666.23	121
16 671.59	121
16 760.22	75
16 799.08	75
16 799.93	75
17 411.90	74
17 453.85	74
17 717.33	91
17 717.43	91
17 718.37	91
17 881.5	133
17 895.6	133
17 895.7	133
17 976.1	132
17 990.4	132
18 165.2	120
18 165.8	120
18 968.6	125
18 968.9	125
18 969.0	125
19 187.4	99
19 188.0	99
19 188.3	99

Wavenumber (cm^{-1})	Mult. No.
4 678.41	52
4 664.61	52
4 537.01	145
4 536.98	145
4 248.76	114
4 245.92	114
4 158.33	58
4 157.81	58
4 144.01	58
4 133.07	119
4 132.89	119
4 130.05	119
4 129.16	131
4 124.75	131
4 124.69	131
4 085.78	130
4 081.37	130
3 998.1	142
3 997.9	142
3 996.5	142
3 808.23	150
3 805.39	150
3 805.36	150
3 647.55	141
3 647.43	141
3 492.97	144
3 492.92	144
3 401.45	118
3 401.27	118
3 277.86	105
3 270.48	105
3 270.30	105
3 161.99	104
3 154.61	104
3 134.85	124
3 134.73	124
3 134.70	124
2 769.52	136
2 767.59	136
2 764.19	149
2 761.35	149
2 761.30	149
2 734.74	148
2 731.90	148
2 701.67	140
2 701.55	140
2 699.62	140
2 434.93	157
2 434.90	157
2 432.97	85
2 425.59	85
2 210.02	90
2 209.72	90
2 206.50	139
2 206.38	139
2 202.34	90
2 031.27	143
2 031.21	143
1 993.59	129
1 989.18	129
1 989.06	129
1 941.69	160
1 939.76	160
1 939.73	160
1 925.62	128
1 921.21	128
1 905.7	152
1 904.3	152
1 862.4	155
1 861.0	155
1 511.92	154
1 511.86	154
1 423.66	113
1 419.25	113
1 390.89	156
1 390.84	156
1 307.97	117
1 307.79	117
1 303.38	117
1 302.49	147
1 299.65	147
1 299.59	147
1 259.11	146
1 256.27	146

TABLE 43. Wavelength finding list for allowed lines for Mg II—Continued

TABLE 43. Wavelength finding list for allowed lines for Mg II—Continued

Wavenumber (cm^{-1})	Mult. No.
993.88	163
993.85	163
903.89	135
901.05	135
897.65	159
895.72	159
895.67	159
868.20	158
866.27	158
836.04	138
835.92	138
833.08	138
644.8	164
643.4	164
643.3	164
609.36	151
607.43	151
566.04	153
565.98	153
564.05	153
489.16	57
489.04	57
488.52	57
430.1	161
428.7	161
400.7	162
399.3	162
270.22	89
270.16	89
269.86	89
162.33	116
162.30	116
162.12	116
104.42	137
104.30	137

TABLE 44. Transition probabilities of allowed lines for Mg II (references for this table are as follows: 1=Taylor,[103] 2=Froese Fischer,[36] 3=Siegel *et al.*,[84] 4=Ansbacher *et al.*,[2] 5=Theodosiou and Federman,[106] 6=Johnson *et al.*,[47] and 7=Froese Fischer[37])

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^{a}	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
1	$3s-3p$	$^2\mathrm{S}-{}^2\mathrm{P}^\circ$	*2 797.92*	*2 798.74*	0.00–*35 730.4*	2–6	2.59+00	9.12−01	1.68+01	0.261	A+	2,3,4,6,7
			2 795.528	2 796.352	0.00–35 760. 88	2–4	2.60+00	6.08−01	1.12+01	0.085	A+	2,3,4,6,7
			2 802.705	2 803.531	0.00–35 669.31	2–2	2.57+00	3.03−01	5.60+00	−0.218	A+	2,3,4,6,7
2	$3s-4p$	$^2\mathrm{S}-{}^2\mathrm{P}^\circ$		*1 240.08*	0.00–*80 639.8*	2–6	1.41−02	9.73−04	7.94−03	−2.711	C	2,3,5,7
				1 239.925	0.00–80 650.02	2–4	1.35−02	6.21−04	5.07−03	−2.906	C	2,3,5,7
				1 240.395	0.00–80 619.50	2–2	1.52−02	3.51−04	2.87−03	−3.154	C	2,3,5,7
3	$3s-5p$	$^2\mathrm{S}-{}^2\mathrm{P}^\circ$		*1 026.02*	0.00–*97 464.3*	2–6	3.50−02	1.66−03	1.12−02	−2.479	B	2,3
				1 025.968	0.00–97 468.92	2–4	3.43−02	1.08−03	7.32−03	−2.666	B	2,3
				1 026.113	0.00–97 455.12	2–2	3.63−02	5.72−04	3.87−03	−2.942	B	2,3
4	$3s-6p$	$^2\mathrm{S}-{}^2\mathrm{P}^\circ$		*946.73*	0.00–*105 627.3*	2–6	2.73−02	1.10−03	6.86−03	−2.658	B	2
				946.703	0.00–105 629.72	2–4	2.69−02	7.22−04	4.50−03	−2.840	B	2
				946.769	0.00–105 622.34	2–2	2.81−02	3.78−04	2.36−03	−3.121	B	2
5	$3s-7p$	$^2\mathrm{S}-{}^2\mathrm{P}^\circ$		*907.39*	0.00–*110 206.5*	2–6	1.96−02	7.27−04	4.34−03	−2.837	C	2
				907.375	0.00–110 207.99	2–4	1.94−02	4.78−04	2.85−03	−3.020	C	2
				907.412	0.00–110 203.58	2–2	2.02−02	2.49−04	1.49−03	−3.303	C	2
6	$3s-8p$	$^2\mathrm{S}-{}^2\mathrm{P}^\circ$		*884.70*	0.00–*113 032.1*	2–6	1.40−02	4.92−04	2.87−03	−3.007	C	2
				884.697	0.00–113 033.09	2–4	1.38−02	3.24−04	1.89−03	−3.188	C	2
				884.719	0.00–113 030.25	2–2	1.44−02	1.68−04	9.81−04	−3.474	C	2
7	$3s-9p$	$^2\mathrm{S}-{}^2\mathrm{P}^\circ$		*870.34*	0.00–*114 898.1*	2–6	1.05−02	3.58−04	2.05−03	−3.145	C	2
				870.332	0.00–114 898.72	2–4	1.04−02	2.35−04	1.35−03	−3.328	C	2
				870.346	0.00–114 896.79	2–2	1.08−02	1.22−04	7.01−04	−3.613	C	2
8	$3p-4s$	$^2\mathrm{P}^\circ-{}^2\mathrm{S}$	*2 933.88*	*2 934.74*	*35 730.4–69 804.95*	6–2	3.45+00	1.48−01	8.60+00	−0.052	A	2,3,6,7

TABLE 44. Transition probabilities of allowed lines for Mg II (references for this table are as follows: 1=Taylor,[103] 2=Froese Fischer,[36] 3=Siegel *et al.*,[84] 4=Ansbacher *et al.*,[2] 5=Theodosiou and Federman,[106] 6=Johnson *et al.*,[47] and 7=Froese Fischer[37])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
			2 936.510	2 937.369	35 760.88–69 804.95	4–2	2.30+00	1.49−01	5.75+00	−0.225	A	2,3,6,7
			2 928.633	2 929.490	35 669.31–69 804.95	2–2	1.15+00	1.48−01	2.86+00	−0.529	A	2,3,6,7
9	$3p-3d$	^{2}P°$-^2$D	*2 795.58*	*2 796.41*	*35 730.4–71 490.5*	6–10	4.80+00	9.37−01	5.18+01	0.750	A	2,3,7
			2 797.998	2 798.823	35 760.88–71 490.19	4–6	4.79+00	8.44−01	3.11+01	0.528	A	2,3,7
			2 790.777	2 791.600	35 669.31–71 491.06	2–4	4.01+00	9.37−01	1.72+01	0.273	A	2,3,7
			2 797.930	2 798.754	35 760.88–71 491.06	4–4	7.98−01	9.38−02	3.46+00	−0.426	A	2,3,7
10	$3p-5s$	^{2}P°$-^2$S		*1 752.54*	*35 730.4–92 790.51*	6–2	1.20+00	1.84−02	6.37−01	−0.957	A	2,3
				1 753.474	35 760.88–92 790.51	4–2	7.98−01	1.84−02	4.25−01	−1.133	A	2,3
				1 750.664	35 669.31–92 790.51	2–2	4.00−01	1.84−02	2.12−01	−1.434	A	2,3
11	$3p-4d$	^{2}P°$-^2$D		*1 736.70*	*35 730.4–93 310.8*	6–10	5.11−01	3.85−02	1.32+00	−0.636	A	2,3,7
				1 737.628	35 760.88–93 310.59	4–6	5.09−01	3.46−02	7.91−01	−0.859	A	2,3,7
				1 734.852	35 669.31–93 311.11	2–4	4.29−01	3.87−02	4.42−01	−1.111	A	2,3,7
				1 737.613	35 760.88–93 311.11	4–4	8.48−02	3.84−03	8.79−02	−1.814	B+	2,3,7
12	$3p-6s$	^{2}P°$-^2$S		*1 482.22*	*35 730.4–103 196.75*	6–2	5.78−01	6.34−03	1.86−01	−1.420	B+	2
				1 482.890	35 760.88–103 196.75	4–2	3.85−01	6.34−03	1.24−01	−1.596	B+	2
				1 480.879	35 669.31–103 196.75	2–2	1.93−01	6.34−03	6.18−02	−1.897	B+	2
13	$3p-5d$	^{2}P°$-^2$D		*1 477.33*	*35 730.4–103 419.8*	6–10	1.31−01	7.14−03	2.08−01	−1.368	B	2,3
				1 478.004	35 760.88–103 419.70	4–6	1.30−01	6.40−03	1.24−01	−1.592	B	2,3
				1 476.000	35 669.31–103 420.00	2–4	1.10−01	7.21−03	7.01−02	−1.841	B	2,3
				1 477.997	35 760.88–103 420.00	4–4	2.16−02	7.08−04	1.38−02	−2.548	B	2,3
14	$3p-7s$	^{2}P°$-^2$S		*1 368.85*	*35 730.4–108 784.33*	6–2	3.25−01	3.04−03	8.23−02	−1.739	C+	2
				1 369.423	35 760.88–108 784.33	4–2	2.17−01	3.04−03	5.49−02	−1.915	B	2
				1 367.708	35 669.31–108 784.33	2–2	1.08−01	3.04−03	2.74−02	−2.216	C+	2
15	$3p-6d$	^{2}P°$-^2$D		*1 366.69*	*35 730.4–108 900.1*	6–10	5.38−02	2.51−03	6.77−02	−1.822	B+	2
				1 367.257	35 760.88–108 900.02	4–6	5.35−02	2.25−03	4.05−02	−2.046	B+	2
				1 365.544	35 669.31–108 900.20	2–4	4.53−02	2.53−03	2.28−02	−2.296	B+	2
				1 367.254	35 760.88–108 900.20	4–4	8.84−03	2.48−04	4.46−03	−3.003	B	2
16	$3p-8s$	^{2}P°$-^2$S		*1 308.92*	*35 730.4–112 129.20*	6–2	2.01−01	1.72−03	4.46−02	−1.986	C+	2
				1 309.443	35 760.88–112 129.20	4–2	1.34−01	1.72−03	2.97−02	−2.162	C+	2
				1 307.875	35 669.31–112 129.20	2–2	6.72−02	1.72−03	1.49−02	−2.463	C+	2
17	$3p-7d$	^{2}P°$-^2$D		*1 307.76*	*35 730.4–112 197.1*	6–10	2.59−02	1.11−03	2.86−02	−2.177	C+	2
				1 308.281	35 760.88–112 197.05	4–6	2.58−02	9.92−04	1.71−02	−2.401	C+	2
				1 306.714	35 669.31–112 197.17	2–4	2.19−02	1.12−03	9.63−03	−2.650	C+	2
				1 308.279	35 760.88–112 197.17	4–4	4.25−03	1.09−04	1.88−03	−3.361	C	2
18	$3p-9s$	^{2}P°$-^2$S		*1 272.93*	*35 730.4*–114 289.36	6–2	1.35−01	1.09−03	2.74−02	−2.184	C+	2
				1 273.423	35 760.88–114 289.36	4–2	8.97−02	1.09−03	1.83−02	−2.361	C+	2
				1 271.940	35 669.31–114 289.36	2–2	4.49−02	1.09−03	9.13−03	−2.662	C+	2
19	$3p-8d$	^{2}P°$-^2$D		*1 272.23*	*35 730.4–114 332.7*	6–10	1.45−02	5.87−04	1.48−02	−2.453	C	2
				1 272.721	35 760.88–114 332.68	4–6	1.44−02	5.26−04	8.81−03	−2.677	C+	2
				1 271.239	35 669.31–114 332.74	2–4	1.23−02	5.95−04	4.98−03	−2.924	C	2
				1 272.720	35 760.88–114 332.74	4–4	2.38−03	5.78−05	9.69−04	−3.636	C	2
20	$3p-10s$	^{2}P°$-^2$S		*1 249.46*	*35 730.4–115 764.99*	6–2	1.15−01	8.95−04	2.21−02	−2.270	B	2

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No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				1 249.936	35 760.88–115 764.99	4–2	7.64−02	8.95−04	1.47−02	−2.446	B	2
				1 248.507	35 669.31–115 764.99	2–2	3.83−02	8.95−04	7.36−03	−2.747	B	2
21	$3p$–$9d$	^{2}P$^\circ$–^{2}D		*1 249.00*	*35 730.4–115 794.4*	6–10	1.06−02	4.15−04	1.02−02	−2.604	C	2
				1 249.477	35 760.88–115 794.39	4–6	1.06−02	3.71−04	6.11−03	−2.829	C	2
				1 248.048	35 669.31–115 794.44	2–4	9.00−03	4.20−04	3.46−03	−3.076	C	2
				1 249.476	35 760.88–115 794.44	4–4	1.74−03	4.08−05	6.71−04	−3.787	C	2
22	$4s$–$4p$	^{2}S–^{2}P$^\circ$	*9 226.9*	*9 229.5*	*69 804.95–80 639.8*	2–6	3.63−01	1.39+00	8.44+01	0.444	A+	2,3,7
			9 218.25	9 220.78	69 804.95–80 650.02	2–4	3.64−01	9.27−01	5.63+01	0.268	A+	2,3,7
			9 244.26	9 246.80	69 804.95–80 619.50	2–2	3.61−01	4.62−01	2.82+01	−0.034	A+	2,3,7
23	$4s$–$5p$	^{2}S–^{2}P$^\circ$	*3 614.38*	*3 615.41*	*69 804.95–97 464.3*	2–6	1.71−03	1.01−03	2.40−02	−2.695	C+	2,3
			3 613.780	3 614.810	69 804.95–97 468.92	2–4	1.79−03	7.03−04	1.67−02	−2.852	C+	2,3
			3 615.583	3 616.614	69 804.95–97 455.12	2–2	1.56−03	3.06−04	7.28−03	−3.213	C+	2,3
24	$4s$–$6p$	^{2}S–^{2}P$^\circ$	*2 790.73*	*2 791.55*	*69 804.95–105 627.3*	2–6	3.47−04	1.22−04	2.24−03	−3.613	C+	2
			2 790.542	2 791.365	69 804.95–105 629.72	2–4	3.20−04	7.47−05	1.37−03	−3.826	C+	2
			2 791.117	2 791.940	69 804.95–105 622.34	2–2	4.02−04	4.70−05	8.63−04	−4.027	C+	2
25	$4s$–$7p$	^{2}S–^{2}P$^\circ$	*2 474.40*	*2 475.15*	*69 804.95–110 206.5*	2–6	9.50−04	2.62−04	4.27−03	−3.281	C	2
			2 474.314	2 475.061	69 804.95–110 207.99	2–4	9.15−04	1.68−04	2.74−03	−3.474	C	2
			2 474.584	2 475.331	69 804.95–110 203.58	2–2	1.02−03	9.36−05	1.53−03	−3.728	C	2
26	$4s$–$8p$	^{2}S–^{2}P$^\circ$	*2 312.65*	*2 313.36*	*69 804.95–113 032.1*	2–6	1.01−03	2.43−04	3.70−03	−3.313	C	2
			2 312.597	2 313.308	69 804.95–113 033.09	2–4	9.81−04	1.57−04	2.40−03	−3.503	C	2
			2 312.749	2 313.460	69 804.95–113 030.25	2–2	1.07−03	8.56−05	1.30−03	−3.766	C	2
27	$4s$–$9p$	^{2}S–^{2}P$^\circ$	*2 216.94*	*2 217.63*	*69 804.95–114 898.1*	2–6	9.18−04	2.03−04	2.96−03	−3.391	C	2
			2 216.911	2 217.601	69 804.95–114 898.72	2–4	8.95−04	1.32−04	1.93−03	−3.578	C	2
			2 217.006	2 217.696	69 804.95–114 896.79	2–2	9.63−04	7.10−05	1.04−03	−3.848	C	2
28	$3d$–$4p$	^{2}D–^{2}P$^\circ$	*10 926.8*	*10 929.8*	*71 490.5–80 639.8*	10–6	1.69−01	1.81−01	6.53+01	0.258	A	2,3,7
			10 914.24	10 917.23	71 490.19–80 650.02	6–4	1.52−01	1.82−01	3.91+01	0.038	A	2,3,7
			10 951.77	10 954.77	71 491.06–80 619.50	4–2	1.68−01	1.51−01	2.18+01	−0.219	A	2,3,7
			10 915.28	10 918.27	71 491.06–80 650.02	4–4	1.69−02	3.02−02	4.35+00	−0.918	A	2,3,7
29	$3d$–$4f$	^{2}D–^{2}F$^\circ$	*4 481.21*	*4 482.46*	*71 490.5–93 799.7*	10–14	2.33+00	9.81−01	1.45+02	0.992	A	2,7
			4 481.126	4 482.383	71 490.19–93 799.75	6–8	2.33+00	9.35−01	8.27+01	0.749	A	2,7
			4 481.325	4 482.582	71 491.06–93 799.63	4–6	2.17+00	9.81−01	5.79+01	0.594	A	2,7
			4 481.150	4 482.407	71 490.19–93 799.63	6–6	1.55−01	4.67−02	4.14+00	−0.553	A	2,7
30	$3d$–$5p$	^{2}D–^{2}P$^\circ$	*3 848.94*	*3 850.03*	*71 490.5–97 464.3*	10–6	3.27−02	4.36−03	5.53−01	−1.361	A	2,3
			3 848.211	3 849.303	71 490.19–97 468.92	6–4	2.96−02	4.38−03	3.33−01	−1.580	A	2,3
			3 850.386	3 851.478	71 491.06–97 455.12	4–2	3.24−02	3.60−03	1.83−01	−1.842	A	2,3
			3 848.340	3 849.432	71 491.06–97 468.92	4–4	3.29−03	7.31−04	3.70−02	−2.534	B+	2,3
31	$3d$–$5f$	^{2}D–^{2}F$^\circ$	*3 104.75*	*3 105.65*	*71 490.5–103 689.9*	10–14	7.97−01	1.61−01	1.65+01	0.207	A	2
			3 104.715	3 105.616	71 490.19–103 689.92	6–8	7.97−01	1.54−01	9.42+00	−0.034	A	2
			3 104.805	3 105.706	71 491.06–103 689.86	4–6	7.44−01	1.61−01	6.60+00	−0.191	A	2
			3 104.721	3 105.622	71 490.19–103 689.86	6–6	5.31−02	7.68−03	4.71−01	−1.336	B+	2
32	$3d$–$6p$	^{2}D–^{2}P$^\circ$	*2 928.54*	*2 929.39*	*71 490.5–105 627.3*	10–6	1.58−02	1.22−03	1.18−01	−1.914	B+	2

TABLE 44. Transition probabilities of allowed lines for Mg II (references for this table are as follows: 1=Taylor,[103] 2=Froese Fischer,[36] 3=Siegel *et al.*,[84] 4=Ansbacher *et al.*,[2] 5=Theodosiou and Federman,[106] 6=Johnson *et al.*,[47] and 7=Froese Fischer[37])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
			2 928.299	2 929.156	71 490.19–105 629.72	6–4	1.43−02	1.22−03	7.08−02	−2.135	B+	2
			2 929.007	2 929.864	71 491.06–105 622.34	4–2	1.57−02	1.01−03	3.89−02	−2.394	B+	2
			2 928.374	2 929.230	71 491.06–105 629.72	4–4	1.59−03	2.04−04	7.89−03	−3.088	B	2
33	$3d-6f$	$^{2}D-^{2}F^{\circ}$	*2 660.78*	*2 661.57*	*71 490.5–109 062.3*	10–14	3.81−01	5.67−02	4.96+00	−0.246	A	2
			2 660.754	2 661.545	71 490.19–109 062.35	6–8	3.81−01	5.39−02	2.84+00	−0.490	A	2
			2 660.817	2 661.609	71 491.06–109 062.32	4–6	3.56−01	5.67−02	1.99+00	−0.644	A	2
			2 660.756	2 661.547	71 490.19–109 062.32	6–6	2.54−02	2.70−03	1.42−01	−1.790	B+	2
34	$3d-7p$	$^{2}D-^{2}P^{\circ}$	*2 582.14*	*2 582.91*	*71 490.5–110 206.5*	10–6	9.17−03	5.50−04	4.68−02	−2.260	C+	2
			2 582.019	2 582.791	71 490.19–110 207.99	6–4	8.28−03	5.52−04	2.82−02	−2.480	C+	2
			2 582.371	2 583.144	71 491.06–110 203.58	4–2	9.09−03	4.55−04	1.55−02	−2.740	C+	2
			2 582.077	2 582.849	71 491.06–110 207.99	4–4	9.23−04	9.23−05	3.14−03	−3.433	C	2
35	$3d-7f$	$^{2}D-^{2}F^{\circ}$	*2 449.58*	*2 450.32*	*71 490.5–112 301.5*	10–14	2.16−01	2.72−02	2.19+00	−0.565	B+	2
			2 449.561	2 450.303	71 490.19–112 301.47	6–8	2.16−01	2.59−02	1.25+00	−0.809	B+	2
			2 449.613	2 450.355	71 491.06–112 301.47	4–6	2.02−01	2.72−02	8.78−01	−0.963	B+	2
			2 449.561	2 450.303	71 490.19–112 301.47	6–6	1.44−02	1.30−03	6.27−02	−2.108	B	2
36	$3d-8p$	$^{2}D-^{2}P^{\circ}$	*2 406.49*	*2 407.23*	*71 490.5–113 032.1*	10–6	5.83−03	3.04−04	2.41−02	−2.517	C+	2
			2 406.418	2 407.150	71 490.19–113 033.09	6–4	5.26−03	3.05−04	1.45−02	−2.738	C+	2
			2 406.633	2 407.365	71 491.06–113 030.25	4–2	5.79−03	2.51−04	7.97−03	−2.998	C+	2
			2 406.469	2 407.201	71 491.06–113 033.09	4–4	5.87−04	5.10−05	1.62−03	−3.690	C	2
37	$3d-8f$	$^{2}D-^{2}F^{\circ}$	*2 329.58*	*2 330.29*	*71 490.5–114 403.6*	10–14	1.36−01	1.55−02	1.19+00	−0.810	B	2
			2 329.562	2 330.277	71 490.19–114 403.55	6–8	1.36−01	1.48−02	6.79−01	−1.052	B+	2
			2 329.609	2 330.324	71 491.06–114 403.55	4–6	1.27−01	1.55−02	4.77−01	−1.208	B	2
			2 329.562	2 330.277	71 490.19–114 403.55	6–6	9.07−03	7.39−04	3.40−02	−2.353	C+	2
38	$3d-9p$	$^{2}D-^{2}P^{\circ}$	*2 303.04*	*2 303.74*	*71 490.5–114 898.1*	10–6	4.08−03	1.95−04	1.48−02	−2.710	C	2
			2 302.986	2 303.695	71 490.19–114 898.72	6–4	3.69−03	1.96−04	8.91−03	−2.930	C+	2
			2 303.134	2 303.843	71 491.06–114 896.79	4–2	4.05−03	1.61−04	4.88−03	−3.191	C	2
			2 303.032	2 303.741	71 491.06–114 898.72	4–4	4.11−04	3.27−05	9.91−04	−3.883	C	2
39	$3d-9f$	$^{2}D-^{2}F^{\circ}$	*2 253.89*	*2 254.58*	*71 490.5–115 844.6*	10–14	1.07−01	1.14−02	8.50−01	−0.943	B	2
			2 253.869	2 254.567	71 490.19–115 844.60	6–8	1.07−01	1.09−02	4.85−01	−1.184	B	2
			2 253.913	2 254.611	71 491.06–115 844.60	4–6	1.00−01	1.15−02	3.40−01	−1.337	B	2
			2 253.869	2 254.567	71 490.19–115 844.60	6–6	7.15−03	5.45−04	2.43−02	−2.485	C+	2
40	$4p-5s$	$^{2}P^{\circ}-^{2}S$	*8 227.7*	*8 230.0*	*80 639.8–92 790.51*	6–2	7.94−01	2.69−01	4.37+01	0.208	A	2,3
			8 234.64	8 236.90	80 650.02–92 790.51	4–2	5.29−01	2.69−01	2.92+01	0.032	A	2,3
			8 213.99	8 216.24	80 619.50–92 790.51	2–2	2.65−01	2.68−01	1.45+01	−0.271	A	2,3
41	$4p-4d$	$^{2}P^{\circ}-^{2}D$	*7 889.9*	*7 892.0*	*80 639.8–93 310.8*	6–10	7.87−01	1.23+00	1.91+02	0.868	A+	2,3,7
			7 896.37	7 898.54	80 650.02–93 310.59	4–6	7.86−01	1.10+00	1.15+02	0.643	A+	2,3,7
			7 877.05	7 879.22	80 619.50–93 311.11	2–4	6.58−01	1.23+00	6.36+01	0.391	A+	2,3,7
			7 896.04	7 898.21	80 650.02–93 311.11	4–4	1.31−01	1.23−01	1.27+01	−0.308	A	2,3,7
42	$4p-6s$	$^{2}P^{\circ}-^{2}S$	*4 431.99*	*4 433.22*	*80 639.8–103 196.75*	6–2	3.16−01	3.10−02	2.72+00	−0.730	A	2
			4 433.988	4 435.233	80 650.02–103 196.75	4–2	2.10−01	3.10−02	1.81+00	−0.907	A	2
			4 427.994	4 429.237	80 619.50–103 196.75	2–2	1.05−01	3.10−02	9.05−01	−1.208	A	2
43	$4p-5d$	$^{2}P^{\circ}-^{2}D$	*4 388.59*	*4 389.82*	*80 639.8–103 419.8*	6–10	1.73−01	8.35−02	7.24+00	−0.300	A	2,3

TABLE 44. Transition probabilities of allowed lines for Mg II (references for this table are as follows: 1=Taylor,[103] 2=Froese Fischer,[36] 3=Siegel *et al.*,[84] 4=Ansbacher *et al.*,[2] 5=Theodosiou and Federman,[106] 6=Johnson *et al.*,[47] and 7=Froese Fischer[37])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})$^{\text{a}}$	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
			4 390.572	4 391.805	80 650.02–103 419.70	4–6	1.73−01	7.50−02	4.34+00	−0.523	A	2,3
			4 384.637	4 385.869	80 619.50–103 420.00	2–4	1.45−01	8.38−02	2.42+00	−0.776	A	2,3
			4 390.514	4 391.747	80 650.02–103 420.00	4–4	2.88−02	8.32−03	4.81−01	−1.478	A	2,3
44	4p−7s	^{2}P$^\circ$−^{2}S	*3 552.08*	*3 553.09*	*80 639.8–108 784.33*	6–2	1.69−01	1.07−02	7.48−01	−1.192	B	2
			3 553.364	3 554.379	80 650.02–108 784.33	4–2	1.12−01	1.07−02	4.99−01	−1.369	B	2
			3 549.513	3 550.527	80 619.50–108 784.33	2–2	5.64−02	1.07−02	2.49−01	−1.670	B	2
45	4p−6d	^{2}P$^\circ$−^{2}D	*3 537.53*	*3 538.53*	*80 639.8–108 900.1*	6–10	6.92−02	2.16−02	1.51+00	−0.887	A	2
			3 538.812	3 539.823	80 650.02–108 900.02	4–6	6.90−02	1.94−02	9.06−01	−1.110	A	2
			3 534.970	3 535.980	80 619.50–108 900.20	2–4	5.80−02	2.17−02	5.06−01	−1.363	B+	2
			3 538.789	3 539.800	80 650.02–108 900.20	4–4	1.15−02	2.15−03	1.00−01	−2.066	B+	2
46	4p−8s	^{2}P$^\circ$−^{2}S	*3 174.76*	*3 175.67*	*80 639.8–112 129.20*	6–2	1.02−01	5.15−03	3.23−01	−1.510	B	2
			3 175.784	3 176.703	80 650.02–112 129.20	4–2	6.81−02	5.15−03	2.15−01	−1.686	B	2
			3 172.708	3 173.626	80 619.50–112 129.20	2–2	3.41−02	5.15−03	1.08−01	−1.987	B	2
47	4p−7d	^{2}P$^\circ$−^{2}D	*3 167.93*	*3 168.84*	*80 639.8–112 197.1*	6–10	3.44−02	8.63−03	5.40−01	−1.286	B	2
			3 168.954	3 169.871	80 650.02–112 197.05	4–6	3.43−02	7.75−03	3.23−01	−1.509	B	2
			3 165.879	3 166.795	80 619.50–112 197.17	2–4	2.89−02	8.68−03	1.81−01	−1.760	B	2
			3 168.941	3 169.858	80 650.02–112 197.17	4–4	5.69−03	8.57−04	3.58−02	−2.465	C+	2
48	4p−9s	^{2}P$^\circ$−^{2}S	*2 970.94*	*2 971.81*	*80 639.8–114 289.36*	6–2	6.75−02	2.98−03	1.75−01	−1.748	B	2
			2 971.842	2 972.710	80 650.02–114 289.36	4–2	4.49−02	2.98−03	1.17−01	−1.924	B	2
			2 969.148	2 970.015	80 619.50–114 289.36	2–2	2.25−02	2.98−03	5.83−02	−2.225	B	2
49	4p−8d	^{2}P$^\circ$−^{2}D	*2 967.12*	*2 967.98*	*80 639.8–114 332.7*	6–10	1.99−02	4.37−03	2.56−01	−1.581	B	2
			2 968.020	2 968.887	80 650.02–114 332.68	4–6	1.98−02	3.92−03	1.53−01	−1.805	B	2
			2 965.328	2 966.194	80 619.50–114 332.74	2–4	1.67−02	4.40−03	8.59−02	−2.056	B	2
			2 968.015	2 968.881	80 650.02–114 332.74	4–4	3.28−03	4.34−04	1.70−02	−2.760	C+	2
50	4p−10s	^{2}P$^\circ$−^{2}S	*2 846.13*	*2 846.96*	*80 639.8*–115 764.99	6–2	5.67−02	2.29−03	1.29−01	−1.862	B+	2
			2 846.952	2 847.788	80 650.02–115 764.99	4–2	3.77−02	2.29−03	8.60−02	−2.038	B+	2
			2 844.479	2 845.315	80 619.50–115 764.99	2–2	1.89−02	2.30−03	4.30−02	−2.337	B+	2
51	4p−9d	^{2}P$^\circ$−^{2}D	*2 843.74*	*2 844.58*	*80 639.8–115 794.4*	6–10	1.49−02	3.01−03	1.69−01	−1.743	B	2
			2 844.570	2 845.406	80 650.02–115 794.39	4–6	1.48−02	2.70−03	1.01−01	−1.967	B	2
			2 842.097	2 842.933	80 619.50–115 794.44	2–4	1.25−02	3.03−03	5.68−02	−2.218	B	2
			2 844.566	2 845.402	80 650.02–115 794.44	4–4	2.46−03	2.99−04	1.12−02	−2.922	C+	2
52	5s−5p	^{2}S−^{2}P$^\circ$		*4 673.8 cm*$^{-1}$	92 790.51–*97 464.3*	2–6	8.85−02	1.82+00	2.57+02	0.561	A	2,3
				4 678.41 cm^{-1}	92 790.51–97 468.92	2–4	8.88−02	1.22+00	1.71+02	0.387	A	2
				4 664.61 cm^{-1}	92 790.51–97 455.12	2–2	8.80−02	6.07−01	8.56+01	0.084	A+	2,3
53	5s−6p	^{2}S−^{2}P$^\circ$	*7 788.0*	*7 790.1*	92 790.51–*105 627.3*	2–6	1.93−03	5.27−03	2.70−01	−1.977	B+	2
			7 786.50	7 788.64	92 790.51–105 629.72	2–4	1.97−03	3.59−03	1.84−01	−2.144	B+	2
			7 790.98	7 793.12	92 790.51–105 622.34	2–2	1.84−03	1.68−03	8.61−02	−2.474	B+	2
54	5s−7p	^{2}S−^{2}P$^\circ$	*5 740.3*	*5 741.8*	92 790.51–*110 206.5*	2–6	4.73−05	7.01−05	2.65−03	−3.853	C	2
			5 739.77	5 741.36	92 790.51–110 207.99	2–4	5.25−05	5.19−05	1.96−03	−3.984	C	2
			5 741.22	5 742.81	92 790.51–110 203.58	2–2	3.67−05	1.81−05	6.86−04	−4.441	C	2
55	5s−8p	^{2}S−^{2}P$^\circ$	*4 938.93*	*4 940.32*	92 790.51–*113 032.1*	2–6	1.59−05	1.75−05	5.68−04	−4.456	D+	2
			4 938.703	4 940.082	92 790.51–113 033.09	2–4	1.33−05	9.72−06	3.16−04	−4.711	D+	2

TABLE 44. Transition probabilities of allowed lines for Mg II (references for this table are as follows: 1=Taylor,[103] 2=Froese Fischer,[36] 3=Siegel *et al.*,[84] 4=Ansbacher *et al.*,[2] 5=Theodosiou and Federman,[106] 6=Johnson *et al.*,[47] and 7=Froese Fischer[37])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
			4 939.396	4 940.775	92 790.51–113 030.25	2–2	2.11−05	7.73−06	2.52−04	−4.811	D+	2
56	$5s-9p$	^{2}S−^{2}P°	*4 522.07*	*4 523.33*	92 790.51–*114 898.1*	2–6	6.00−05	5.52−05	1.64−03	−3.957	C	2
			4 521.938	4 523.207	92 790.51–114 898.72	2–4	5.58−05	3.42−05	1.02−03	−4.165	C	2
			4 522.333	4 523.601	92 790.51–114 896.79	2–2	6.83−05	2.10−05	6.24−04	−4.377	C	2
57	$4d-4f$	^{2}D−^{2}F°		*488.9 cm^{-1}*	*93 310.8–93 799.7*	10–14	6.51−05	5.72−02	3.85+02	−0.243	A+	2,7
				489.16 cm^{-1}	93 310.59–93 799.75	6–8	6.52−05	5.45−02	2.20+02	−0.485	A+	2,7
				488.52 cm^{-1}	93 311.11–93 799.63	4–6	6.07−05	5.72−02	1.54+02	−0.641	A+	2,7
				489.04 cm^{-1}	93 310.59–93 799.63	6–6	4.35−06	2.72−03	1.10+01	−1.787	A	2,7
58	$4d-5p$	^{2}D−^{2}P°		*4 153.5 cm^{-1}*	*93 310.8–97 464.3*	10–6	6.95−02	3.62−01	2.87+02	0.559	A	2,3
				4 158.33 cm^{-1}	93 310.59–97 468.92	6–4	6.27−02	3.63−01	1.72+02	0.338	A	2,3
				4 144.01 cm^{-1}	93 311.11–97 455.12	4–2	6.91−02	3.02−01	9.59+01	0.082	A	2,3
				4 157.81 cm^{-1}	93 311.11–97 468.92	4–4	6.96−03	6.04−02	1.91+01	−0.617	A	2,3
59	$4d-5f$	^{2}D−^{2}F°	*9 632.1*	*9 634.7*	*93 310.8–103 689.9*	10–14	4.21−01	8.21−01	2.60+02	0.914	A	2,3
			9 631.89	9 634.53	93 310.59–103 689.92	6–8	4.21−01	7.82−01	1.49+02	0.671	A	2,3
			9 632.43	9 635.07	93 311.11–103 689.86	4–6	3.93−01	8.20−01	1.04+02	0.516	A	2,3
			9 631.95	9 634.59	93 310.59–103 689.86	6–6	2.81−02	3.91−02	7.44+00	−0.630	A	2,3
60	$4d-6p$	^{2}D−^{2}P°	*8 117.0*	*8 119.2*	*93 310.8–105 627.3*	10–6	1.35−02	8.02−03	2.14+00	−1.096	A	2
			8 115.22	8 117.46	93 310.59–105 629.72	6–4	1.22−02	8.05−03	1.29+00	−1.316	A	2
			8 120.43	8 122.67	93 311.11–105 622.34	4–2	1.34−02	6.62−03	7.09−01	−1.577	A	2
			8 115.57	8 117.80	93 311.11–105 629.72	4–4	1.36−03	1.35−03	1.44−01	−2.268	B+	2
61	$4d-6f$	^{2}D−^{2}F°	*6 346.8*	*6 348.6*	*93 310.8–109 062.3*	10–14	2.20−01	1.86−01	3.89+01	0.270	A	2
			6 346.74	6 348.50	93 310.59–109 062.35	6–8	2.20−01	1.77−01	2.22+01	0.026	A	2
			6 346.96	6 348.72	93 311.11–109 062.32	4–6	2.05−01	1.86−01	1.56+01	−0.128	A	2
			6 346.75	6 348.51	93 310.59–109 062.32	6–6	1.47−02	8.86−03	1.11+00	−1.274	A	2
62	$4d-7p$	^{2}D−^{2}P°	*5 917.0*	*5 918.7*	*93 310.8–110 206.5*	10–6	7.10−03	2.24−03	4.36−01	−1.650	B	2
			5 916.43	5 918.07	93 310.59–110 207.99	6–4	6.42−03	2.25−03	2.63−01	−1.870	B	2
			5 918.16	5 919.80	93 311.11–110 203.58	4–2	7.04−03	1.85−03	1.44−01	−2.131	B	2
			5 916.61	5 918.25	93 311.11–110 207.99	4–4	7.16−04	3.76−04	2.93−02	−2.823	C+	2
63	$4d-7f$	^{2}D−^{2}F°	*5 264.28*	*5 265.74*	*93 310.8–112 301.5*	10–14	1.27−01	7.40−02	1.28+01	−0.131	B+	2
			5 264.220	5 265.685	93 310.59–112 301.47	6–8	1.27−01	7.05−02	7.33+00	−0.374	B+	2
			5 264.364	5 265.830	93 311.11–112 301.47	4–6	1.19−01	7.40−02	5.13+00	−0.529	B+	2
			5 264.220	5 265.685	93 310.59–112 301.47	6–6	8.47−03	3.52−03	3.66−01	−1.675	B	2
64	$4d-8p$	^{2}D−^{2}P°	*5 069.23*	*5 070.66*	*93 310.8–113 032.1*	10–6	4.39−03	1.02−03	1.70−01	−1.991	B	2
			5 068.938	5 070.351	93 310.59–113 033.09	6–4	3.97−03	1.02−03	1.02−01	−2.213	B	2
			5 069.802	5 071.215	93 311.11–113 030.25	4–2	4.35−03	8.39−04	5.61−02	−2.474	B	2
			5 069.072	5 070.485	93 311.11–113 033.09	4–4	4.43−04	1.71−04	1.14−02	−3.165	C+	2
65	$4d-8f$	^{2}D−^{2}F°	*4 739.64*	*4 740.95*	*93 310.8–114 403.6*	10–14	8.09−02	3.82−02	5.96+00	−0.418	B+	2
			4 739.593	4 740.918	93 310.59–114 403.55	6–8	8.09−02	3.63−02	3.40+00	−0.662	B+	2
			4 739.709	4 741.035	93 311.11–114 403.55	4–6	7.55−02	3.82−02	2.38+00	−0.816	B+	2
			4 739.593	4 740.918	93 310.59–114 403.55	6–6	5.39−03	1.82−03	1.70−01	−1.962	B	2
66	$4d-9p$	^{2}D−^{2}P°	*4 631.06*	*4 632.35*	*93 310.8–114 898.1*	10–6	3.04−03	5.87−04	8.95−02	−2.231	C+	2
			4 630.878	4 632.175	93 310.59–114 898.72	6–4	2.75−03	5.89−04	5.39−02	−2.452	B	2

TABLE 44. Transition probabilities of allowed lines for Mg II (references for this table are as follows: 1=Taylor,[103] 2=Froese Fischer,[36] 3=Siegel *et al.*,[84] 4=Ansbacher *et al.*,[2] 5=Theodosiou and Federman,[106] 6=Johnson *et al.*,[47] and 7=Froese Fischer[37])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
			4 631.404	4 632.701	93 311.11–114 896.79	4–2	3.01−03	4.84−04	2.95−02	−2.713	C+	2
			4 630.990	4 632.287	93 311.11–114 898.72	4–4	3.06−04	9.85−05	6.01−03	−3.405	C	2
67	$4d-9f$	$^{2}\mathrm{D}-{}^{2}\mathrm{F}^{\circ}$	*4 436.53*	*4 437.78*	*93 310.8–115 844.6*	10–14	6.38−02	2.64−02	3.85+00	−0.578	B+	2
			4 436.491	4 437.737	93 310.59–115 844.60	6–8	6.38−02	2.51−02	2.20+00	−0.822	B+	2
			4 436.593	4 437.839	93 311.11–115 844.60	4–6	5.95−02	2.64−02	1.54+00	−0.976	B+	2
			4 436.491	4 437.737	93 310.59–115 844.60	6–6	4.25−03	1.26−03	1.10−01	−2.121	B	2
68	$4d-10p$	$^{2}\mathrm{D}-{}^{2}\mathrm{P}^{\circ}$	*4 368.7*	*4 369.8*	*93 310.8–116 195*	10–6	2.74−03	4.70−04	6.76−02	−2.328	E+	1
			4 368.54	4 369.77	93 310.59–116 195.1	6–4	2.46−03	4.70−04	4.06−02	−2.550	D	LS
			4 368.91	4 370.13	93 311.11–116 193.7	4–2	2.74−03	3.92−04	2.26−02	−2.805	+	LS
			4 368.64	4 369.87	93 311.11–116 195.1	4–4	2.74−04	7.84−05	4.51−03	−3.504	E+	LS
69	$4f-5d$	$^{2}\mathrm{F}^{\circ}-{}^{2}\mathrm{D}$	*10 392.0*	*10 394.9*	*93 799.7–103 419.8*	14–10	1.05−02	1.22−02	5.84+00	−0.768	A	2
			10 392.22	10 395.06	93 799.75–103 419.70	8–6	1.00−02	1.22−02	3.33+00	−1.011	A	2
			10 391.76	10 394.61	93 799.63–103 420.00	6–4	1.06−02	1.14−02	2.34+00	−1.165	A	2
			10 392.09	10 394.93	93 799.63–103 419.70	6–6	5.00−04	8.10−04	1.66−01	−2.313	B+	2
70	$4f-6d$	$^{2}\mathrm{F}^{\circ}-{}^{2}\mathrm{D}$	*6 620.5*	*6 622.3*	*93 799.7–108 900.1*	14–10	4.60−03	2.16−03	6.59−01	−1.519	B+	2
			6 620.57	6 622.40	93 799.75–108 900.02	8–6	4.37−03	2.15−03	3.76−01	−1.764	B+	2
			6 620.44	6 622.27	93 799.63–108 900.20	6–4	4.61−03	2.02−03	2.65−01	−1.916	B+	2
			6 620.52	6 622.35	93 799.63–108 900.02	6–6	2.19−04	1.44−04	1.88−02	−3.063	B	2
71	$4f-7d$	$^{2}\mathrm{F}^{\circ}-{}^{2}\mathrm{D}$	*5 434.04*	*5 435.55*	*93 799.7–112 197.1*	14–10	2.45−03	7.75−04	1.94−01	−1.965	B	2
			5 434.070	5 435.580	93 799.75–112 197.05	8–6	2.33−03	7.74−04	1.11−01	−2.208	B	2
			5 433.999	5 435.509	93 799.63–112 197.17	6–4	2.45−03	7.24−04	7.77−02	−2.362	B	2
			5 434.034	5 435.545	93 799.63–112 197.05	6–6	1.16−04	5.15−05	5.53−03	−3.510	C	2
72	$4f-8d$	$^{2}\mathrm{F}^{\circ}-{}^{2}\mathrm{D}$	*4 868.85*	*4 870.21*	*93 799.7–114 332.7*	14–10	1.49−03	3.77−04	8.47−02	−2.278	C+	2
			4 868.866	4 870.226	93 799.75–114 332.68	8–6	1.41−03	3.75−04	4.81−02	−2.523	C+	2
			4 868.823	4 870.183	93 799.63–114 332.74	6–4	1.50−03	3.55−04	3.41−02	−2.672	C+	2
			4 868.837	4 870.197	93 799.63–114 332.68	6–6	7.10−05	2.52−05	2.43−03	−3.820	C	2
73	$4f-9d$	$^{2}\mathrm{F}^{\circ}-{}^{2}\mathrm{D}$	*4 545.27*	*4 546.55*	*93 799.7–115 794.4*	14–10	1.15−03	2.55−04	5.35−02	−2.447	C+	2
			4 545.288	4 546.562	93 799.75–115 794.39	8–6	1.10−03	2.55−04	3.05−02	−2.690	C+	2
			4 545.253	4 546.527	93 799.63–115 794.44	6–4	1.15−03	2.38−04	2.14−02	−2.845	C+	2
			4 545.263	4 546.537	93 799.63–115 794.39	6–6	5.47−05	1.70−05	1.52−03	−3.991	C	2
74	$5p-6s$	$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{S}$	*17 439.8*	*17 444.5*	*97 464.3–103 196.75*	6–2	2.56−01	3.89−01	1.34+02	0.368	A	2
			17 453.85	17 458.62	97 468.92–103 196.75	4–2	1.71−01	3.90−01	8.96+01	0.193	A	2
			17 411.90	17 416.66	97 455.12–103 196.75	2–2	8.53−02	3.88−01	4.45+01	−0.110	A	2
75	$5p-5d$	$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{D}$	*16 786.6*	*16 791.2*	*97 464.3–103 419.8*	6–10	2.10−01	1.48+00	4.90+02	0.948	A+	2,3
			16 799.93	16 804.52	97 468.92–103 419.70	4–6	2.09−01	1.33+00	2.94+02	0.726	A+	2,3
			16 760.22	16 764.80	97 455.12–103 420.00	2–4	1.75−01	1.48+00	1.63+02	0.471	A+	2,3
			16 799.08	16 803.67	97 468.92–103 420.00	4–4	3.49−02	1.48−01	3.27+01	−0.228	A	2,3
76	$5p-7s$	$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{S}$	*8 831.5*	*8 833.9*	*97 464.3*–108 784.33	6–2	1.10−01	4.31−02	7.52+00	−0.587	B+	2
			8 835.08	8 837.51	97 468.92–108 784.33	4–2	7.36−02	4.31−02	5.01+00	−0.763	B+	2
			8 824.32	8 826.74	97 455.12–108 784.33	2–2	3.69−02	4.31−02	2.50+00	−1.064	B+	2
77	$5p-6d$	$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{D}$	*8 742.1*	*8 744.5*	*97 464.3–108 900.1*	6–10	6.38−02	1.22−01	2.10+01	−0.135	A	2
			8 745.66	8 748.06	97 468.92–108 900.02	4–6	6.37−02	1.10−01	1.26+01	−0.357	A	2

TABLE 44. Transition probabilities of allowed lines for Mg II (references for this table are as follows: 1=Taylor,[103] 2=Froese Fischer,[36] 3=Siegel *et al.*,[84] 4=Ansbacher *et al.*,[2] 5=Theodosiou and Federman,[106] 6=Johnson *et al.*,[47] and 7=Froese Fischer[37])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
			8 734.98	8 737.38	97 455.12–108 900.20	2–4	5.34−02	1.22−01	7.03+00	−0.613	A	2
			8 745.52	8 747.93	97 468.92–108 900.20	4–4	1.06−02	1.22−02	1.40+00	−1.312	A	2
78	$5p-8s$	$^2\mathrm{P}^\circ-{}^2\mathrm{S}$	*6 817.1*	*6 819.0*	*97 464.3–112 129.20*	6–2	6.32−02	1.47−02	1.98+00	−1.055	B+	2
			6 819.27	6 821.15	97 468.92–112 129.20	4–2	4.21−02	1.47−02	1.32+00	−1.231	B+	2
			6 812.86	6 814.74	97 455.12–112 129.20	2–2	2.11−02	1.47−02	6.60−01	−1.532	B+	2
79	$5p-7d$	$^2\mathrm{P}^\circ-{}^2\mathrm{D}$	*6 785.7*	*6 787.6*	*97 464.3–112 197.1*	6–10	2.97−02	3.42−02	4.59+00	−0.688	B+	2
			6 787.85	6 789.73	97 468.92–112 197.05	4–6	2.96−02	3.07−02	2.75+00	−0.911	B+	2
			6 781.45	6 783.32	97 455.12–112 197.17	2–4	2.49−02	3.43−02	1.53+00	−1.164	B+	2
			6 787.80	6 789.67	97 468.92–112 197.17	4–4	4.92−03	3.40−03	3.04−01	−1.866	B	2
80	$5p-9s$	$^2\mathrm{P}^\circ-{}^2\mathrm{S}$	*5 941.9*	*5 943.5*	*97 464.3*–114 289.36	6–2	4.06−02	7.17−03	8.42−01	−1.366	B	2
			5 943.50	5 945.15	97 468.92–114 289.36	4–2	2.71−02	7.17−03	5.61−01	−1.542	B+	2
			5 938.63	5 940.27	97 455.12–114 289.36	2–2	1.36−02	7.18−03	2.81−01	−1.843	B	2
81	$5p-8d$	$^2\mathrm{P}^\circ-{}^2\mathrm{D}$	*5 926.6*	*5 928.2*	*97 464.3–114 332.7*	6–10	1.67−02	1.47−02	1.72+00	−1.055	B+	2
			5 928.23	5 929.88	97 468.92–114 332.68	4–6	1.66−02	1.32−02	1.03+00	−1.277	B+	2
			5 923.36	5 925.01	97 455.12–114 332.74	2–4	1.40−02	1.47−02	5.74−01	−1.532	B+	2
			5 928.21	5 929.85	97 468.92–114 332.74	4–4	2.76−03	1.46−03	1.14−01	−2.234	B	2
82	$5p-10s$	$^2\mathrm{P}^\circ-{}^2\mathrm{S}$	*5 462.76*	*5 464.27*	*97 464.3*–115 764.99	6–2	3.33−02	4.97−03	5.37−01	−1.525	B+	2
			5 464.136	5 465.655	97 468.92–115 764.99	4–2	2.22−02	4.97−03	3.58−01	−1.702	B+	2
			5 460.018	5 461.535	97 455.12–115 764.99	2–2	1.11−02	4.98−03	1.79−01	−2.002	B+	2
83	$5p-9d$	$^2\mathrm{P}^\circ-{}^2\mathrm{D}$	*5 453.99*	*5 455.51*	*97 464.3–115 794.4*	6–10	1.22−02	9.10−03	9.81−01	−1.263	B	2
			5 455.370	5 456.886	97 468.92–115 794.39	4–6	1.22−02	8.17−03	5.87−01	−1.486	B+	2
			5 451.250	5 452.765	97 455.12–115 794.44	2–4	1.03−02	9.14−03	3.28−01	−1.738	B	2
			5 455.355	5 456.871	97 468.92–115 794.44	4–4	2.03−03	9.04−04	6.50−02	−2.442	B	2
84	$5p-10d$	$^2\mathrm{P}^\circ-{}^2\mathrm{D}$	*5 160.08*	*5 161.50*	*97 464.3–116 838.5*	6–10	5.24−03	3.49−03	3.56−01	−1.679	D	1
			5 161.310	5 162.748	97 468.92–116 838.45	4–6	5.24−03	3.14−03	2.13−01	−1.901	D	LS
			5 157.628	5 159.064	97 455.12–116 838.48	2–4	4.37−03	3.49−03	1.19−01	−2.156	D	LS
			5 161.302	5 162.740	97 468.92–116 838.48	4–4	8.73−04	3.49−04	2.37−02	−2.855	E+	LS
85	$6s-6p$	$^2\mathrm{S}-{}^2\mathrm{P}^\circ$		*2 430.6 cm^{-1}*	*103 196.75–105 627.3*	2–6	2.94−02	2.24+00	6.07+02	0.651	A	2
				2 432.97 cm^{-1}	103 196.75–105 629.72	2–4	2.95−02	1.49+00	4.05+02	0.474	A	2
				2 425.59 cm^{-1}	103 196.75–105 622.34	2–2	2.93−02	7.46−01	2.03+02	0.174	A	2
86	$6s-7p$	$^2\mathrm{S}-{}^2\mathrm{P}^\circ$	*14 261.9*	*14 265.8*	103 196.75–*110 206.5*	2–6	1.13−03	1.03−02	9.68−01	−1.686	B	2
			14 258.91	14 262.81	103 196.75–110 207.99	2–4	1.15−03	6.99−03	6.56−01	−1.854	B+	2
			14 267.89	14 271.79	103 196.75–110 203.58	2–2	1.09−03	3.32−03	3.12−01	−2.178	B	2
87	$6s-8p$	$^2\mathrm{S}-{}^2\mathrm{P}^\circ$	*10 164.6*	*10 167.4*	103 196.75–*113 032.1*	2–6	1.12−04	5.23−04	3.50−02	−2.980	C+	2
			10 163.60	10 166.38	103 196.75–113 033.09	2–4	1.18−04	3.64−04	2.44−02	−3.138	C+	2
			10 166.53	10 169.32	103 196.75–113 030.25	2–2	1.02−04	1.59−04	1.06−02	−3.498	C+	2
88	$6s-9p$	$^2\mathrm{S}-{}^2\mathrm{P}^\circ$	*8 543.7*	*8 546.0*	*103 196.75–114 898.1*	2–6	7.64−06	2.51−05	1.41−03	−4.299	C	2
			8 543.22	8 545.57	103 196.75–114 898.72	2–4	8.70−06	1.91−05	1.07−03	−4.418	C	2
			8 544.63	8 546.98	103 196.75–114 896.79	2–2	5.52−06	6.04−06	3.40−04	−4.918	D+	2
89	$5d-5f$	$^2\mathrm{D}-{}^2\mathrm{F}^\circ$		*270.1 cm^{-1}*	*103 419.8–103 689.9*	10–14	3.90−05	1.12−01	1.37+03	0.049	A	2
				270.22 cm^{-1}	103 419.70–103 689.92	6–8	3.90−05	1.07−01	7.81+02	−0.192	A	2

TABLE 44. Transition probabilities of allowed lines for Mg II (references for this table are as follows: 1=Taylor,[103] 2=Froese Fischer,[36] 3=Siegel *et al.*,[84] 4=Ansbacher *et al.*,[2] 5=Theodosiou and Federman,[106] 6=Johnson *et al.*,[47] and 7=Froese Fischer[37])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				269.86 cm^{-1}	103 420.00–103 689.86	4–6	3.63−05	1.12−01	5.47+02	−0.349	A	2
				270.16 cm^{-1}	103 419.70–103 689.86	6–6	2.60−06	5.34−03	3.91+01	−1.494	A	2
90	$5d-6p$	^{2}D–^{2}P$^\circ$		*2 207.5 cm^{-1}*	*103 419.8–105 627.3*	10–6	2.96−02	5.47−01	8.15+02	0.738	A	2
				2 210.02 cm^{-1}	103 419.70–105 629.72	6–4	2.67−02	5.47−01	4.89+02	0.516	A	2
				2 202.34 cm^{-1}	103 420.00–105 622.34	4–2	2.94−02	4.55−01	2.72+02	0.260	A	2
				2 209.72 cm^{-1}	103 420.00–105 629.72	4–4	2.97−03	9.11−02	5.43+01	−0.438	A	2
91	$5d-6f$	^{2}D–^{2}F$^\circ$	*17 717.7*	*17 722.6*	*103 419.8–109 062.3*	10–14	1.18−01	7.75−01	4.52+02	0.889	A	2
			17 717.33	17 722.17	103 419.70–109 062.35	6–8	1.18−01	7.39−01	2.59+02	0.647	A	2
			17 718.37	17 723.21	103 420.00–109 062.32	4–6	1.09−01	7.73−01	1.81+02	0.490	A	2
			17 717.43	17 722.26	103 419.70–109 062.32	6–6	7.84−03	3.69−02	1.29+01	−0.655	A	2
92	$5d-7p$	^{2}D–^{2}P$^\circ$	*14 730.7*	*14 734.7*	*103 419.8–110 206.5*	10–6	5.57−03	1.09−02	5.28+00	−0.963	B+	2
			14 727.23	14 731.25	103 419.70–110 207.99	6–4	5.04−03	1.09−02	3.18+00	−1.184	B+	2
			14 737.45	14 741.48	103 420.00–110 203.58	4–2	5.52−03	8.98−03	1.74+00	−1.445	B+	2
			14 727.88	14 731.90	103 420.00–110 207.99	4–4	5.62−04	1.83−03	3.55−01	−2.135	B	2
93	$5d-7f$	^{2}D–^{2}F$^\circ$	*11 256.1*	*11 259.1*	*103 419.8–112 301.5*	10–14	7.20−02	1.92−01	7.10+01	0.283	A	2
			11 255.93	11 259.02	103 419.70–112 301.47	6–8	7.20−02	1.83−01	4.06+01	0.041	A	2
			11 256.32	11 259.40	103 420.00–112 301.47	4–6	6.71−02	1.91−01	2.84+01	−0.117	A	2
			11 255.93	11 259.02	103 419.70–112 301.47	6–6	4.80−03	9.13−03	2.03+00	−1.261	B+	2
94	$5d-8p$	^{2}D–^{2}P$^\circ$	*10 400.5*	*10 403.3*	*103 419.8–113 032.1*	10–6	3.04−03	2.96−03	1.01+00	−1.529	B	2
			10 399.31	10 402.16	103 419.70–113 033.09	6–4	2.74−03	2.97−03	6.10−01	−1.749	B+	2
			10 402.71	10 405.56	103 420.00–113 030.25	4–2	3.01−03	2.44−03	3.35−01	−2.011	B	2
			10 399.63	10 402.48	103 420.00–113 033.09	4–4	3.07−04	4.98−04	6.82−02	−2.701	B	2
95	$5d-8f$	^{2}D–^{2}F$^\circ$	*9 101.9*	*9 104.3*	*103 419.8–114 403.6*	10–14	4.66−02	8.10−02	2.43+01	−0.092	B+	2
			9 101.78	9 104.28	103 419.70–114 403.55	6–8	4.66−02	7.72−02	1.39+01	−0.334	B+	2
			9 102.03	9 104.52	103 420.00–114 403.55	4–6	4.34−02	8.10−02	9.71+00	−0.489	B+	2
			9 101.78	9 104.28	103 419.70–114 403.55	6–6	3.10−03	3.86−03	6.94−01	−1.635	B+	2
96	$5d-9p$	^{2}D–^{2}P$^\circ$	*8 709.7*	*8 712.1*	*103 419.8–114 898.1*	10–6	2.02−03	1.38−03	3.96−01	−1.860	B	2
			8 709.15	8 711.55	103 419.70–114 898.72	6–4	1.83−03	1.39−03	2.38−01	−2.079	B	2
			8 710.85	8 713.24	103 420.00–114 896.79	4–2	2.00−03	1.14−03	1.31−01	−2.341	B	2
			8 709.38	8 711.77	103 420.00–114 898.72	4–4	2.04−04	2.32−04	2.66−02	−3.032	C+	2
97	$5d-9f$	^{2}D–^{2}F$^\circ$	*8 046.2*	*8 048.4*	*103 419.8–115 844.6*	10–14	3.67−02	4.99−02	1.32+01	−0.302	B+	2
			8 046.14	8 048.35	103 419.70–115 844.60	6–8	3.67−02	4.75−02	7.55+00	−0.545	B+	2
			8 046.34	8 048.55	103 420.00–115 844.60	4–6	3.42−02	4.98−02	5.28+00	−0.701	B+	2
			8 046.14	8 048.35	103 419.70–115 844.60	6–6	2.45−03	2.37−03	3.78−01	−1.847	B	2
98	$5d-10p$	^{2}D–^{2}P$^\circ$	*7 826*	*7 828*	*103 419.8–116 195*	10–6	1.88−03	1.04−03	2.68−01	−1.983	D	1
			7 825.4	7 827.5	103 419.70–116 195.1	6–4	1.70−03	1.04−03	1.61−01	−2.205	D	LS
			7 826.4	7 828.6	103 420.00–116 193.7	4–2	1.88−03	8.64−04	8.91−02	−2.461	D	LS
			7 825.6	7 827.7	103 420.00–116 195.1	4–4	1.88−04	1.73−04	1.78−02	−3.160	E+	LS
99	$5f-6d$	^{2}F$^\circ$–^{2}D	*19 188*	*19 193*	*103 689.9–108 900.1*	14–10	7.93−03	3.13−02	2.77+01	−0.358	A	2
			19 188.3	19 193.5	103 689.92–108 900.02	8–6	7.54−03	3.12−02	1.58+01	−0.603	A	2
			19 187.4	19 192.6	103 689.86–108 900.20	6–4	7.96−03	2.93−02	1.11+01	−0.755	A	2
			19 188.0	19 193.3	103 689.86–108 900.02	6–6	3.77−04	2.08−03	7.89−01	−1.904	A	2
100	$5f-7d$	^{2}F$^\circ$–^{2}D	*11 751.5*	*11 754.7*	*103 689.9–112 197.1*	14–10	3.96−03	5.85−03	3.17+00	−1.087	B+	2

TABLE 44. Transition probabilities of allowed lines for Mg II (references for this table are as follows: 1=Taylor,[103] 2=Froese Fischer,[36] 3=Siegel *et al.*,[84] 4=Ansbacher *et al.*,[2] 5=Theodosiou and Federman,[106] 6=Johnson *et al.*,[47] and 7=Froese Fischer[37])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
			11 751.63	11 754.85	103 689.92–112 197.05	8–6	3.76−03	5.84−03	1.81+00	−1.330	B+	2
			11 751.38	11 754.60	103 689.86–112 197.17	6–4	3.97−03	5.48−03	1.27+00	−1.483	B+	2
			11 751.55	11 754.76	103 689.86–112 197.05	6–6	1.88−04	3.89−04	9.04−02	−2.632	B	2
101	$5f-8d$	$^{2}\mathrm{F}^{\circ}-{}^{2}\mathrm{D}$	*9 393.4*	*9 396.0*	*103 689.9–114 332.7*	14–10	2.29−03	2.17−03	9.38−01	−1.517	B	2
			9 393.48	9 396.06	103 689.92–114 332.68	8–6	2.18−03	2.16−03	5.34−01	−1.762	B	2
			9 393.38	9 395.95	103 689.86–114 332.74	6–4	2.30−03	2.03−03	3.77−01	−1.914	B	2
			9 393.43	9 396.01	103 689.86–114 332.68	6–6	1.09−04	1.44−04	2.68−02	−3.063	C+	2
102	$5f-9d$	$^{2}\mathrm{F}^{\circ}-{}^{2}\mathrm{D}$	*8 259.1*	*8 261.4*	*103 689.9–115 794.4*	14–10	1.70−03	1.24−03	4.74−01	−1.760	B	2
			8 259.14	8 261.41	103 689.92–115 794.39	8–6	1.62−03	1.24−03	2.70−01	−2.003	B	2
			8 259.07	8 261.34	103 689.86–115 794.44	6–4	1.71−03	1.16−03	1.90−01	−2.157	B	2
			8 259.10	8 261.37	103 689.86–115 794.39	6–6	8.09−05	8.28−05	1.35−02	−3.304	C+	2
103	$5f-10d$	$^{2}\mathrm{F}^{\circ}-{}^{2}\mathrm{D}$	*7 603.3*	*7 605.4*	*103 689.9–116 838.5*	14–10	1.17−03	7.22−04	2.53−01	−1.995	D	1
			7 603.32	7 605.41	103 689.92–116 838.45	8–6	1.11−03	7.22−04	1.45−01	−2.238	D	LS
			7 603.27	7 605.36	103 689.86–116 838.48	6–4	1.17−03	6.74−04	1.01−01	−2.393	D	LS
			7 603.29	7 605.38	103 689.86–116 838.45	6–6	5.55−05	4.81−05	7.23−03	−3.540	E+	LS
104	$6p-7s$	$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{S}$		*3 157.0 cm^{-1}*	*105 627.3*–108 784.33	6–2	1.01−01	5.07−01	3.18+02	0.483	A	2
				3 154.61 cm^{-1}	105 629.72–108 784.33	4–2	6.75−02	5.08−01	2.12+02	0.308	A	2
				3 161.99 cm^{-1}	105 622.34–108 784.33	2–2	3.38−02	5.06−01	1.05+02	0.005	A	2
105	$6p-6d$	$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{D}$		*3 272.8 cm^{-1}*	*105 627.3–108 900.1*	6–10	7.25−02	1.69+00	1.02+03	1.006	A	2
				3 270.30 cm^{-1}	105 629.72–108 900.02	4–6	7.24−02	1.52+00	6.13+02	0.784	A	2
				3 277.86 cm^{-1}	105 622.34–108 900.20	2–4	6.05−02	1.69+00	3.39+02	0.529	A	2
				3 270.48 cm^{-1}	105 629.72–108 900.20	4–4	1.21−02	1.69−01	6.82+01	−0.170	A	2
106	$6p-8s$	$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{S}$	*15 375.8*	*15 380.1*	*105 627.3*–112 129.20	6–2	4.65−02	5.50−02	1.67+01	−0.481	B+	2
			15 381.64	15 385.85	105 629.72–112 129.20	4–2	3.10−02	5.49−02	1.11+01	−0.658	B+	2
			15 364.20	15 368.40	105 622.34–112 129.20	2–2	1.55−02	5.50−02	5.56+00	−0.959	B+	2
107	$6p-7d$	$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{D}$	*15 216.9*	*15 221.2*	*105 627.3–112 197.1*	6–10	2.65−02	1.53−01	4.61+01	−0.037	B+	2
			15 222.73	15 226.89	105 629.72–112 197.05	4–6	2.64−02	1.38−01	2.76+01	−0.258	A	2
			15 205.36	15 209.52	105 622.34–112 197.17	2–4	2.22−02	1.54−01	1.54+01	−0.511	B+	2
			15 222.45	15 226.61	105 629.72–112 197.17	4–4	4.40−03	1.53−02	3.07+00	−1.213	B+	2
108	$6p-9s$	$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{S}$	*11 541.4*	*11 544.6*	*105 627.3*–114 289.36	6–2	2.82−02	1.88−02	4.28+00	−0.948	B+	2
			11 544.66	11 547.82	105 629.72–114 289.36	4–2	1.88−02	1.88−02	2.85+00	−1.124	B+	2
			11 534.83	11 537.99	105 622.34–114 289.36	2–2	9.42−03	1.88−02	1.43+00	−1.425	B+	2
109	$6p-8d$	$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{D}$	*11 483.9*	*11 487.1*	*105 627.3–114 332.7*	6–10	1.38−02	4.56−02	1.03+01	−0.563	B+	2
			11 487.20	11 490.34	105 629.72–114 332.68	4–6	1.38−02	4.10−02	6.20+00	−0.785	B+	2
			11 477.39	11 480.53	105 622.34–114 332.74	2–4	1.16−02	4.57−02	3.46+00	−1.039	B+	2
			11 487.12	11 490.26	105 629.72–114 332.74	4–4	2.29−03	4.54−03	6.87−01	−1.741	B+	2
110	$6p-10s$	$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{S}$	*9 861.4*	*9 864.2*	*105 627.3*–115 764.99	6–2	2.21−02	1.08−02	2.10+00	−1.188	A	2
			9 863.83	9 866.54	105 629.72–115 764.99	4–2	1.47−02	1.08−02	1.40+00	−1.365	A	2
			9 856.65	9 859.36	105 622.34–115 764.99	2–2	7.40−03	1.08−02	7.00−01	−1.666	A	2
111	$6p-9d$	$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{D}$	*9 832.9*	*9 835.6*	*105 627.3–115 794.4*	6–10	9.65−03	2.33−02	4.53+00	−0.854	B+	2
			9 835.30	9 838.00	105 629.72–115 794.39	4–6	9.63−03	2.10−02	2.72+00	−1.076	B+	2
			9 828.12	9 830.81	105 622.34–115 794.44	2–4	8.08−03	2.34−02	1.52+00	−1.330	B+	2

TABLE 44. Transition probabilities of allowed lines for Mg II (references for this table are as follows: 1=Taylor,[103] 2=Froese Fischer,[36] 3=Siegel *et al.*,[84] 4=Ansbacher *et al.*,[2] 5=Theodosiou and Federman,[106] 6=Johnson *et al.*,[47] and 7=Froese Fischer[37])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
			9 835.25	9 837.95	105 629.72–115 794.44	4–4	1.60−03	2.32−03	3.01−01	−2.032	B	2
112	$6p$−$10d$	^{2}P°−^{2}D	*8 917.2*	*8 919.7*	*105 627.3–116 838.5*	6–10	4.41−03	8.77−03	1.55+00	−1.279	D+	1
			8 919.17	8 921.62	105 629.72–116 838.45	4–6	4.41−03	7.89−03	9.27−01	−1.501	D+	LS
			8 913.28	8 915.72	105 622.34–116 838.48	2–4	3.68−03	8.78−03	5.15−01	−1.755	E+	LS
			8 919.14	8 921.59	105 629.72–116 838.48	4–4	7.35−04	8.77−04	1.03−01	−2.455	D	LS
113	$7s$−$7p$	^{2}S−^{2}P°		*1 422.2 cm^{-1}*	108 784.33–*110 206.5*	2–6	1.19−02	2.65+00	1.23+03	0.724	A	2
				1 423.66 cm^{-1}	108 784.33–110 207.99	2–4	1.20−02	1.77+00	8.18+02	0.549	A	2
				1 419.25 cm^{-1}	108 784.33–110 203.58	2–2	1.19−02	8.83−01	4.10+02	0.247	A	2
114	$7s$−$8p$	^{2}S−^{2}P°		*4 247.8 cm^{-1}*	108 784.33–*113 032.1*	2–6	6.30−04	1.57−02	2.43+00	−1.503	B+	2
				4 248.76 cm^{-1}	108 784.33–113 033.09	2–4	6.39−04	1.06−02	1.65+00	−1.674	B+	2
				4 245.92 cm^{-1}	108 784.33–113 030.25	2–2	6.11−04	5.08−03	7.87−01	−1.993	B+	2
115	$7s$−$9p$	^{2}S−^{2}P°	*16 352.1*	*16 356.5*	108 784.33–*114 898.1*	2–6	1.02−04	1.23−03	1.32−01	−2.609	B	2
			16 350.39	16 354.86	108 784.33–114 898.72	2–4	1.05−04	8.46−04	9.11−02	−2.772	B	2
			16 355.56	16 360.03	108 784.33–114 896.79	2–2	9.58−05	3.84−04	4.14−02	−3.115	C+	2
116	$6d$−$6f$	^{2}D−^{2}F°		*162.2 cm^{-1}*	*108 900.1–109 062.3*	10–14	2.05−05	1.63−01	3.31+03	0.212	A	2
				162.33 cm^{-1}	108 900.02–109 062.35	6–8	2.05−05	1.56−01	1.89+03	−0.029	A	2
				162.12 cm^{-1}	108 900.20–109 062.32	4–6	1.91−05	1.63−01	1.33+03	−0.186	A	2
				162.30 cm^{-1}	108 900.02–109 062.32	6–6	1.37−06	7.78−03	9.47+01	−1.331	A	2
117	$6d$−$7p$	^{2}D−^{2}P°		*1 306.4 cm^{-1}*	*108 900.1–110 206.5*	10–6	1.37−02	7.20−01	1.82+03	0.857	A	2
				1 307.97 cm^{-1}	108 900.02–110 207.99	6–4	1.23−02	7.21−01	1.09+03	0.636	A	2
				1 303.38 cm^{-1}	108 900.20–110 203.58	4–2	1.36−02	5.99−01	6.06+02	0.379	A	2
				1 307.79 cm^{-1}	108 900.20–110 207.99	4–4	1.37−03	1.20−01	1.21+02	−0.319	A	2
118	$6d$−$7f$	^{2}D−^{2}F°		*3 401.4 cm^{-1}*	*108 900.1–112 301.5*	10–14	4.13−02	7.49−01	7.25+02	0.874	A	2
				3 401.45 cm^{-1}	108 900.02–112 301.47	6–8	4.14−02	7.15−01	4.15+02	0.632	A	2
				3 401.27 cm^{-1}	108 900.20–112 301.47	4–6	3.85−02	7.48−01	2.90+02	0.476	A	2
				3 401.45 cm^{-1}	108 900.02–112 301.47	6–6	2.76−03	3.57−02	2.07+01	−0.669	B+	2
119	$6d$−$8p$	^{2}D−^{2}P°		*4 132.0 cm^{-1}^{a}*	*108 900.1–113 032.1*	10–6	2.50−03	1.32−02	1.05+01	−0.879	B+	2
				4 133.07 cm^{-1}	108 900.02–113 033.09	6–4	2.26−03	1.32−02	6.33+00	−1.101	B+	2
				4 130.05 cm^{-1}	108 900.20–113 030.25	4–2	2.48−03	1.09−02	3.47+00	−1.361	B+	2
				4 132.89 cm^{-1}	108 900.20–113 033.09	4–4	2.53−04	2.22−03	7.07−01	−2.052	B+	2
120	$6d$−$8f$	^{2}D−^{2}F°	*18 165*	*18 170*	*108 900.1–114 403.6*	10–14	2.82−02	1.95−01	1.17+02	0.290	A	2
			18 165.2	18 170.2	108 900.02–114 403.55	6–8	2.82−02	1.86−01	6.68+01	0.048	A	2
			18 165.8	18 170.8	108 900.20–114 403.55	4–6	2.63−02	1.95−01	4.67+01	−0.108	A	2
			18 165.2	18 170.2	108 900.02–114 403.55	6–6	1.88−03	9.30−03	3.34+00	−1.253	B+	2
121	$6d$−$9p$	^{2}D−^{2}P°	*16 667.7*	*16 672.2*	*108 900.1–114 898.1*	10–6	1.43−03	3.58−03	1.97+00	−1.446	B+	2
			16 665.73	16 670.28	108 900.02–114 898.72	6–4	1.30−03	3.60−03	1.19+00	−1.666	B+	2
			16 671.59	16 676.14	108 900.20–114 896.79	4–2	1.42−03	2.95−03	6.49−01	−1.928	B+	2
			16 666.23	16 670.78	108 900.20–114 898.72	4–4	1.45−04	6.04−04	1.33−01	−2.617	B	2
122	$6d$−$9f$	^{2}D−^{2}F°	*14 395.9*	*14 399.9*	*108 900.1–115 844.6*	10–14	2.22−02	9.65−02	4.58+01	−0.015	B+	2
			14 395.78	14 399.72	108 900.02–115 844.60	6–8	2.22−02	9.20−02	2.62+01	−0.258	A	2
			14 396.16	14 400.09	108 900.20–115 844.60	4–6	2.07−02	9.65−02	1.83+01	−0.413	B+	2
			14 395.78	14 399.72	108 900.02–115 844.60	6–6	1.48−03	4.60−03	1.31+00	−1.559	B+	2

TABLE 44. Transition probabilities of allowed lines for Mg II (references for this table are as follows: 1=Taylor,[103] 2=Froese Fischer,[36] 3=Siegel *et al.*,[84] 4=Ansbacher *et al.*,[2] 5=Theodosiou and Federman,[106] 6=Johnson *et al.*,[47] and 7=Froese Fischer[37])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})$^{\text{a}}$	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
123	$6d-10p$	^{2}D$-^2$P$^\circ$	*13 705*	*13 708*	*108 900.1–116 195*	10–6	1.33−03	2.24−03	1.01+00	−1.650	D+	1
			13 704.1	13 707.9	108 900.02–116 195.1	6–4	1.19−03	2.24−03	6.07−01	−1.872	D+	LS
			13 707.1	13 710.8	108 900.20–116 193.7	4–2	1.33−03	1.87−03	3.38−01	−2.126	D+	LS
			13 704.5	13 708.2	108 900.20–116 195.1	4–4	1.33−04	3.74−04	6.75−02	−2.825	D	LS
124	$6f-7d$	^{2}F$^\circ-^2$D		*3 134.8 cm^{-1}*	*109 062.3–112 197.1*	14–10	5.03−03	5.48−02	8.06+01	−0.115	A	2
				3 134.70 cm^{-1}	109 062.35–112 197.05	8–6	4.78−03	5.47−02	4.59+01	−0.359	A	2
				3 134.85 cm^{-1}	109 062.32–112 197.17	6–4	5.05−03	5.13−02	3.23+01	−0.512	A	2
				3 134.73 cm^{-1}	109 062.32–112 197.05	6–6	2.39−04	3.65−03	2.30+00	−1.660	B+	2
125	$6f-8d$	^{2}F$^\circ-^2$D	*18 969*	*18 974*	*109 062.3–114 332.7*	14–10	2.77−03	1.07−02	9.35+00	−0.824	B+	2
			18 969.0	18 974.1	109 062.35–114 332.68	8–6	2.64−03	1.07−02	5.33+00	−1.068	B+	2
			18 968.6	18 973.8	109 062.32–114 332.74	6–4	2.78−03	1.00−02	3.75+00	−1.222	B+	2
			18 968.9	18 974.0	109 062.32–114 332.68	6–6	1.32−04	7.12−04	2.67−01	−2.369	B	2
126	$6f-9d$	^{2}F$^\circ-^2$D	*14 850.2*	*14 854.2*	*109 062.3–115 794.4*	14–10	1.94−03	4.59−03	3.14+00	−1.192	B+	2
			14 850.28	14 854.34	109 062.35–115 794.39	8–6	1.85−03	4.58−03	1.79+00	−1.436	B+	2
			14 850.10	14 854.16	109 062.32–115 794.44	6–4	1.95−03	4.29−03	1.26+00	−1.589	B+	2
			14 850.21	14 854.27	109 062.32–115 794.39	6–6	9.23−05	3.05−04	8.96−02	−2.738	B	2
127	$6f-10d$	^{2}F$^\circ-^2$D	*12 856.4*	*12 859.8*	*109 062.3–116 838.5*	14–10	1.30−03	2.30−03	1.36+00	−1.492	D+	1
			12 856.40	12 859.92	109 062.35–116 838.45	8–6	1.24−03	2.30−03	7.79−01	−1.735	D+	LS
			12 856.30	12 859.82	109 062.32–116 838.48	6–4	1.30−03	2.15−03	5.46−01	−1.889	D+	LS
			12 856.35	12 859.87	109 062.32–116 838.45	6–6	6.17−05	1.53−04	3.89−02	−3.037	E+	LS
128	$7p-8s$	^{2}P$^\circ-^2$S		*1 922.7 cm^{-1}*	*110 206.5–112 129.20*	6–2	4.63−02	6.25−01	6.43+02	0.574	A	2
				1 921.21 cm^{-1}	110 207.99–112 129.20	4–2	3.08−02	6.26−01	4.29+02	0.399	A	2
				1 925.62 cm^{-1}	110 203.58–112 129.20	2–2	1.54−02	6.24−01	2.13+02	0.096	A	2
129	$7p-7d$	^{2}P$^\circ-^2$D		*1 990.6 cm^{-1}*	*110 206.5–112 197.1*	6–10	3.03−02	1.91+00	1.90+03	1.059	A	2
				1 989.06 cm^{-1}	110 207.99–112 197.05	4–6	3.03−02	1.72+00	1.14+03	0.838	A	2
				1 993.59 cm^{-1}	110 203.58–112 197.17	2–4	2.53−02	1.91+00	6.31+02	0.582	A	2
				1 989.18 cm^{-1}	110 207.99–112 197.17	4–4	5.06−03	1.92−01	1.27+02	−0.115	A	2
130	$7p-9s$	^{2}P$^\circ-^2$S		*4 082.9 cm^{-1}*	*110 206.5*–114 289.36	6–2	2.24−02	6.71−02	3.24+01	−0.395	B+	2
				4 081.37 cm^{-1}	110 207.99–114 289.36	4–2	1.49−02	6.70−02	2.16+01	−0.572	B+	2
				4 085.78 cm^{-1}	110 203.58–114 289.36	2–2	7.47−03	6.71−02	1.08+01	−0.872	B+	2
131	$7p-8d$	^{2}P$^\circ-^2$D		*4 126.2 cm^{-1}*	*110 206.5–114 332.7*	6–10	1.25−02	1.83−01	8.76+01	0.041	A	2
				4 124.69 cm^{-1}	110 207.99–114 332.68	4–6	1.25−02	1.65−01	5.25+01	−0.180	A	2
				4 129.16 cm^{-1}	110 203.58–114 332.74	2–4	1.04−02	1.83−01	2.93+01	−0.437	A	2
				4 124.75 cm^{-1}	110 207.99–114 332.74	4–4	2.07−03	1.83−02	5.83+00	−1.135	B+	2
132	$7p-10s$	^{2}P$^\circ-^2$S	*17 986*	*17 990*	*110 206.5*–115 764.99	6–2	1.61−02	2.60−02	9.24+00	−0.807	B+	2
			17 990.4	17 995.3	110 207.99–115 764.99	4–2	1.07−02	2.60−02	6.16+00	−0.983	B+	2
			17 976.1	17 981.1	110 203.58–115 764.99	2–2	5.37−03	2.60−02	3.08+00	−1.284	B+	2
133	$7p-9d$	^{2}P$^\circ-^2$D	*17 891*	*17 896*	*110 206.5–115 794.4*	6–10	7.88−03	6.31−02	2.23+01	−0.422	B+	2
			17 895.7	17 900.6	110 207.99–115 794.39	4–6	7.87−03	5.67−02	1.34+01	−0.644	B+	2
			17 881.5	17 886.3	110 203.58–115 794.44	2–4	6.60−03	6.33−02	7.45+00	−0.898	B+	2
			17 895.6	17 900.5	110 207.99–115 794.44	4–4	1.31−03	6.29−03	1.48+00	−1.599	B+	2
134	$7p-10d$	^{2}P$^\circ-^2$D	*15 074.4*	*15 078.4*	*110 206.5–116 838.5*	6–10	3.75−03	2.13−02	6.35+00	−0.893	D	1

TABLE 44. Transition probabilities of allowed lines for Mg II (references for this table are as follows: 1=Taylor,[103] 2=Froese Fischer,[36] 3=Siegel *et al.*,[84] 4=Ansbacher *et al.*,[2] 5=Theodosiou and Federman,[106] 6=Johnson *et al.*,[47] and 7=Froese Fischer[37])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
			15 077.79	15 081.91	110 207.99–116 838.45	4–6	3.75−03	1.92−02	3.81+00	−1.115	D	LS
			15 067.70	15 071.82	110 203.58–116 838.48	2–4	3.13−03	2.13−02	2.11+00	−1.371	D	LS
			15 077.72	15 081.84	110 207.99–116 838.48	4–4	6.25−04	2.13−03	4.23−01	−2.070	E+	LS
135	$8s-8p$	$^2S-^2P^\circ$		*902.9 cm^{-1}*	112 129.20–*113 032.1*	2–6	5.55−03	3.06+00	2.23+03	0.787	A	2
				903.89 cm^{-1}	112 129.20–113 033.09	2–4	5.56−03	2.04+00	1.49+03	0.611	A	2
				901.05 cm^{-1}	112 129.20–113 030.25	2–2	5.52−03	1.02+00	7.45+02	0.310	A	2
136	$8s-9p$	$^2S-^2P^\circ$		*2 768.9 cm^{-1}*	112 129.20–*114 898.1*	2–6	3.63−04	2.13−02	5.06+00	−1.371	B+	2
				2 769.52 cm^{-1}	112 129.20–114 898.72	2–4	3.68−04	1.44−02	3.42+00	−1.541	B+	2
				2 767.59 cm^{-1}	112 129.20–114 896.79	2–2	3.53−04	6.91−03	1.64+00	−1.859	B+	2
137	$7d-7f$	$^2D-^2F^\circ$		*104.4 cm^{-1}*	*112 197.1–112 301.5*	10–14	1.10−05	2.12−01	6.67+03	0.326	A	2
				104.42 cm^{-1}	112 197.05–112 301.47	6–8	1.10−05	2.02−01	3.81+03	0.084	A	2
				104.30 cm^{-1}	112 197.17–112 301.47	4–6	1.02−05	2.11−01	2.67+03	−0.074	A	2
				104.42 cm^{-1}	112 197.05–112 301.47	6–6	7.33−07	1.01−02	1.91+02	−1.218	A	2
138	$7d-8p$	$^2D-^2P^\circ$		*835.0 cm^{-1}*	*112 197.1–113 032.1*	10–6	6.91−03	8.91−01	3.51+03	0.950	A	2
				836.04 cm^{-1}	112 197.05–113 033.09	6–4	6.23−03	8.91−01	2.11+03	0.728	A	2
				833.08 cm^{-1}	112 197.17–113 030.25	4–2	6.86−03	7.41−01	1.17+03	0.472	A	2
				835.92 cm^{-1}	112 197.17–113 033.09	4–4	6.92−04	1.48−01	2.34+02	−0.228	A	2
139	$7d-8f$	$^2D-^2F^\circ$		*2 206.5 cm^{-1}*	*112 197.1–114 403.6*	10–14	1.73−02	7.46−01	1.11+03	0.873	A	2
				2 206.50 cm^{-1}	112 197.05–114 403.55	6–8	1.73−02	7.12−01	6.37+02	0.631	A	2
				2 206.38 cm^{-1}	112 197.17–114 403.55	4–6	1.61−02	7.45−01	4.45+02	0.474	A	2
				2 206.50 cm^{-1}	112 197.05–114 403.55	6–6	1.16−03	3.56−02	3.19+01	−0.670	A	2
140	$7d-9p$	$^2D-^2P^\circ$		*2 701.0 cm^{-1}*	*112 197.1–114 898.1*	10–6	1.24−03	1.53−02	1.87+01	−0.815	B+	2
				2 701.67 cm^{-1}	112 197.05–114 898.72	6–4	1.13−03	1.54−02	1.13+01	−1.034	B+	2
				2 699.62 cm^{-1}	112 197.17–114 896.79	4–2	1.23−03	1.27−02	6.17+00	−1.294	B+	2
				2 701.55 cm^{-1}	112 197.17–114 898.72	4–4	1.26−04	2.58−03	1.26+00	−1.986	B+	2
141	$7d-9f$	$^2D-^2F^\circ$		*3 647.5 cm^{-1}*	*112 197.1–115 844.6*	10–14	1.39−02	2.19−01	1.98+02	0.340	A	2
				3 647.55 cm^{-1}	112 197.05–115 844.60	6–8	1.39−02	2.09−01	1.13+02	0.098	A	2
				3 647.43 cm^{-1}	112 197.17–115 844.60	4–6	1.30−02	2.19−01	7.91+01	−0.057	A	2
				3 647.55 cm^{-1}	112 197.05–115 844.60	6–6	9.27−04	1.04−02	5.66+00	−1.205	B+	2
142	$7d-10p$	$^2D-^2P^\circ$		*3 998 cm^{-1}*	*112 197.1–116 195*	10–6	1.01−03	5.68−03	4.68+00	−1.246	D	1
				3 998.1 cm^{-1}	112 197.05–116 195.1	6–4	9.08−04	5.68−03	2.81+00	−1.468	D	LS
				3 996.5 cm^{-1}	112 197.17–116 193.7	4–2	1.01−03	4.73−03	1.56+00	−1.723	D	LS
				3 997.9 cm^{-1}	112 197.17–116 195.1	4–4	1.01−04	9.47−04	3.12−01	−2.422	E+	LS
143	$7f-8d$	$^2F^\circ-^2D$		*2 031.2 cm^{-1}*	*112 301.5–114 332.7*	14–10	3.14−03	8.15−02	1.85+02	0.057	A	2
				2 031.21 cm^{-1}	112 301.47–114 332.68	8–6	2.99−03	8.14−02	1.06+02	−0.186	A	2
				2 031.27 cm^{-1}	112 301.47–114 332.74	6–4	3.15−03	7.63−02	7.42+01	−0.339	A	2
				2 031.21 cm^{-1}	112 301.47–114 332.68	6–6	1.49−04	5.43−03	5.28+00	−1.487	B+	2
144	$7f-9d$	$^2F^\circ-^2D$		*3 492.9 cm^{-1}*	*112 301.5–115 794.4*	14–10	2.03−03	1.78−02	2.35+01	−0.603	B+	2
				3 492.92 cm^{-1}	112 301.47–115 794.39	8–6	1.93−03	1.77−02	1.34+01	−0.849	B+	2
				3 492.97 cm^{-1}	112 301.47–115 794.44	6–4	2.03−03	1.66−02	9.40+00	−1.002	B+	2
				3 492.92 cm^{-1}	112 301.47–115 794.39	6–6	9.63−05	1.18−03	6.69−01	−2.150	B+	2
145	$7f-10d$	$^2F^\circ-^2D$		*4 537.0 cm^{-1}*	*112 301.5–116 838.5*	14–10	1.36−03	7.08−03	7.19+00	−1.004	D	1

TABLE 44. Transition probabilities of allowed lines for Mg II (references for this table are as follows: 1=Taylor,[103] 2=Froese Fischer,[36] 3=Siegel *et al.*,[84] 4=Ansbacher *et al.*,[2] 5=Theodosiou and Federman,[106] 6=Johnson *et al.*,[47] and 7=Froese Fischer[37])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				4 536.98 cm^{-1}	112 301.47–116 838.45	8–6	1.30−03	7.08−03	4.11+00	−1.247	D	LS
				4 537.01 cm^{-1}	112 301.47–116 838.48	6–4	1.36−03	6.61−03	2.88+00	−1.402	D	LS
				4 536.98 cm^{-1}	112 301.47–116 838.45	6–6	6.48−05	4.72−04	2.05−01	−2.548	E	LS
146	8*p*−9*s*	$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{S}$		*1 257.3 cm*$^{-1}$	*113 032.1–114 289.36*	6–2	2.35−02	7.44−01	1.17+03	0.650	A	2
				1 256.27 cm^{-1}	113 033.09–114 289.36	4–2	1.57−02	7.45−01	7.81+02	0.474	A	2
				1 259.11 cm^{-1}	113 030.25–114 289.36	2–2	7.85−03	7.43−01	3.88+02	0.172	A	2
147	8*p*−8*d*	$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{D}$		*1 300.6 cm*$^{-1}$	*113 032.1–114 332.7*	6–10	1.44−02	2.13+00	3.24+03	1.107	A	2
				1 299.59 cm^{-1}	113 033.09–114 332.68	4–6	1.44−02	1.92+00	1.95+03	0.885	A	2
				1 302.49 cm^{-1}	113 030.25–114 332.74	2–4	1.21−02	2.13+00	1.08+03	0.629	A	2
				1 299.65 cm^{-1}	113 033.09–114 332.74	4–4	2.41−03	2.14−01	2.17+02	−0.068	A	2
148	8*p*−10*s*	$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{S}$		*2 732.9 cm*$^{-1}$	*113 032.1–115 764.99*	6–2	1.25−02	8.37−02	6.05+01	−0.299	A	2
				2 731.90 cm^{-1}	113 033.09–115 764.99	4–2	8.33−03	8.36−02	4.03+01	−0.476	A	2
				2 734.74 cm^{-1}	113 030.25–115 764.99	2–2	4.18−03	8.38−02	2.02+01	−0.776	B+	2
149	8*p*−9*d*	$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{D}$		*2 762.3 cm*$^{-1}$	*113 032.1–115 794.4*	6–10	6.79−03	2.22−01	1.59+02	0.125	A	2
				2 761.30 cm^{-1}	113 033.09–115 794.39	4–6	6.78−03	2.00−01	9.54+01	−0.097	A	2
				2 764.19 cm^{-1}	113 030.25–115 794.44	2–4	5.68−03	2.23−01	5.31+01	−0.351	A	2
				2 761.35 cm^{-1}	113 033.09–115 794.44	4–4	1.13−03	2.22−02	1.06+01	−1.052	B+	2
150	8*p*−10*d*	$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{D}$		*3 806.4 cm*$^{-1}$	*113 032.1–116 838.5*	6–10	3.36−03	5.79−02	3.01+01	−0.459	D+	1
				3 805.36 cm^{-1}	113 033.09–116 838.45	4–6	3.35−03	5.21−02	1.80+01	−0.681	D+	LS
				3 808.23 cm^{-1}	113 030.25–116 838.48	2–4	2.81−03	5.80−02	1.00+01	−0.936	D+	LS
				3 805.39 cm^{-1}	113 033.09–116 838.48	4–4	5.59−04	5.79−03	2.00+00	−1.635	D	LS
151	9*s*−9*p*	$^{2}\mathrm{S}-{}^{2}\mathrm{P}^{\circ}$		*608.7 cm*$^{-1}$	*114 289.36–114 898.1*	2–6	2.82−03	3.43+00	3.71+03	0.836	A	2
				609.36 cm^{-1}	114 289.36–114 898.72	2–4	2.83−03	2.29+00	2.47+03	0.661	A	2
				607.43 cm^{-1}	114 289.36–114 896.79	2–2	2.81−03	1.14+00	1.24+03	0.358	A	2
152	9*s*−10*p*	$^{2}\mathrm{S}-{}^{2}\mathrm{P}^{\circ}$		*1 906 cm*$^{-1}$	*114 289.36–116 195*	2–6	2.21−04	2.74−02	9.48+00	−1.261	D	1
				1 905.7 cm^{-1}	114 289.36–116 195.1	2–4	2.22−04	1.83−02	6.32+00	−1.437	D	LS
				1 904.3 cm^{-1}	114 289.36–116 193.7	2–2	2.21−04	9.13−03	3.16+00	−1.738	D	LS
153	8*d*−9*p*	$^{2}\mathrm{D}-{}^{2}\mathrm{P}^{\circ}$		*565.4 cm*$^{-1}$	*114 332.7–114 898.1*	10–6	3.72−03	1.05+00	6.10+03	1.021	A	2
				566.04 cm^{-1}	114 332.68–114 898.72	6–4	3.36−03	1.05+00	3.66+03	0.799	A	2
				564.05 cm^{-1}	114 332.74–114 896.79	4–2	3.70−03	8.72−01	2.04+03	0.543	A	2
				565.98 cm^{-1}	114 332.74–114 898.72	4–4	3.73−04	1.74−01	4.06+02	−0.157	A	2
154	8*d*−9*f*	$^{2}\mathrm{D}-{}^{2}\mathrm{F}^{\circ}$		*1 511.9 cm*$^{-1}$	*114 332.7–115 844.6*	10–14	8.66−03	7.95−01	1.73+03	0.900	A	2
				1 511.92 cm^{-1}	114 332.68–115 844.60	6–8	8.67−03	7.58−01	9.90+02	0.658	A	2
				1 511.86 cm^{-1}	114 332.74–115 844.60	4–6	8.06−03	7.93−01	6.91+02	0.501	A	2
				1 511.92 cm^{-1}	114 332.68–115 844.60	6–6	5.78−04	3.79−02	4.95+01	−0.643	A	2
155	8*d*−10*p*	$^{2}\mathrm{D}-{}^{2}\mathrm{P}^{\circ}$		*1 862 cm*$^{-1}$	*114 332.7–116 195*	10–6	9.17−04	2.38−02	4.21+01	−0.623	D+	1
				1 862.4 cm^{-1}	114 332.68–116 195.1	6–4	8.26−04	2.38−02	2.52+01	−0.845	C	LS
				1 861.0 cm^{-1}	114 332.74–116 193.7	4–2	9.15−04	1.98−02	1.40+01	−1.101	D+	LS
				1 862.4 cm^{-1}	114 332.74–116 195.1	4–4	9.16−05	3.96−03	2.80+00	−1.800	D	LS
156	8*f*−9*d*	$^{2}\mathrm{F}^{\circ}-{}^{2}\mathrm{D}$		*1 390.8 cm*$^{-1}$	*114 403.6–115 794.4*	14–10	2.07−03	1.15−01	3.80+02	0.207	A	2
				1 390.84 cm^{-1}	114 403.55–115 794.39	8–6	1.97−03	1.15−01	2.17+02	−0.036	A	2
				1 390.89 cm^{-1}	114 403.55–115 794.44	6–4	2.08−03	1.07−01	1.53+02	−0.192	A	2

TABLE 44. Transition probabilities of allowed lines for Mg II (references for this table are as follows: 1=Taylor,[103] 2=Froese Fischer,[36] 3=Siegel *et al.*,[84] 4=Ansbacher *et al.*,[2] 5=Theodosiou and Federman,[106] 6=Johnson *et al.*,[47] and 7=Froese Fischer[37])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				1 390.84 cm^{-1}	114 403.55–115 794.39	6–6	9.87−05	7.65−03	1.09+01	−1.338	B+	2
157	8f−10d	^{2}F$^\circ$−^{2}D		*2 434.9 cm^{-1}*	*114 403.6–116 838.5*	14–10	1.42−03	2.57−02	4.87+01	−0.444	D+	1
				2 434.90 cm^{-1}	114 403.55–116 838.45	8–6	1.36−03	2.57−02	2.78+01	−0.687	C	LS
				2 434.93 cm^{-1}	114 403.55–116 838.48	6–4	1.42−03	2.40−02	1.95+01	−0.842	D+	LS
				2 434.90 cm^{-1}	114 403.55–116 838.45	6–6	6.76−05	1.71−03	1.39+00	−1.989	E+	LS
158	9p−10s	^{2}P$^\circ$−^{2}S		*866.9 cm^{-1}*	*114 898.1*–115 764.99	6–2	1.24−02	8.26−01	1.88+03	0.695	A	2
				866.27 cm^{-1}	114 898.72–115 764.99	4–2	8.28−03	8.27−01	1.26+03	0.520	A	2
				868.20 cm^{-1}	114 896.79–115 764.99	2–2	4.15−03	8.25−01	6.26+02	0.217	A	2
159	9p−9d	^{2}P$^\circ$−^{2}D		*896.3 cm^{-1}*	*114 898.1–115 794.4*	6–10	7.34−03	2.28+00	5.03+03	1.136	A	2
				895.67 cm^{-1}	114 898.72–115 794.39	4–6	7.33−03	2.06+00	3.02+03	0.916	A	2
				897.65 cm^{-1}	114 896.79–115 794.44	2–4	6.13−03	2.28+00	1.67+03	0.659	A	2
				895.72 cm^{-1}	114 898.72–115 794.44	4–4	1.22−03	2.29−01	3.36+02	−0.038	A	2
160	9p−10d	^{2}P$^\circ$−^{2}D		*1 940.4 cm^{-1}*	*114 898.1–116 838.5*	6–10	3.32−03	2.20−01	2.24+02	0.121	C	1
				1 939.73 cm^{-1}	114 898.72–116 838.45	4–6	3.31−03	1.98−01	1.34+02	−0.101	C	LS
				1 941.69 cm^{-1}	114 896.79–116 838.48	2–4	2.78−03	2.21−01	7.49+01	−0.355	C	LS
				1 939.76 cm^{-1}	114 898.72–116 838.48	4–4	5.52−04	2.20−02	1.49+01	−1.056	D+	LS
161	10s−10p	^{2}S−^{2}P$^\circ$		*430 cm^{-1}*	115 764.99–*116 195*	2–6	1.59−03	3.88+00	5.95+03	0.890	B+	1
				430.1 cm^{-1}	115 764.99–116 195.1	2–4	1.60−03	2.59+00	3.96+03	0.714	A	LS
				428.7 cm^{-1}	115 764.99–116 193.7	2–2	1.58−03	1.29+00	1.98+03	0.412	B+	LS
162	9d−10p	^{2}D−^{2}P$^\circ$		*401 cm^{-1}*	*115 794.4–116 195*	10–6	2.06−03	1.16+00	9.52+03	1.064	B+	1
				400.7 cm^{-1}	115 794.39–116 195.1	6–4	1.86−03	1.16+00	5.72+03	0.843	B+	LS
				399.3 cm^{-1}	115 794.44–116 193.7	4–2	2.04−03	9.60−01	3.17+03	0.584	B	LS
				400.7 cm^{-1}	115 794.44–116 195.1	4–4	2.07−04	1.93−01	6.34+02	−0.112	B	LS
163	9f−10d	^{2}F$^\circ$−^{2}D		*993.9 cm^{-1}*	*115 844.6–116 838.5*	14–10	1.53−03	1.66−01	7.70+02	0.366	C+	1
				993.85 cm^{-1}	115 844.60–116 838.45	8–6	1.46−03	1.66−01	4.40+02	0.123	C+	LS
				993.88 cm^{-1}	115 844.60–116 838.48	6–4	1.53−03	1.55−01	3.08+02	−0.032	C+	LS
				993.85 cm^{-1}	115 844.60–116 838.45	6–6	7.25−05	1.10−02	2.19+01	−1.180	D+	LS
164	10p−10d	^{2}P$^\circ$−^{2}D		*644 cm^{-1}*	*116 195–116 838.5*	6–10	4.61−03	2.78+00	8.52+03	1.222	B+	1
				643.3 cm^{-1}	116 195.1–116 838.45	4–6	4.60−03	2.50+00	5.12+03	1.000	A	LS
				644.8 cm^{-1}	116 193.7–116 838.48	2–4	3.85−03	2.78+00	2.84+03	0.745	B+	LS
				643.4 cm^{-1}	116 195.1–116 838.48	4–4	7.68−04	2.78−01	5.69+02	0.046	B+	LS

[a]Wavelengths (Å) are always given nuless cm^{-1} is indicated

11.2.3. Forbidden Transitions for Mg II

Wherever available we have used the data of Tachiev and Froese Fischer,[32] which result from extensive MCHF calculations with Breit-Pauli corrections to order α^2. The calculations only extend to transitions from energy levels up to the 4d. Majumder *et al.*[58] used a relativistic coupled cluster approach.

Only one transition is reported in more than one of the studies,[32,42,52,110] To estimate the accuracy of the forbidden lines from allowed lines, we isoelectronically averaged the logarithmic quality factors (see Sec. 4.1 of the Introduction) observed for lines from the lower-lying levels of Na-like ions of Na, Mg, Al, and Si and applied the result to forbidden lines of Mg II, as described in the introduction. Thus these listed accuracies are less well established than for the spin-allowed lines.

11.2.4. References for Forbidden Transitions for Mg II

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TABLE 45. Wavelength finding list for forbidden lines for Mg II

Wavelength (vac) (Å)	Mult. No.	Wavelength (vac) (Å)	Mult. No.	Wavelength (vac) (Å)	Mult. No.	Wavelength (vac) (Å)	Mult. No.
855.883	11	918.273	7	1 398.786	3	1 737.613	16
863.600	10	966.933	6	1 432.563	2	1 737.628	16
874.640	9	1 071.687	5	1 734.852	16		
891.289	8	1 239.925	4	1 734.868	16		
Wavelength (air) (Å)	Mult. No.	Wavelength (air) (Å)	Mult. No.	Wavelength (air) (Å)	Mult. No.	Wavelength (air) (Å)	Mult. No.
2 222.484	15	2 795.528	1	4 581.657	19	9 218.25	17
2 223.993	15	2 797.930	14	4 581.766	19	10 914.24	18
2 227.018	15	2 797.998	14	7 877.05	21	10 915.28	18
2 228.533	15	2 936.510	13	7 877.38	21	10 950.73	18
2 790.777	14	4 581.474	19	7 896.04	21	10 951.77	18
2 790.845	14	4 581.584	19	7 896.37	21		
Wavenumber (cm^{-1})	Mult. No.	Wavenumber (cm^{-1})	Mult. No.				
91.57	12	30.52	20				

TABLE 46. Transition probabilities of forbidden lines for Mg II (references for this table are as follows: 1=Froese Fischer,[32] 2=Kundo and Mukherjee,[52] 3 =Godefroid *et al.*,[42] and 4=Tull *et al.*[110])

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^{a}	E_i-E_k (cm^{-1})	g_i-g_k	Type	A_{ki} (s^{-1})	S (a.u.)	Acc.	Source
1	$3s-3p$	$^2S-{}^2P^\circ$									
			2 795.528	2 796.352	0.00–35 760.88	2–4	M2	3.80−03	1.74+02	B+	1
2	$3s-4s$	$^2S-{}^2S$									
				1 432.563	0.00–69 804.95	2–2	M1	1.87−02	4.07−06	D	1
3	$3s-3d$	$^2S-{}^2D$									
				1 398.786	0.00–71 490.54	2–6	E2	8.77+03	2.52+02	B+	2,3
4	$3s-4p$	$^2S-{}^2P^\circ$									
				1 239.925	0.00–80 650.02	2–4	M2	4.33−05	3.40−02	D+	1
5	$3s-4d$	$^2S-{}^2D$									
				1 071.687	0.00–93 310.80	2–6	E2	1.04+03	7.84+00	A	2
6	$3s-5d$	$^2S-{}^2D$									
				966.933	0.00–103 419.82	2–6	E2	1.97+02	8.94+01	B+	2
7	$3s-6d$	$^2S-{}^2D$									
				918.273	0.00–108 900.09	2–6	E2	2.69+01	9.41+02	B	2
8	$3s-7d$	$^2S-{}^2D$									
				891.289	0.00–112 197.10	2–6	E2	4.25+00	1.28−02	C	1
9	$3s-8d$	$^2S-{}^2D$									
				874.640	0.00–114 332.70	2–6	E2	1.69+01	4.64−02	C	4
10	$3-9d$	$^2S-{}^2D$									
				863.600	0.00–115 794.41	2–6	E2	9.75+00	2.51−02	D+	4
11	$3s-10d$	$^2S-{}^2D$									
				855.883	0.00–116 838.46	2–6	E2	6.10+00	1.50−02	C+	4
12	$3p-3p$	$^2P^\circ-{}^2P^\circ$									
				91.57 cm^{-1}	35 669.31–35 760.88	2–4	M1	6.90−06	1.33+00	B	1
				91.57 cm^{-1}	35 669.31–35 760.88	2–4	E2	2.66−11	1.48+02	A	1
13	$3p-4s$	$^2P^\circ-{}^2S$									
			2 936.510	2 937.369	35 760.88–69 804.95	4–2	M2	2.85−03	8.37+01	B+	1
14	$3p-3d$	$^2P^\circ-{}^2D$									
			2 790.845	2 791.668	35 669.31–71 490.19	2–6	M2	1.63−03	1.11+02	B+	1
			2 797.998	2 798.823	35 760.88–71 490.19	4–6	M2	8.82−03	6.09+02	B+	1
			2 790.777	2 791.600	35 669.31–71 491.06	2–4	M2	2.29−04	1.04+01	B	1
			2 797.930	2 798.754	35 760.88–71 491.06	4–4	M2	2.19−10	1.01−05	E	1
15	$3p-4p$	$^2P^\circ-{}^2P^\circ$									
			2 227.018	2 227.710	35 760.88–80 650.02	4–4	M1	8.31−04	1.36−01	E+	1
			2 227.018	2 227.710	35 760.88–80 650.02	4–4	E2	4.02+02	7.88+01	A	1
			2 223.993	2 224.685	35 669.31–80 619.50	2–2	M1	1.68−04	1.37−07	E+	1
			2 228.533	2 229.226	35 760.88–80 619.50	4–2	M1	1.64−03	1.34−06	E+	1
			2 228.533	2 229.226	35 760.88–80 619.50	4–2	E2	8.04+02	7.91+01	A	1
			2 222.484	2 223.175	35 669.31–80 650.02	2–4	M1	4.92−04	8.02−07	E+	1
			2 222.484	2 223.175	35 669.31–80 650.02	2–4	E2	4.02+02	7.85+01	A	1
16	$3p-4d$	$^2P^\circ-{}^2D$									
				1 734.868	35 669.31–93 310.59	2–6	M2	4.70−04	2.98+00	C+	1
				1 737.628	35 760.88–93 310.59	4–6	M2	2.54−03	1.62+01	B	1
				1 734.852	35 669.31–93 311.11	2–4	M2	6.55−05	2.76−01	C	1
				1 737.613	35 760.88–93 311.11	4–4	M2	1.22−09	5.18−06	E	1
17	$4s-4p$	$^2S-{}^2P^\circ$									

TABLE 46. Transition probabilities of forbidden lines for Mg II (references for this table are as follows: 1 = Froese Fischer,[32] 2 = Kundo and Mukherjee,[52] 3 = Godefroid *et al.*,[42] and 4 = Tull *et al.*[110])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	Type	A_{ki} (s^{-1})	S (a.u.)	Acc.	Source
			9 218.25	9 220.78	69 804.95–80 650.02	2–4	M2	4.74−05	8.48+02	B+	1
18	$3d-4p$	$^{2}\mathrm{D}-{}^{2}\mathrm{P}^{\circ}$									
			10 950.73	10 953.73	71 490.19–80 619.50	6–2	M2	6.54−06	1.38+02	B+	1
			10 914.24	10 917.23	71 490.19–80 650.02	6–4	M2	1.82−05	7.56+02	B+	1
			10 951.77	10 954.77	71 491.06–80 619.50	4–2	M2	6.14−07	1.30+01	B	1
			10 915.28	10 918.27	71 491.06–80 650.02	4–4	M2	7.69−14	3.20−06	E	1
19	$3d-4d$	$^{2}\mathrm{D}-{}^{2}\mathrm{D}$									
			4 581.584	4 582.867	71 490.19–93 310.59	6–6	M1	2.03−05	4.34−07	E+	1
			4 581.584	4 582.867	71 490.19–93 310.59	6–6	E2	6.30+01	6.82+02	A	1
			4 581.657	4 582.941	71 491.06–93 311.11	4–4	M1	5.42−06	7.73−08	E+	1
			4 581.657	4 582.941	71 491.06–93 311.11	4–4	E2	5.51+01	3.98+02	A	1
			4 581.474	4 582.758	71 490.19–93 311.11	6–4	M1	1.95−06	2.79+08	E	1
			4 581.474	4 582.758	71 490.19–93 311.11	6–4	E2	2.36+01	1.71+02	A	1
			4 581.766	4 583.050	71 491.06–93 310.59	4–6	M1	3.74−07	8.00−09	E	1
			4 581.766	4 583.050	71 491.06–93 310.59	4–6	E2	1.57+01	1.71+02	A	1
20	$4p-4p$	$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{P}^{\circ}$									
				30.52 cm^{-1}	80 619.50–80 650.02	2–4	M1	2.56−07	1.33+00	B	1
				30.52 cm^{-1}	80 619.50–80 650.02	2–4	E2	2.61−12	3.53+03	A	1
21	$4p-4d$	$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{D}$									
			7 877.38	7 879.54	80 619.50–93 310.59	2–6	M2	3.32−05	4.06+02	B+	1
			7 896.37	7 898.54	80 650.02–93 310.59	4–6	M2	1.80−04	2.22+03	A	1
			7 877.05	7 879.22	80 619.50–93 311.11	2–4	M2	4.67−06	3.80+01	B+	1
			7 896.04	7 898.21	80 650.02–93 311.11	4–4	M2	2.03−13	1.67−06	E	1

[a] Wavelengths (Å) are always given unless cm^{-1} is indicated.

11.3. Mg III

Neon isoelectronic sequence
Ground state: $1s^22s^22p^6\ ^1S_0$
Ionization energy: 80.1436 eV = 646 402 cm^{-1}

11.3.1. Allowed Transitions for Mg III

Wherever available we have used the data of Tachiev and Froese Fischer,[96] which result from extensive MCHF calculations with Breit-Pauli corrections to order α^2, with energy corrections (though it has not been demonstrated that these are more accurate than the *ab initio* results of Tachiev and Froese Fischer[92]). The calculations only extend to transitions from energy levels up to the $2p^54s$. Hibbert *et al.*[45] applied the CIV3 code. Träbert[107] measured the lifetimes using the beam-foil technique. These sources are far from comprehensive, resulting in the relatively small number of lines presented below.

To estimate accuracies, we pooled the relative standard deviation of the mean (RSDM) for each of the lines with transition rates published in two or more references,[10,45,92,96,107] as described in the general introduction (data from Tachiev and Froese Fischer[92] are cited only for lines not listed in Tachiev and Froese Fischer[96]). For this purpose the spin-allowed and intercombination data were treated separately and each of these was in turn divided into two upper-level energy groups below and above 476 000 cm^{-1}. Estimated accuracies were substantially better for the lower energy groups. The isoelectronic pooling fit parameters of the intercombination lines were slightly inferior to those of the allowed lines (in which case the estimated accuracies are still generally lower, due to smaller line strengths).

11.3.2. References for Allowed Transitions for Mg III

[10] J. P. Buchet, M. C. Buchet-Poulizac, and P. Ceyzeriat, Phys. Lett. A **77**, 424 (1980).

[45] A. Hibbert, M. Le Dourneuf, and M. Mohan, At. Data Nucl. Data Tables **53** 24 (1993).

[92] G. Tachiev and C. Froese Fischer, http://www.vuse.vanderbilt.edu/~cff/mchf_collection/ (MCHF, *ab initio*, downloaded on Mar. 28, 2002).

[96] G. Tachiev and C. Froese Fischer, http://www.vuse.vanderbilt.edu/~cff/mchf_collection/ (MCHF, energy adjusted, downloaded on Sept. 3, 2003).

[107] E. Träbert, Phys. Scr. **53**, 167 (1996).

TABLE 47. Wavelength finding list for allowed lines for Mg III

Wavelength (vac) (Å)	Mult. No.
186.514	4
187.197	3
231.734	2
234.264	1
1 229.374	52
1 239.835	51
1 274.829	45
1 350.153	54
1 365.788	54
1 378.711	53
1 393.394	46
1 405.177	46
1 422.121	46
1 431.135	57
1 435.546	55
1 439.773	57
1 443.737	57
1 446.257	10
1 447.264	47
1 454.048	19
1 458.185	56
1 462.315	47
1 467.199	48
1 482.670	48
1 483.715	18
1 493.110	49
1 506.832	49
1 550.818	16
1 572.713	17
1 586.242	17
1 592.364	17
1 626.096	25
1 635.954	23
1 642.835	23
1 646.803	24
1 648.829	25
1 652.221	23
1 659.239	23
1 663.287	24
1 675.696	23
1 679.467	23
1 687.080	24
1 697.274	22
1 703.105	31
1 703.728	23
1 704.376	21
1 714.789	22
1 722.039	21
1 730.706	21
1 730.778	36
1 731.785	29
1 738.834	21
1 739.496	29
1 743.947	30
1 745.021	41
1 747.555	21
1 748.921	21
1 757.170	20
1 757.880	41
1 760.405	34
1 761.742	29
1 763.793	41
1 772.974	35
1 775.143	39
1 775.950	20
1 783.25	39
1 787.92	40
1 791.37	34
1 793.22	20
1 794.57	39
1 800.65	28
1 803.10	20
1 806.63	39
1 807.64	40
1 808.65	27
1 820.42	39
1 820.91	20
1 826.76	39
1 828.98	20
1 838.32	27
1 839.89	33
1 847.57	38
1 858.19	9
1 868.21	26
1 879.49	9
1 887.33	26
1 896.30	8
1 901.56	32
1 901.58	9
1 908.50	9
1 918.77	37
1 921.37	32
1 923.89	9
1 930.36	32
1 930.67	7
1 937.84	9
1 938.94	37
1 941.49	37
1 941.51	8
1 954.83	37
1 962.15	37
1 971.52	37
1 977.55	7
1 979.32	8
1 979.43	50

Wavelength (air) (Å)	Mult. No.
2 004.86	6
2 039.55	6

TABLE 47. Wavelength finding list for allowed lines for Mg III—Continued

Wavelength (air) (Å)	Mult. No.
2 055.48	6
2 064.91	6
2 085.89	15
2 091.96	6
2 094.22	15
2 097.93	6
2 112.78	15
2 134.05	14
2 177.70	13
2 273.43	12

TABLE 47. Wavelength finding list for allowed lines for Mg III—Continued

Wavelength (air) (Å)	Mult. No.
2 318.13	12
2 395.16	5
2 467.76	5
2 490.54	44
2 529.19	5
2 618.01	43
2 788.69	11
2 905.41	42

TABLE 48. Transition probabilities of allowed lines for Mg III (references for this table are as follows: 1 = Tachiev and Froese Fischer,[96] 2 = Tachiev and Froese Fischer,[92] 3 = Hibbert *et al.*,[45] 4 = Trabert,[107] and 5 = Buchet *et al.*[10])

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
1	$2p^6-2p^53s$	$^1\mathrm{S}-{}^3\mathrm{P}^\circ$										
				234.264	0–426 868.1	1–3	4.98+00	1.23−02	9.48−03	−1.910	C	1,5
2		$^1\mathrm{S}-{}^1\mathrm{P}^\circ$		231.734	0–431 530.0	1–3	9.12+01	2.20−01	1.68−01	−0.658	B+	1,4
3	$2p^6-2p^53d$	$^1\mathrm{S}-{}^3\mathrm{D}^\circ$										
				187.197	0–534 197.7	1–3	1.26+02	1.98−01	1.22−01	−0.703	C	1
4		$^1\mathrm{S}-{}^1\mathrm{P}^\circ$		186.514	0–536 152.0	1–3	1.86+02	2.91−01	1.79−01	−0.536	C+	1
5	$2p^53s-2p^53p$	$^3\mathrm{P}^\circ-{}^3\mathrm{S}$	*2 433.3*	*2 434.1*	*426 295*–467 378.5	9–3	2.53+00	7.48−02	5.40+00	−0.172	A	1
			2 395.16	2 395.89	425 640.3–467 378.5	5–3	1.67+00	8.63−02	3.40+00	−0.365	A	1
			2 467.76	2 468.50	426 868.1–467 378.5	3–3	6.91−01	6.31−02	1.54+00	−0.723	B+	1
			2 529.19	2 529.95	427 852.1–467 378.5	1–3	1.89−01	5.44−02	4.53−01	−1.264	B+	1
6		$^3\mathrm{P}^\circ-{}^3\mathrm{D}$	*2 071.9*	*2 072.6*	*426 295–474 544*	9–15	4.15+00	4.45−01	2.73+01	0.603	A	1
			2 064.91	2 065.57	425 640.3–474 053.2	5–7	4.21+00	3.77−01	1.28+01	0.275	A	1
			2 091.96	2 092.62	426 868.1–474 655.0	3–5	2.57+00	2.82−01	5.82+00	−0.073	A	1
			2 097.93	2 098.60	427 852.1–475 502.9	1–3	1.50+00	2.98−01	2.06+00	−0.526	A	1
			2 039.55	2 040.20	425 640.3–474 655.0	5–5	1.54+00	9.61−02	3.23+00	−0.318	A	1
			2 055.48	2 056.14	426 868.1–475 502.9	3–3	2.35+00	1.49−01	3.02+00	−0.350	A	1
			2 004.86	2 005.51	425 640.3–475 502.9	5–3	3.33−01	1.21−02	3.98−01	−1.218	B+	1
7		$^3\mathrm{P}^\circ-{}^1\mathrm{D}$										
				1 977.55	426 868.1–477 435.7	3–5	4.94−01	4.82−02	9.42−01	−0.840	B	1
				1 930.67	425 640.3–477 435.7	5–5	1.70+00	9.49−02	3.02+00	−0.324	B+	1
8		$^3\mathrm{P}^\circ-{}^1\mathrm{P}$										
				1 941.51	426 868.1–478 374.5	3–3	3.27−01	1.85−02	3.54−01	−1.256	B	1
				1 896.30	425 640.3–478 374.5	5–3	4.20−01	1.36−02	4.24−01	−1.167	B	1
				1 979.32	427 852.1–478 374.5	1–3	1.22+00	2.15−01	1.40+00	−0.668	B+	1
9		$^3\mathrm{P}^\circ-{}^3\mathrm{P}$		*1 893.9*	*426 295–479 096*	9–9	3.45+00	1.85−01	1.04+01	0.221	B+	1
				1 879.49	425 640.3–478 846.1	5–5	1.76+00	9.33−02	2.88+00	−0.331	B+	1
				1 901.58	426 868.1–479 456.0	3–3	5.47−01	2.96−02	5.57−01	−1.052	B	1
				1 858.19	425 640.3–479 456.0	5–3	1.28+00	3.99−02	1.22+00	−0.700	B	1
				1 908.50	426 868.1–479 265.3	3–1	5.15+00	9.37−02	1.77+00	−0.551	B+	1
				1 923.89	426 868.1–478 846.1	3–5	1.37+00	1.26−01	2.40+00	−0.423	B+	1
				1 937.84	427 852.1–479 456.0	1–3	1.46+00	2.46−01	1.57+00	−0.609	B	1

TABLE 48. Transition probabilities of allowed lines for Mg III (references for this table are as follows: 1 = Tachiev and Froese Fischer,[96] 2 = Tachiev and Froese Fischer,[92] 3 = Hibbert *et al.*,[45] 4 = Trabert,[107] and 5 = Buchet *et al.*[10])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
10		$^3P^\circ-^1S$										
				1 446.257	426 868.1–496 012.1	3–1	4.15−01	4.33−03	6.19−02	−1.886	C	3
11		$^1P^\circ-^3S$										
			2 788.69	2 789.52	431 530.0–467 378.5	3–3	9.69−03	1.13−03	3.11−02	−2.470	C	1
12		$^1P^\circ-^3D$										
			2 318.13	2 318.84	431 530.0–474 655.0	3–5	4.44−02	5.96−03	1.37−01	−1.748	C+	1
			2 273.43	2 274.13	431 530.0–475 502.9	3–3	1.27−02	9.88−04	2.22−02	−2.528	C	1
13		$^1P^\circ-^1D$	2 177.70	2 178.38	431 530.0–477 435.7	3–5	2.12+00	2.51−01	5.41+00	−0.123	B+	1
14		$^1P^\circ-^1P$	2 134.05	2 134.72	431 530.0–478 374.5	3–3	2.36+00	1.61−01	3.40+00	−0.316	B	1
15		$^1P^\circ-^3P$										
			2 085.89	2 086.55	431 530.0–479 456.0	3–3	1.61+00	1.05−01	2.17+00	−0.502	B+	1
			2 094.22	2 094.89	431 530.0–479 265.3	3–1	1.21−01	2.65−03	5.49−02	−2.100	C+	1
			2 112.78	2 113.45	431 530.0–478 846.1	3–5	1.69+00	1.88−01	3.93+00	−0.249	B+	1
16		$^1P^\circ-^1S$		1 550.818	431 530.0–496 012.1	3–1	1.04+01	1.25−01	1.92+00	−0.426	B+	2
17	$2p^53p-2p^53d$	$^3S-^3P^\circ$		*1 579.37*	*467 378.5–530 695*	3–9	7.48+00	8.39−01	1.31+01	0.401	B+	1
				1 572.713	467 378.5–530 962.9	3–5	6.92+00	4.28−01	6.64+00	0.109	B+	1
				1 586.242	467 378.5–530 420.6	3–3	8.02+00	3.02−01	4.74+00	−0.043	B+	1
				1 592.364	467 378.5–530 178.2	3–1	8.53+00	1.08−01	1.70+00	−0.489	B+	1
18		$^3S-^1D^\circ$										
				1 483.715	467 378.5–534 776.9	3–5	9.54−03	5.25−04	7.69−03	−2.803	D	1
19		$^3S-^1P^\circ$										
				1 454.048	467 378.5–536 152.0	3–3	5.00−02	1.58−03	2.27−02	−2.324	D+	1
20		$^3D-^3P^\circ$		*1 780.9*	*474 544–530 695*	15–9	4.24−01	1.21−02	1.06+00	−0.741	C+	1
				1 757.170	474 053.2–530 962.9	7–5	2.04−01	6.75−03	2.74−01	−1.326	C+	1
				1 793.22	474 655.0–530 420.6	5–3	3.36−01	9.72−03	2.87−01	−1.313	C+	1
				1 828.98	475 502.9–530 178.2	3–1	4.97−01	8.30−03	1.50−01	−1.604	C+	1
				1 775.950	474 655.0–530 962.9	5–5	1.28−01	6.04−03	1.77−01	−1.520	C+	1
				1 820.91	475 502.9–530 420.6	3–3	3.05−02	1.52−03	2.73−02	−2.341	C	1
				1 803.10	475 502.9–530 962.9	3–5	1.03−01	8.36−03	1.49−01	−1.601	C+	1
21		$^3D-^3F^\circ$		*1 742.58*	*474 544–531 930*	15–21	1.07+01	6.80−01	5.85+01	1.009	A	1
				1 738.834	474 053.2–531 563.0	7–9	1.14+01	6.63−01	2.66+01	0.667	A	1
				1 748.921	474 655.0–531 833.1	5–7	8.71+00	5.59−01	1.61+01	0.446	A	1
				1 747.555	475 502.9–532 725.7	3–5	7.38+00	5.63−01	9.72+00	0.228	B+	1
				1 730.706	474 053.2–531 833.1	7–7	1.03+00	4.62−02	1.84+00	−0.490	B+	1
				1 722.039	474 655.0–532 725.7	5–5	3.23+00	1.44−01	4.08+00	−0.143	B+	1
				1 704.376	474 053.2–532 725.7	7–5	1.79−01	5.56−03	2.18−01	−1.410	C+	1
22		$^3D-^1F^\circ$										
				1 714.789	474 655.0–532 971.2	5–7	4.76−01	2.94−02	8.29−01	−0.833	B	1
				1 697.274	474 053.2–532 971.2	7–7	2.14+00	9.26−02	3.62+00	−0.188	B+	1
23		$^3D-^3D^\circ$		*1 657.82*	*474 544–534 864*	15–15	2.10+00	8.67−02	7.10+00	0.114	B	1
				1 642.835	474 053.2–534 923.6	7–7	9.17−01	3.71−02	1.40+00	−0.586	B	1
				1 652.221	474 655.0–535 179.6	5–5	9.10−01	3.72−02	1.01+00	−0.730	B	1
				1 703.728	475 502.9–534 197.7	3–3	2.97+00	1.29−01	2.18+00	−0.412	B+	1
				1 635.954	474 053.2–535 179.6	7–5	2.44−01	6.99−03	2.63−01	−1.310	C+	1
				1 679.467	474 655.0–534 197.7	5–3	5.88−01	1.49−02	4.12−01	−1.128	B	1

TABLE 48. Transition probabilities of allowed lines for Mg III (references for this table are as follows: 1 = Tachiev and Froese Fischer,[96] 2 = Tachiev and Froese Fischer,[92] 3 = Hibbert *et al.*,[45] 4 = Trabert,[107] and 5 = Buchet *et al.*[10])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				1 659.239	474 655.0–534 923.6	5–7	8.48−01	4.90−02	1.34+00	−0.611	B	1
				1 675.696	475 502.9–535 179.6	3–5	4.19−01	2.94−02	4.86−01	−1.055	B	1
24		^{3}D−^{1}D°										
				1 663.287	474 655.0–534 776.9	5–5	1.68−01	6.96−03	1.91−01	−1.458	C	1
				1 646.803	474 053.2–534 776.9	7–5	3.96−02	1.15−03	4.36−02	−2.094	D+	1
				1 687.080	475 502.9–534 776.9	3–5	1.41+00	1.00−01	1.67+00	−0.523	B	1
25		^{3}D−^{1}P°										
				1 626.096	474 655.0–536 152.0	5–3	1.77−01	4.22−03	1.13−01	−1.676	C	1
				1 648.829	475 502.9–536 152.0	3–3	5.38−01	2.19−02	3.57−01	−1.182	C+	1
26		^{1}D−^{3}P°										
				1 887.33	477 435.7–530 420.6	5–3	7.56−01	2.42−02	7.53−01	−0.917	B	1
				1 868.21	477 435.7–530 962.9	5–5	1.94+00	1.02−01	3.12+00	−0.292	B+	1
27		^{1}D−^{3}F°										
				1 838.32	477 435.7–531 833.1	5–7	1.09+00	7.74−02	2.34+00	−0.412	B	1
				1 808.65	477 435.7–532 725.7	5–5	8.55−04	4.20−05	1.25−03	−3.678	E+	1
28		^{1}D−^{1}F°		1 800.65	477 435.7–532 971.2	5–7	8.21+00	5.59−01	1.66+01	0.446	A	1
29		^{1}D−^{3}D°										
				1 731.785	477 435.7–535 179.6	5–5	1.60+00	7.21−02	2.05+00	−0.443	B	1
				1 761.742	477 435.7–534 197.7	5–3	3.16−03	8.82−05	2.56−03	−3.356	E+	1
				1 739.496	477 435.7–534 923.6	5–7	3.26−04	2.07−05	5.94−04	−3.985	E+	1
30		^{1}D−^{1}D°		1 743.947	477 435.7–534 776.9	5–5	3.76−01	1.71−02	4.92−01	−1.068	B	1
31		^{1}D−^{1}P°		1 703.105	477 435.7–536 152.0	5–3	1.71−01	4.47−03	1.25−01	−1.651	C+	1
32		^{1}P−^{3}P°										
				1 921.37	478 374.5–530 420.6	3–3	2.26−01	1.25−02	2.37−01	−1.426	C	1
				1 930.36	478 374.5–530 178.2	3–1	8.30−01	1.55−02	2.95−01	−1.333	C+	1
				1 901.56	478 374.5–530 962.9	3–5	3.78−01	3.41−02	6.41−01	−0.990	C+	1
33		^{1}P−^{3}F°										
				1 839.89	478 374.5–532 725.7	3–5	4.55−01	3.85−02	7.00−01	−0.937	C+	1
34		^{1}P−^{3}D°										
				1 760.405	478 374.5–535 179.6	3–5	4.14−02	3.20−03	5.57−02	−2.018	D+	1
				1 791.37	478 374.5–534 197.7	3–3	2.32+00	1.12−01	1.98+00	−0.474	B	1
35		^{1}P−^{1}D°		1 772.974	478 374.5–534 776.9	3–5	7.67+00	6.02−01	1.06+01	0.257	A	1
36		^{1}P−^{1}P°		1 730.778	478 374.5–536 152.0	3–3	1.44+00	6.47−02	1.11+00	−0.712	C	1
37		^{3}P−^{3}P°		*1 938.0*	*479 096–530 695*	9–9	2.21+00	1.25−01	7.16+00	0.051	B	1
				1 918.77	478 846.1–530 962.9	5–5	1.98+00	1.09−01	3.44+00	−0.264	B+	1
				1 962.15	479 456.0–530 420.6	3–3	7.76−01	4.48−02	8.68−01	−0.872	B	1
				1 938.94	478 846.1–530 420.6	5–3	8.97−01	3.03−02	9.68−01	−0.820	B	1
				1 971.52	479 456.0–530 178.2	3–1	2.06+00	3.99−02	7.78−01	−0.922	B	1
				1 941.49	479 456.0–530 962.9	3–5	1.23−01	1.16−02	2.22−01	−1.458	C+	1
				1 954.83	479 265.3–530 420.6	1–3	7.97−01	1.37−01	8.81−01	−0.863	B	1
38		^{3}P−^{1}F°										
				1 847.57	478 846.1–532 971.2	5–7	3.74−02	2.68−03	8.15−02	−1.873	C	1
39		^{3}P−^{3}D°		*1 793.2*	*479 096–534 864*	9–15	7.57+00	6.08−01	3.23+01	0.738	A	1
				1 783.25	478 846.1–534 923.6	5–7	9.39+00	6.27−01	1.84+01	0.496	A	1
				1 794.57	479 456.0–535 179.6	3–5	7.73+00	6.22−01	1.10+01	0.271	A	1

TABLE 48. Transition probabilities of allowed lines for Mg III (references for this table are as follows: 1=Tachiev and Froese Fischer,[96] 2=Tachiev and Froese Fischer,[92] 3=Hibbert *et al.*,[45] 4=Trabert,[107] and 5=Buchet *et al.*[10])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				1 820.42	479 265.3–534 197.7	1–3	2.98+00	4.44−01	2.66+00	−0.353	B+	1
				1 775.143	478 846.1–535 179.6	5–5	4.53−02	2.14−03	6.25−02	−1.971	C	1
				1 826.76	479 456.0–534 197.7	3–3	1.32−01	6.62−03	1.20−01	−1.702	C	1
				1 806.63	478 846.1–534 197.7	5–3	4.42−02	1.30−03	3.86−02	−2.187	C	1
40		$^{3}\mathrm{P}-^{1}\mathrm{D}^{\circ}$										
				1 807.64	479 456.0–534 776.9	3–5	4.62−02	3.77−03	6.73−02	−1.947	C	1
				1 787.92	478 846.1–534 776.9	5–5	1.46+00	6.99−02	2.06+00	−0.457	B	1
41		$^{3}\mathrm{P}-^{1}\mathrm{P}^{\circ}$										
				1 763.793	479 456.0–536 152.0	3–3	3.17+00	1.48−01	2.57+00	−0.353	B+	1
				1 745.021	478 846.1–536 152.0	5–3	5.37−02	1.47−03	4.23−02	−2.134	D+	1
				1 757.880	479 265.3–536 152.0	1–3	2.10+00	2.91−01	1.69+00	−0.536	B	1
42		$^{1}\mathrm{S}-^{3}\mathrm{P}^{\circ}$										
			2 905.41	2 906.26	496 012.1–530 420.6	1–3	6.84−03	2.60−03	2.49−02	−2.585	D	3
43		$^{1}\mathrm{S}-^{3}\mathrm{D}^{\circ}$										
			2 618.01	2 618.79	496 012.1–534 197.7	1–3	8.72−01	2.69−01	2.32+00	−0.570	B	3
44		$^{1}\mathrm{S}-^{1}\mathrm{P}^{\circ}$	2 490.54	2 491.29	496 012.1–536 152.0	1–3	1.61+00	4.48−01	3.67+00	−0.349	B+	2
45	$2p^53p$– $2p^5(^2\mathrm{P}^{\circ}_{3/2})4s$	$^{3}\mathrm{S}-^{2}[3/2]^{\circ}$										
				1 274.829	467 378.5–545 820.4	3–5	2.53+00	1.03−01	1.29+00	−0.510	B	1
46		$^{3}\mathrm{D}-^{2}[3/2]^{\circ}$										
				1 422.121	475 502.9–545 820.4	3–5	1.80−01	9.11−03	1.28−01	−1.563	C	1
				1 405.177	474 655.0–545 820.4	5–5	1.54+00	4.57−02	1.06+00	−0.641	C+	1
				1 393.394	474 053.2–545 820.4	7–5	6.38+00	1.33−01	4.26+00	−0.031	B+	1
47		$^{1}\mathrm{D}-^{2}[3/2]^{\circ}$										
				1 462.315	477 435.7–545 820.4	5–5	1.21+00	3.89−02	9.36−01	−0.711	C+	1
				1 447.264	477 435.7–546 531.6	5–3	2.22+00	4.18−02	9.95−01	−0.680	C+	1
48		$^{1}\mathrm{P}-^{2}[3/2]^{\circ}$										
				1 482.670	478 374.5–545 820.4	3–5	1.55−01	8.52−03	1.25−01	−1.592	D+	1
				1 467.199	478 374.5–546 531.6	3–3	9.37−01	3.02−02	4.38−01	−1.043	C	1
49		$^{3}\mathrm{P}-^{2}[3/2]^{\circ}$										
				1 506.832	479 456.0–545 820.4	3–5	3.91−01	2.22−02	3.31−01	−1.177	C	1
				1 493.110	478 846.1–545 820.4	5–5	1.02+00	3.41−02	8.37−01	−0.768	C+	1
50		$^{1}\mathrm{S}-^{2}[3/2]^{\circ}$										
				1 979.43	496 012.1–546 531.6	1–3	4.10−01	7.23−02	4.71−01	−1.141	C	1
51	$2p^53p$– $2p^5(^2\mathrm{P}^{\circ}_{1/2})4s$	$^{3}\mathrm{S}-^{2}[1/2]^{\circ}$										
				1 239.835	467 378.5–548 034.4	3–1	1.82+00	1.40−02	1.71−01	−1.377	C	1
52		$^{3}\mathrm{S}-^{2}[1/2]^{\circ}$										
				1 229.374	467 378.5–548 720.7	3–3	5.72−01	1.30−02	1.57−01	−1.409	D+	1
53		$^{3}\mathrm{D}-^{2}[1/2]^{\circ}$										
				1 378.711	475 502.9–548 034.4	3–1	5.32+00	5.06−02	6.88−01	−0.819	C+	1
54		$^{3}\mathrm{D}-^{2}[1/2]^{\circ}$										
				1 365.788	475 502.9–548 720.7	3–3	2.75−01	7.69−03	1.04−01	−1.637	D+	1
				1 350.153	474 655.0–548 720.7	5–3	3.50−01	5.75−03	1.28−01	−1.541	D+	1
55		$^{1}\mathrm{P}-^{2}[1/2]^{\circ}$										
				1 435.546	478 374.5–548 034.4	3–1	3.04+00	3.13−02	4.43−01	−1.027	C	1

TABLE 48. Transition probabilities of allowed lines for Mg III (references for this table are as follows: 1=Tachiev and Froese Fischer,[96] 2=Tachiev and Froese Fischer,[92] 3=Hibbert *et al.*,[45] 4=Trabert,[107] and 5=Buchet *et al.*[10])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
56		^{3}P–^{2}[1/2]°										
				1 458.185	479 456.0–548 034.4	3–1	3.21+00	3.41−02	4.91−01	−0.990	C+	1
57		^{3}P–^{2}[1/2]°										
				1 439.773	479 265.3–548 720.7	1–3	3.54−01	3.30−02	1.56−01	−1.481	D+	1
				1 443.737	479 456.0–548 720.7	3–3	1.81+00	5.65−02	8.05−01	−0.771	C+	1
				1 431.135	478 846.1–548 720.7	5–3	4.30+00	7.92−02	1.87+00	−0.402	B	1

[a] Wavelengths (Å) are always given unless cm^{-1} is indicated.

11.3.3. Forbidden Transitions for Mg III

Wherever available we have used the data of Tachiev and Froese Fischer,[96] which result from extensive MCHF calculations with Breit-Pauli corrections to order α^2. These calculations only extend to transitions from energy levels up to the $2p^54s$.

Only one transition was cited in both of Tachiev and Froese Fischer[96] and Landman.[53] To estimate the accuracy of the forbidden lines from allowed lines, we isoelectronically averaged the logarithmic quality factors (see Sec. 4.1 of the Introduction) observed for lines from the lower-lying levels of Ne-like ions of Na, Mg, Al, and Si and applied the result to forbidden lines of Mg III, as described in the introduction. Thus these listed accuracies are less well established than for the allowed lines.

11.3.4. References for Forbidden Transitions for Mg III

[53] D. A. Landman, J. Quant. Spectrosc. Radiat. Transf. **34**, 365 (1985).
[96] G. Tachiev and C. Froese Fischer, http://www.vuse.vanderbilt.edu/~cff/mchf_collection/ (MCHF, energy adjusted, downloaded on Sept. 3, 2003).

TABLE 49. Wavelength finding list for forbidden lines for Mg III

Wavelength (vac) (Å)	Mult. No.	Wavelength (vac) (Å)	Mult. No.	Wavelength (vac) (Å)	Mult. No.	Wavelength (vac) (Å)	Mult. No.
210.679	2	234.940	1				
Wavelength (air) (Å)	**Mult. No.**	**Wavelength (air) (Å)**	**Mult. No.**	**Wavelength (air) (Å)**	**Mult. No.**	**Wavelength (air) (Å)**	**Mult. No.**
2 004.86	6	2 091.96	6	2 318.13	8	2 788.69	7
2 039.55	6	2 118.64	6	2 350.94	8	16 974.2	4
2 055.48	6	2 135.95	6	2 395.16	5		
2 064.91	6	2 273.43	8	2 467.76	5		
Wavenumber (cm^{-1})	**Mult. No.**	**Wavenumber (cm^{-1})**	**Mult. No.**	**Wavenumber (cm^{-1})**	**Mult. No.**	**Wavenumber (cm^{-1})**	**Mult. No.**
4 661.9	4	2 211.8	3	984.0	3	601.8	9
3 677.9	4	1 227.8	3	847.9	9		

TABLE 50. Transition probabilities of forbidden lines for Mg III (references for this table are as follows: 1=Tachiev and Froese Fischer[96] and 2=Landman[53])

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	Type	A_{ki} (s^{-1})	S (a.u.)	Acc.	Source
1	$2p^6-2p^53s$	$^1S-^3P^\circ$									
				234.940	0–425 640.3	1–5	M2	7.62+00	1.83+00	C+	1,2
2	$2p^6-2p^53p$	$^1S-^3D$									
				210.679	0–474 655.0	1–5	E2	3.21+04	5.95−02	D+	1
3	$2p^53s-2p^53s$	$^3P^\circ-^3P^\circ$									
				2 211.8 cm^{-1}	425 640.3–427 852.1	5–1	E2	6.38−07	1.08−01	D+	2
				1 227.8 cm^{-1}	425 640.3–426 868.1	5–3	M1	3.95−02	2.37+00	B	1
				984.0 cm^{-1}	426 868.1–427 852.1	3–1	M1	4.88−02	1.90+00	B+	1,2
4		$^3P^\circ-^1P^\circ$									
				4 661.9 cm^{-1}	426 868.1–431 530.0	3–3	M1	6.56−02	7.21−02	D+	1
			16 974.2	16 978.8	425 640.3–431 530.0	5–3	M1	2.32−01	1.27−01	C	1
				3 677.9 cm^{-1}	427 852.1–431 530.0	1–3	M1	4.53−02	1.01−01	D+	1
5	$2p^53s-2p^53p$	$^3P^\circ-^3S$									
			2 395.16	2 395.89	425 640.3–467 378.5	5–3	M2	2.22−03	3.53+01	B+	1
			2 467.76	2 468.50	426 868.1–467 378.5	3–3	M2	1.59−04	2.94+00	C+	1
6		$^3P^\circ-^3D$									
			2 118.64	2 119.31	426 868.1–474 053.2	3–7	M2	3.43−03	6.88+01	A	1
			2 135.95	2 136.62	427 852.1–474 655.0	1–5	M2	7.72−04	1.15+01	B+	1
			2 064.91	2 065.57	425 640.3–474 053.2	5–7	M2	4.69−03	8.28+01	A	1
			2 091.96	2 092.62	426 868.1–474 655.0	3–5	M2	4.73−04	6.36+00	B	1
			2 039.55	2 040.20	425 640.3–474 655.0	5–5	M2	2.82−05	3.34−01	D+	1
			2 055.48	2 056.14	426 868.1–475 502.9	3–3	M2	8.18−04	6.05+00	B	1
			2 004.86	2 005.51	425 640.3–475 502.9	5–3	M2	2.27−03	1.48+01	B+	1
7		$^1P^\circ-^3S$									
			2 788.69	2 789.52	431 530.0–467 378.5	3–3	M2	6.11−04	2.08+01	B+	1
8		$^1P^\circ-^3D$									
			2 350.94	2 351.66	431 530.0–474 053.2	3–7	M2	1.65−03	5.59+01	A	1
			2 318.13	2 318.84	431 530.0–474 655.0	3–5	M2	5.06−04	1.14+01	B+	1
			2 273.43	2 274.13	431 530.0–475 502.9	3–3	M2	5.45−05	6.67−01	C	1
9	$2p^53p-2p^53p$	$^3D-^3D$									
				601.8 cm^{-1}	474 053.2–474 655.0	7–5	M1	4.91−03	4.17+00	B+	1
				847.9 cm^{-1}	474 655.0–475 502.9	5–3	M1	2.11−02	3.85+00	B+	1

[a] Wavelengths (Å) are always given unless cm^{-1} is indicated.

11.4. Mg IV

Fluorine isoelectronic sequence
Ground state: $1s^2 2s^2 2p^5\ ^2P^o_{3/2}$
Ionization energy: 109.265 eV=881 285 cm^{-1}

11.4.1. Allowed Transitions for Mg IV

Only OP (Ref. 14) results were available for energy levels above the $2p^4 3d$. Wherever available we have used the data of Tachiev and Froese Fischer,[92,96] which result from extensive MCHF calculations with Breit-Pauli corrections to order α^2, with energy adjustments.

The spin-allowed (non-OP) and intercombination data were treated separately and each of these was in turn divided into two upper-level energy groups below and above 610 000 cm^{-1}. Lines from the CI calculations of Biémont[4] and the OP constituted fifth and sixth groups, respectively, and have been used only when more accurate sources were not available.

Except for the strongest transitions, the results for fluorinelike transitions by Blackford and Hibbert[8] are not as accurate, as was demonstrated in later calculations for F-like Na III by McPeake and Hibbert[57] and by Tachiev and Froese Fischer[96] (Biémont[7] contains results for many F-like spectra). To estimate accuracies for all but the low-lying spin--allowed group, we scaled the pooling fit parameters found for F-like Na III by applying the logarithmic quality factor (see Sec. 4.1 of the Introduction), as described in the introduction. Thus the accuracies we list for these lines are somewhat less reliable. Energy levels labeled $2p^4(^3P)3p\ (^2S^o$ and $^2P^o)$, $2p^4(^1D)3p\ ^2P^o$, and $2p^4(^3P)3p\ ^2F$ have a highly mixed composition in LS coupling, and therefore transitions from them have been assigned lower accuracies.

11.4.2. References for Allowed Transitions for Mg IV

[7] E. Biémont, Phys. Scr. **31**, 45 (1985).
[8] H. M. S. Blackford and A. Hibbert, At. Data Nucl. Data Tables **58** 101 (1994).
[14] K. Butler and C. J. Zeippen, http://legacy.gsfc.nasa.gov/topbase, downloaded on July **28**, 1995 (Opacity Project).
[57] D. McPeake and A. Hibbert, J. Phys. B **33**, 2809 (2000).
[92] G. Tachiev and C. Froese Fischer, http://www.vuse.vanderbilt.edu/~cff/mchf_collection/ (MCHF, *ab initio*, downloaded on Mar. 28, 2002).
[96] G. Tachiev and C. Froese Fischer, http://www.vuse.vanderbilt.edu/~cff/mchf_collection/ (MCHF, energy adjusted, downloaded on Sept. 3, 2003).

TABLE 51. Wavelength finding list for allowed lines for Mg IV

Wavelength (vac) (Å)	Mult. No.
124.416	17
124.525	16
124.540	16
124.641	15
124.650	15
124.762	17
124.871	16
124.988	15
124.998	15
129.710	13
129.857	14
129.968	14
129.979	13
130.086	13
130.345	14
130.356	13
132.803	12
132.814	12
133.197	12
140.118	11
140.172	11
140.425	10
140.473	9
140.522	9
140.557	11
140.866	10
140.914	9
140.963	9
146.526	8
146.838	8
146.952	7
147.006	8
147.052	7
147.254	6
147.320	8
147.400	6
147.497	6
147.535	7
147.885	6
147.983	6
160.228	5
160.802	5
171.651	4
171.655	4
172.310	4
180.069	3
180.614	3
180.795	3
181.344	3
183.165	2
183.440	2
183.916	2
183.918	2
184.193	2
269.282	19
269.310	19
294.497	18
295.395	18
320.994	1
323.307	1
608.45	76
608.68	76
611.13	76
611.67	76
612.52	76
614.15	76
618.92	123
619.06	123
631.27	107
631.67	107
631.84	107
632.24	107
634.27	106
634.52	106
634.62	78
635.09	106
637.27	78
639.77	77
642.89	77
644.72	77
650.65	110
653.63	109
654.05	109
655.05	110
656.84	108
657.11	108
658.07	109
661.32	108
661.59	108
680.30	105
685.11	105
737.724	115
773.854	32
774.082	32
784.021	32
784.256	32
800.409	71
803.072	71
803.741	71
806.595	71
809.979	71
811.273	71
814.869	71
827.11	122
827.22	103
827.37	122
833.24	104
834.35	103
837.81	104
838.26	103

TABLE 51. Wavelength finding list for allowed lines for Mg IV—Continued

Wavelength (vac) (Å)	Mult. No.
840.364	100
840.432	100
842.083	100
845.11	104
845.58	103
852.232	72
854.405	72
854.932	72
857.290	72
859.249	72
861.994	72
863.694	72
865.722	73
866.734	73
868.644	72
868.676	97
869.172	97
870.938	97
875.62	121
875.91	121
877.489	73
890.355	75
891.008	101
891.085	101
892.145	101
892.222	101
902.807	75
911.001	74
919.023	74
922.901	98
923.461	98
924.120	98
924.682	98
929.779	74
936.205	102
936.290	102
945.262	68
945.341	102
947.694	68
958.068	68
960.567	68
963.939	67
971.479	99
972.100	99
974.899	67
977.260	67
981.321	99
988.329	70
990.988	70
996.740	40
996.899	40
997.278	40
1 006.250	69
1 008.765	69
1 026.401	31
1 037.393	31
1 041.740	113
1 044.365	31
1 055.747	31
1 056.223	124
1 058.994	124
1 061.738	125
1 068.592	114
1 073.736	114
1 097.450	30
1 099.175	30
1 119.802	30
1 190.882	44
1 197.434	44
1 198.646	44
1 205.284	44
1 210.962	43
1 212.855	44
1 218.990	43
1 220.904	43
1 221.399	42
1 229.066	43
1 229.568	42
1 235.634	42
1 235.875	43
1 236.939	43
1 243.837	43
1 292.740	49
1 307.359	49
1 307.649	89
1 307.930	89
1 311.649	89
1 311.931	89
1 315.260	49
1 316.436	48
1 318.734	49
1 319.212	88
1 323.954	88
1 326.774	49
1 328.055	88
1 328.780	47
1 331.599	48
1 333.330	49
1 336.857	41
1 337.709	96
1 340.822	55
1 342.156	41
1 342.215	41
1 343.402	48
1 343.631	48
1 344.231	47
1 345.645	47
1 346.542	41
1 346.649	41
1 350.904	120

TABLE 51. Wavelength finding list for allowed lines for Mg IV—Continued

Wavelength (vac) (Å)	Mult. No.
1 351.602	120
1 351.611	41
1 351.779	120
1 352.026	41
1 355.649	48
1 356.107	41
1 356.260	47
1 356.440	96
1 357.068	46
1 361.493	47
1 362.494	48
1 363.126	46
1 363.938	48
1 366.014	96
1 366.736	55
1 370.868	48
1 371.042	46
1 373.187	46
1 375.497	46
1 377.382	54
1 382.545	46
1 384.426	46
1 385.552	96
1 385.742	46
1 386.155	54
1 387.498	46
1 394.360	55
1 404.315	53
1 404.662	87
1 404.743	54
1 409.278	87
1 409.340	87
1 413.869	54
1 417.704	53
1 418.371	52
1 423.682	61
1 425.596	119
1 426.373	119
1 427.711	119
1 429.159	65
1 432.767	53
1 434.864	92
1 437.476	92
1 437.604	52
1 437.815	92
1 439.425	51
1 446.707	53
1 447.402	52
1 448.455	91
1 450.648	51
1 451.461	91
1 453.681	61
1 453.886	24
1 454.173	91
1 456.151	53
1 457.203	91
1 459.392	65
1 459.524	39
1 459.598	23
1 464.970	60
1 466.628	51
1 469.333	51
1 470.770	64
1 472.956	45
1 474.898	60
1 478.240	45
1 480.777	64
1 481.029	51
1 481.499	39
1 481.850	39
1 482.687	57
1 484.472	24
1 485.421	45
1 487.274	90
1 490.428	23
1 491.965	45
1 492.609	57
1 492.776	90
1 494.623	45
1 495.475	59
1 495.969	90
1 497.387	45
1 500.123	45
1 501.520	63
1 502.715	24
1 502.948	45
1 506.462	56
1 506.798	45
1 508.510	45
1 508.819	23
1 510.668	59
1 511.426	58
1 516.836	63
1 520.968	59
1 524.730	22
1 527.221	63
1 541.728	62
1 552.303	66
1 554.610	62
1 558.329	22
1 558.404	22
1 571.811	95
1 576.481	50
1 578.522	22
1 578.547	95
1 583.855	50
1 589.967	50
1 593.521	22
1 597.735	95
1 606.075	50

TABLE 51. Wavelength finding list for allowed lines for Mg IV—Continued

Wavelength (vac) (Å)	Mult. No.
1 607.097	38
1 607.510	38
1 610.799	38
1 611.214	38
1 611.269	94
1 612.427	50
1 617.628	93
1 620.142	50
1 624.139	93
1 638.522	94
1 640.891	21
1 645.099	93
1 651.833	93
1 658.851	21
1 669.563	21
1 679.958	21
1 683.000	21
1 692.675	21
1 698.788	21
1 699.654	29
1 701.262	79
1 702.368	79
1 703.360	21
1 707.467	28
1 749.484	29
1 757.763	28
1 797.28	27
1 800.16	37
1 807.75	37
1 808.28	37
1 844.15	27
1 853.09	27
1 874.58	20
1 893.89	20
1 906.72	20
1 925.74	20
1 936.93	20
1 946.12	20
1 946.76	26
1 956.55	20
1 960.91	26
1 986.61	26
Wavelength (air) (Å)	**Mult. No.**
2 011.76	26
2 026.88	26
2 276.29	25
2 303.46	25
2 332.70	25
2 366.61	25
2 382.21	118
2 384.38	118
2 395.98	25
2 473.52	118

TABLE 51. Wavelength finding list for allowed lines for Mg IV—Continued

Wavelength (air) (Å)	Mult. No.
2 475.86	118
2 642.66	82
2 652.69	82
2 747.96	82
2 788.59	81
2 799.76	81
2 824.80	81
2 836.26	81
2 961.95	80
2 974.55	80
3 060.44	80
3 084.46	86
3 185.93	86
3 228.86	86
3 242.53	117
3 246.55	117
3 275.43	117
3 285.11	85
3 335.48	85
3 339.14	36
3 340.24	86
3 340.93	36
3 415.11	116
3 419.58	116
3 442.63	84
3 454.46	85
3 524.25	84
3 580.85	84
3 657.35	84
3 661.65	83
3 718.34	84
3 735.19	83
3 738.18	35
3 740.42	35
3 805.54	83
3 946.88	35
3 949.37	35
4 452.08	34
4 523.52	34
4 526.79	34
4 634	131
4 662.72	34
4 666.20	34
4 858.74	34
4 924	131
6 662.5	33
6 893.1	33
6 900.7	33
7 161.7	33
7 169.9	33
10 804	127

TABLE 51. Wavelength finding list for allowed lines for Mg IV—Continued

Wavenumber (cm^{-1})	Mult. No.
4 222	126
4 066	128
4 004	128
3 781	126
3 256	129
2 855.8	111
2 817.6	111
2 556	130
2 396.3	111
1 866.2	112
1 828.0	112
1 002	132
940	132
416.7	112
378.5	112

TABLE 52. Transition probabilities of allowed lines for Mg IV (references for this table are as follows: 1 = Butler and Zeippen,[14] 2 = Tachiev and Froese Fischer,[96] 3 = Tachiev and Froese Fischer,[92] and 4 = Biémont[7])

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	$E_i - E_k$ (cm^{-1})	$g_i - g_k$	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
1	$2s^22p^5-2s2p^6$	$^2P^\circ-^2S$		*321.76*	*743*–311 532	6–2	1.68+02	8.71−02	5.54−01	−0.282	B+	2
				320.994	0–311 532	4–2	1.13+02	8.74−02	3.70−01	−0.456	B+	2
				323.307	2 228–311 532	2–2	5.52+01	8.65−02	1.84−01	−0.762	B+	2
2	$2s^22p^5-2p^4(^3P)3s$	$^2P^\circ-^4P$										
				183.440	0–545 137.6	4–4	1.33+00	6.69−04	1.62−03	−2.573	D+	2
				183.916	2 228–545 955.4	2–2	3.55−01	1.80−04	2.18−04	−3.444	D	2
				183.165	0–545 955.4	4–2	2.40−02	6.04−06	1.46−05	−4.617	E+	2
				183.918	0–543 720.4	4–6	7.90−02	6.01−05	1.46−04	−3.619	D	2
				184.193	2 228–545 137.6	2–4	1.31−01	1.33−04	1.62−04	−3.575	D	2
3		$^2P^\circ-^2P$		*180.67*	*743–554 225*	6–6	2.47+02	1.21−01	4.31−01	−0.139	B	2
				180.614	0–553 666.1	4–4	2.09+02	1.02−01	2.43−01	−0.389	B+	2
				180.795	2 228–555 341.9	2–2	1.63+02	7.96−02	9.48−02	−0.798	B	2
				180.069	0–555 341.9	4–2	8.53+01	2.07−02	4.91−02	−1.082	B	2
				181.344	2 228–553 666.1	2–4	3.72+01	3.67−02	4.38−02	−1.134	B	2
4	$2p^5-2p^4(^1D)3s$	$^2P^\circ-^2D$		*171.87*	*743–582 569*	6–10	9.66+01	7.13−02	2.42−01	−0.369	B	2
				171.655	0–582 562.4	4–6	9.66+01	6.40−02	1.45−01	−0.592	B	2
				172.310	2 228–582 578.4	2–4	8.44+01	7.52−02	8.53−02	−0.823	B	2
				171.651	0–582 578.4	4–4	1.22+01	5.41−03	1.22−02	−1.665	B	2
5	$2p^5-2p^4(^1S)3s$	$^2P^\circ-^2S$		*160.42*	*743*–624 109.6	6–2	9.85+01	1.27−02	4.01−02	−1.118	D	2
				160.228	0–624 109.6	4–2	6.28+01	1.21−02	2.55−02	−1.315	D+	2
				160.802	2 228–624 109.6	2–2	3.56+01	1.38−02	1.46−02	−1.559	D	2
6	$2s^22p^5-2p^4(^3P)3d$	$^2P^\circ-^4P$										
				147.400	0–678 428.3	4–4	1.11+01	3.63−03	7.04−03	−1.838	E+	2
				147.983	2 228–677 980.0	2–2	3.11−01	1.02−04	9.94−05	−3.690	E	2
				147.497	0–677 980.0	4–2	1.83+00	2.98−04	5.80−04	−2.924	E	2
				147.254	0–679 100.8	4–6	2.89+01	1.41−02	2.73−02	−1.249	D	2
				147.885	2 228–678 428.3	2–4	5.23+00	3.43−03	3.34−03	−2.164	E	2
7		$^2P^\circ-^2D$		*147.15*	*743–680 309*	6–10	5.20+02	2.81−01	8.18−01	0.227	C	2
				146.952	0–680 493.2	4–6	5.12+02	2.49−01	4.81−01	−0.002	C+	2
				147.535	2 228–680 033.7	2–4	3.29+02	2.14−01	2.08−01	−0.369	C	2
				147.052	0–680 033.7	4–4	2.04+02	6.61−02	1.28−01	−0.578	C	2
8		$^2P^\circ-^2P$		*146.79*	*743–681 990*	6–6	2.90+02	9.38−02	2.72−01	−0.250	C	2
				146.526	0–682 472.8	4–4	1.17+02	3.78−02	7.29−02	−0.820	C	2

TABLE 52. Transition probabilities of allowed lines for Mg IV (references for this table are as follows: 1=Butler and Zeippen,[14] 2=Tachiev and Froese Fischer,[96] 3=Tachiev and Froese Fischer,[92] and 4=Biémont[7])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				147.320	2 228–681 023.3	2–2	1.59+02	5.17−02	5.02−02	−0.985	D+	2
				146.838	0–681 023.3	4–2	9.16+01	1.48−02	2.86−02	−1.228	D+	2
				147.006	2 228–682 472.8	2–4	1.92+02	1.24−01	1.20−01	−0.606	C	2
9	$2p^5-2p^4(^1D)3d$	$^2P^\circ-^2P$		*140.65*	*743–711 715*	6–6	6.40+02	1.90−01	5.27−01	0.057	D+	2,4
				140.522	0–711 632.7	4–4	4.59+02	1.36−01	2.52−01	−0.264	C	2
				140.914	2 228–711 880.5	2–2	3.94+02	1.17−01	1.09−01	−0.631	D	4
				140.473	0–711 880.5	4–2	4.05+02	6.00−02	1.11−01	−0.620	D	4
				140.963	2 228–711 632.7	2–4	1.01+02	6.01−02	5.58−02	−0.920	D	2
10		$^2P^\circ-^2S$		*140.57*	*743*–712 124.5	6–2	7.51+02	7.42−02	2.06−01	−0.351	C	2
				140.425	0–712 124.5	4–2	1.60+02	2.36−02	4.37−02	−1.025	D+	2
				140.866	2 228–712 124.5	2–2	5.89+02	1.75−01	1.62−01	−0.456	C	2
11		$^2P^\circ-^2D$		*140.30*	*743–713 520*	6–10	2.98+02	1.46−01	4.06−01	−0.057	C	2
				140.172	0–713 411.0	4–6	2.85+02	1.26−01	2.32−01	−0.298	C	2
				140.557	2 228–713 682.5	2–4	2.60+02	1.54−01	1.43−01	−0.511	C	2
				140.118	0–713 682.5	4–4	5.68+01	1.67−02	3.08−02	−1.175	D+	2
12	$2p^5-2p^4(^1S)3d$	$^2P^\circ-^2D$		*132.94*	*743–752 958*	6–10	1.06+02	4.68−02	1.23−01	−0.552	D+	3
				132.814	0–752 931.7	4–6	1.01+02	4.01−02	7.02−02	−0.795	D+	3
				133.197	2 228–752 997.4	2–4	9.65+01	5.13−02	4.50−02	−0.989	D+	3
				132.803	0–752 997.4	4–4	1.66+01	4.38−03	7.67−03	−1.756	D	3
13	$2p^5-2p^4(^3P)4d$	$^2P^\circ-^2P$		*129.93*	*743–770 417*	6–6	4.31+02	1.09−01	2.80−01	−0.184	D	4
				129.710	0–770 948	4–4	8.06+01	2.03−02	3.47−02	−1.090	E+	4
				130.356	2 228–769 356	2–2	2.20+02	5.61−02	4.82−02	−0.950	E+	4
				129.979	0–769 356	4–2	1.22+02	1.54−02	2.64−02	−1.210	E+	4
				130.086	2 228–770 948	2–4	3.92+02	1.99−01	1.70−01	−0.400	D	4
14		$^2P^\circ-^2D$		*130.03*	*743–769 813*	6–10	5.65+02	2.39−01	6.13−01	0.157	D	4
				129.857	0–770 075	4–6	5.61+02	2.13−01	3.64−01	−0.070	D+	4
				130.345	2 228–769 421	2–4	2.47+02	1.26−01	1.08−01	−0.599	E+	4
				129.968	0–769 421	4–4	3.27+02	8.28−02	1.42−01	−0.480	D	4
15	$2p^5-2p^4(^1D)4d$	$^2P^\circ-^2P$		*124.76*	*743–802 265*	6–6	4.18+02	9.76−02	2.41−01	−0.232	D	4
				124.650	0–802 244	4–4	3.32+02	7.73−02	1.27−01	−0.510	D	4
				124.988	2 228–802 306	2–2	2.81+02	6.59−02	5.42−02	−0.880	E+	4
				124.641	0–802 306	4–2	1.59+02	1.85−02	3.04−02	−1.131	E+	4
				124.998	2 228–802 244	2–4	7.56+01	3.54−02	2.91−02	−1.150	E+	4
16		$^2P^\circ-^2D$		*124.65*	*743–802 994*	6–10	2.10+02	8.15−02	2.01−01	−0.311	D	4
				124.540	0–802 954	4–6	1.93+02	6.73−02	1.10−01	−0.570	D	4
				124.871	2 228–803 054	2–4	1.90+02	8.89−02	7.31−02	−0.750	D	4
				124.525	0–803 054	4–4	4.48+01	1.04−02	1.71−02	−1.381	E+	4
17		$^2P^\circ-^2S$		*124.53*	*743*–803 754	6–2	5.13+02	3.97−02	9.78−02	−0.623	E+	4
				124.416	0–803 754	4–2	3.26+02	3.78−02	6.20−02	−0.820	D	4
				124.762	2 228–803 754	2–2	1.87+02	4.35−02	3.58−02	−1.060	E+	4
18	$2s2p^6-2s^22p^4(^1D)3p$	$^2S-^2P^\circ$		*295.10*	311 532–*650 406*	2–6	1.50+00	5.89−03	1.14−02	−1.929	D	2
				295.395	311 532–650 061.6	2–4	1.48+00	3.86−03	7.51−03	−2.112	D	2
				294.497	311 532–651 093.9	2–2	1.56+00	2.03−03	3.94−03	−2.391	E+	2

TABLE 52. Transition probabilities of allowed lines for Mg IV (references for this table are as follows: 1=Butler and Zeippen,[14] 2=Tachiev and Froese Fischer,[96] 3=Tachiev and Froese Fischer,[92] and 4=Biémont[7])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
19	$2s2p^6$–$2s^22p^4(^1S)3p$	^2S–$^2P^\circ$		*269.29*	*311 532–682 877*	2–6	2.18+00	7.10−03	1.26−02	−1.848	D	2
				269.282	311 532–682 889.5	2–4	2.20+00	4.78−03	8.47−03	−2.020	D	2
				269.310	311 532–682 851.3	2–2	2.14+00	2.32−03	4.12−03	−2.333	E+	2
20	$2p^4(^3P)3s$–$2p^4(^3P)3p$	^4P–$^4P^\circ$		*1 911.5*	*544 565–596 880*	12–12	3.77+00	2.07−01	1.56+01	0.395	B+	2
				1 893.89	543 720.4–596 521.8	6–6	3.04+00	1.64−01	6.12+00	−0.007	B+	2
				1 925.74	545 137.6–597 065.7	4–4	5.49−01	3.05−02	7.73−01	−0.914	B+	2
				1 936.93	545 955.4–597 583.6	2–2	4.86−01	2.73−02	3.49−01	−1.263	B+	2
				1 874.58	543 720.4–597 065.7	6–4	2.14+00	7.51−02	2.78+00	−0.346	B+	2
				1 906.72	545 137.6–597 583.6	4–2	3.29+00	8.96−02	2.25+00	−0.446	B+	2
				1 946.12	545 137.6–596 521.8	4–6	7.71−01	6.57−02	1.68+00	−0.580	B+	2
				1 956.55	545 955.4–597 065.7	2–4	1.11+00	1.28−01	1.65+00	−0.592	B+	2
21		^4P–$^4D^\circ$		*1 685.58*	*544 565–603 892*	12–20	5.58+00	3.96−01	2.64+01	0.677	B+	2
				1 683.000	543 720.4–603 138.1	6–8	5.63+00	3.19−01	1.06+01	0.282	B+	2
				1 698.788	545 137.6–604 003.1	4–6	4.24+00	2.75−01	6.16+00	0.041	B+	2
				1 703.360	545 955.4–604 662.9	2–4	2.59+00	2.25−01	2.52+00	−0.347	B+	2
				1 658.851	543 720.4–604 003.1	6–6	1.25+00	5.16−02	1.69+00	−0.509	B+	2
				1 679.958	545 137.6–604 662.9	4–4	2.79+00	1.18−01	2.61+00	−0.326	B+	2
				1 692.675	545 955.4–605 033.5	2–2	4.78+00	2.05−01	2.29+00	−0.387	B+	2
				1 640.891	543 720.4–604 662.9	6–4	1.61−01	4.33−03	1.40−01	−1.585	B	2
				1 669.563	545 137.6–605 033.5	4–2	7.76−01	1.62−02	3.56−01	−1.188	B+	2
22		^4P–$^2D^\circ$										
				1 593.521	545 137.6–607 891.7	4–6	5.33−02	3.05−03	6.39−02	−1.914	D+	2
				1 578.522	545 955.4–609 305.8	2–4	1.32−02	9.83−04	1.02−02	−2.706	E+	2
				1 558.329	543 720.4–607 891.7	6–6	2.99−02	1.09−03	3.35−02	−2.184	D	2
				1 558.404	545 137.6–609 305.8	4–4	7.73−03	2.82−04	5.78−03	−2.948	E+	2
				1 524.730	543 720.4–609 305.8	6–4	4.81−03	1.12−04	3.36−03	−3.173	E	2
23		^4P–$^4S^\circ$		*1 477.82*	*544 565*–612 232.4	12–4	8.15+00	8.90−02	5.20+00	0.029	B	2
				1 459.598	543 720.4–612 232.4	6–4	3.72+00	7.92−02	2.28+00	−0.323	B	2
				1 490.428	545 137.6–612 232.4	4–4	2.83+00	9.42−02	1.85+00	−0.424	B	2
				1 508.819	545 955.4–612 232.4	2–4	1.57+00	1.07−01	1.06+00	−0.670	C+	2
24		^4P–$^2P^\circ$										
				1 484.472	545 137.6–612 501.6	4–4	5.94−02	1.96−03	3.84−02	−2.106	D	2
				1 453.886	543 720.4–612 501.6	6–4	6.13−02	1.29−03	3.72−02	−2.111	D	2
				1 502.715	545 955.4–612 501.6	2–4	1.07−02	7.26−04	7.18−03	−2.838	E+	2
25		^2P–$^4P^\circ$										
			2 303.46	2 304.17	553 666.1–597 065.7	4–4	8.34−05	6.63−06	2.01−04	−4.576	D	2
			2 366.61	2 367.33	555 341.9–597 583.6	2–2	7.24−04	6.08−05	9.48−04	−3.915	D+	2
			2 276.29	2 277.00	553 666.1–597 583.6	4–2	1.49−03	5.81−05	1.74−03	−3.634	D+	2
			2 332.70	2 333.41	553 666.1–596 521.8	4–6	3.85−04	4.72−05	1.45−03	−3.724	D+	2
			2 395.98	2 396.71	555 341.9–597 065.7	2–4	9.90−06	1.71−06	2.69−05	−5.466	E+	2
26		^2P–$^4D^\circ$										
				1 986.61	553 666.1–604 003.1	4–6	4.52−02	4.01−03	1.05−01	−1.795	C+	2
			2 026.88	2 027.53	555 341.9–604 662.9	2–4	1.34−02	1.65−03	2.21−02	−2.481	C	2
				1 960.91	553 666.1–604 662.9	4–4	4.85−04	2.80−05	7.22−04	−3.951	D+	2
			2 011.76	2 012.41	555 341.9–605 033.5	2–2	1.09−03	6.59−05	8.74−04	−3.880	D+	2
				1 946.76	553 666.1–605 033.5	4–2	3.06−04	8.69−06	2.23−04	−4.459	D	2
27		^2P–$^2D^\circ$		*1 843.9*	*554 225–608 457*	6–10	4.42+00	3.76−01	1.37+01	0.353	B+	2

TABLE 52. Transition probabilities of allowed lines for Mg IV (references for this table are as follows: 1=Butler and Zeippen,[14] 2=Tachiev and Froese Fischer,[96] 3=Tachiev and Froese Fischer,[92] and 4=Biémont[7])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				1 844.15	553 666.1–607 891.7	4–6	4.41+00	3.38−01	8.20+00	0.131	B+	2
				1 853.09	555 341.9–609 305.8	2–4	3.10+00	3.19−01	3.90+00	−0.195	B	2
				1 797.28	553 666.1–609 305.8	4–4	1.39+00	6.71−02	1.59+00	−0.571	B	2
28		^{2}P–^{4}S°										
				1 707.467	553 666.1–612 232.4	4–4	6.00−02	2.62−03	5.89−02	−1.980	D	2
				1 757.763	555 341.9–612 232.4	2–4	1.32−02	1.22−03	1.41−02	−2.613	E+	2
29		^{2}P–^{2}P°				6–4						
				1 699.654	553 666.1–612 501.6	4–4	2.90+00	1.26−01	2.81+00	−0.298	B	2
				1 749.484	555 341.9–612 501.6	2–4	1.30+00	1.19−01	1.37+00	−0.623	B	2
30	$2p^4(^3\text{P})3s$–$2p^4(^1\text{D})3p$	^{2}P–^{2}D°		*1 104.92*	*554 225–644 729*	6–10	5.98−03	1.83−03	3.98−02	−1.959	D	2
				1 097.450	553 666.1–644 786.4	4–6	4.39−02	1.19−03	1.72−02	−2.322	D	2
				1 119.802	555 341.9–644 643.4	2–4	2.02−02	7.58−04	5.59−03	−2.819	D	2
				1 099.175	553 666.1–644 643.4	4–4	6.51−02	1.18−03	1.71−02	−2.326	D	2
31		^{2}P–^{2}P°		*1 039.71*	*554 225–650 406*	6–6	6.81+00	1.10−01	2.27+00	−0.180	C+	2
				1 037.393	553 666.1–650 061.6	4–4	5.71+00	9.22−02	1.26+00	−0.433	B	2
				1 044.365	555 341.9–651 093.9	2–2	4.53+00	7.41−02	5.10−01	−0.829	C+	2
				1 026.401	553 666.1–651 093.9	4–2	2.10+00	1.66−02	2.24−01	−1.178	C	2
				1 055.747	555 341.9–650 061.6	2–4	1.19+00	3.96−02	2.76−01	−1.101	C	2
32	$2p^4(^3\text{P})3s$–$2p^4(^1\text{S})3p$	^{2}P–^{2}P°		*777.29*	*554 225–682 877*	6–6	5.78−01	5.23−03	8.04−02	−1.503	D+	2
				773.854	553 666.1–682 889.5	4–4	4.47−01	4.01−03	4.09−02	−1.795	D+	2
				784.256	555 341.9–682 851.3	2–2	4.28−01	3.95−03	2.04−02	−2.102	D	2
				774.082	553 666.1–682 851.3	4–2	2.20−01	9.88−04	1.01−02	−2.403	D	2
				784.021	555 341.9–682 889.5	2–4	9.48−02	1.75−03	9.02−03	−2.456	D	2
33	$2p^4(^1\text{D})3s$–$2p^4(^3\text{P})3p$	^{2}D–^{4}P°										
			6 893.1	6 895.0	582 562.4–597 065.7	6–4	1.11−05	5.27−06	7.18−04	−4.500	D+	2
			6 662.5	6 664.4	582 578.4–597 583.6	4–2	8.59−06	2.86−06	2.51−04	−4.942	D	2
			7 161.7	7 163.6	582 562.4–596 521.8	6–6	1.40−06	1.07−06	1.52−04	−5.192	D	2
			6 900.7	6 902.6	582 578.4–597 065.7	4–4	3.33−06	2.38−06	2.16−04	−5.021	D	2
			7 169.9	7 171.9	582 578.4–596 521.8	4–6	1.45−07	1.67−07	1.58−05	−6.175	E+	2
34		^{2}D–^{4}D°										
			4 662.72	4 664.03	582 562.4–604 003.1	6–6	9.51−06	3.10−06	2.86−04	−4.730	D	2
			4 526.79	4 528.06	582 578.4–604 662.9	4–4	1.52−05	4.68−06	2.79−04	−4.728	D	2
			4 523.52	4 524.78	582 562.4–604 662.9	6–4	1.16−05	2.38−06	2.12−04	−4.845	D	2
			4 452.08	4 453.33	582 578.4–605 033.5	4–2	1.79−05	2.66−06	1.56−04	−4.973	D	2
			4 858.74	4 860.10	582 562.4–603 138.1	6–8	3.17−06	1.50−06	1.44−04	−5.046	D	2
			4 666.20	4 667.51	582 578.4–604 003.1	4–6	2.45−06	1.20−06	7.38−05	−5.319	D	2
35		^{2}D–^{2}D°	*3 861.6*	*3 862.8*	*582 569–608 457*	10–10	1.81−03	4.06−04	5.16−02	−2.391	D	2
			3 946.88	3 948.00	582 562.4–607 891.7	6–6	6.09−04	1.42−04	1.11−02	−3.070	D	2
			3 740.42	3 741.48	582 578.4–609 305.8	4–4	2.27−03	4.77−04	2.35−02	−2.719	D+	2
			3 738.18	3 739.24	582 562.4–609 305.8	6–4	1.60−03	2.24−04	1.66−02	−2.872	D	2
			3 949.37	3 950.49	582 578.4–607 891.7	4–6	2.50−05	8.76−06	4.56−04	−4.455	E	2
36		^{2}D–^{2}P°				10–4						
			3 339.14	3 340.10	582 562.4–612 501.6	6–4	1.45−01	1.62−02	1.07+00	−1.012	C+	2
			3 340.93	3 341.89	582 578.4–612 501.6	4–4	1.47−02	2.46−03	1.08−01	−2.007	C	2
37	$2p^4(^1\text{D})3s$–$2p^4(^1\text{D})3p$	^{2}D–^{2}F°		*1 803.6*	*582 569–638 013*	10–14	4.66+00	3.18−01	1.89+01	0.502	B+	2

TABLE 52. Transition probabilities of allowed lines for Mg IV (references for this table are as follows: 1=Butler and Zeippen,[14] 2=Tachiev and Froese Fischer,[96] 3=Tachiev and Froese Fischer,[92] and 4=Biémont[7])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^{a}	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				1 800.16	582 562.4–638 112.9	6–8	4.69+00	3.04−01	1.08+01	0.261	B+	2
				1 808.28	582 578.4–637 879.7	4–6	4.26+00	3.13−01	7.45+00	0.098	B+	2
				1 807.75	582 562.4–637 879.7	6–6	3.68−01	1.80−02	6.44−01	−0.967	C+	2
38		$^{2}\mathrm{D}-{}^{2}\mathrm{D}^{\circ}$		*1 608.74*	*582 569–644 729*	10–10	6.47+00	2.51−01	1.33+01	0.400	B+	2
				1 607.097	582 562.4–644 786.4	6–6	5.97+00	2.31−01	7.34+00	0.142	B+	2
				1 611.214	582 578.4–644 643.4	4–4	6.01+00	2.34−01	4.96+00	−0.029	B+	2
				1 610.799	582 562.4–644 643.4	6–4	4.19−01	1.09−02	3.46−01	−1.184	C	2
				1 607.510	582 578.4–644 786.4	4–6	5.24−01	3.04−02	6.44−01	−0.915	C+	2
39		$^{2}\mathrm{D}-{}^{2}\mathrm{P}^{\circ}$		*1 474.12*	*582 569–650 406*	10–6	6.66+00	1.30−01	6.32+00	0.114	B	2
				1 481.499	582 562.4–650 061.6	6–4	6.16+00	1.35−01	3.96+00	−0.092	B	2
				1 459.524	582 578.4–651 093.9	4–2	6.94+00	1.11−01	2.13+00	−0.353	B	2
				1 481.850	582 578.4–650 061.6	4–4	3.64−01	1.20−02	2.34−01	−1.319	C	2
40	$2p^{4}(^{1}\mathrm{D})3s-2p^{4}(^{1}\mathrm{S})3p$	$^{2}\mathrm{D}-{}^{2}\mathrm{P}^{\circ}$		*996.93*	*582 569–682 877*	10–6	3.86−02	3.45−04	1.13−02	−2.462	D	2
				996.740	582 562.4–682 889.5	6–4	4.13−02	4.10−04	8.07−03	−2.609	D	2
				997.278	582 578.4–682 851.3	4–2	1.68−02	1.25−04	1.65−03	−3.301	E+	2
				996.899	582 578.4–682 889.5	4–4	8.24−03	1.23−04	1.61−03	−3.308	E+	2
41	$2p^{4}(^{3}\mathrm{P})3p-2p^{4}(^{3}\mathrm{P})3d$	$^{4}\mathrm{P}^{\circ}-{}^{4}\mathrm{D}$		*1 348.35*	*596 880–671 045*	12–20	1.11+01	5.06−01	2.70+01	0.783	B+	2
				1 346.542	596 521.8–670 786.1	6–8	1.07+01	3.87−01	1.03+01	0.366	B+	2
				1 352.026	597 065.7–671 028.8	4–6	6.59+00	2.71−01	4.82+00	0.035	B+	2
				1 356.107	597 583.6–671 324.1	2–4	3.67+00	2.02−01	1.81+00	−0.394	B	2
				1 342.156	596 521.8–671 028.8	6–6	4.72+00	1.28−01	3.38+00	−0.115	B	2
				1 346.649	597 065.7–671 324.1	4–4	6.87+00	1.87−01	3.31+00	−0.126	B	2
				1 351.611	597 583.6–671 569.4	2–2	9.06+00	2.48−01	2.21+00	−0.305	B	2
				1 336.857	596 521.8–671 324.1	6–4	1.07+00	1.92−02	5.06−01	−0.939	C+	2
				1 342.215	597 065.7–671 569.4	4–2	2.66+00	3.59−02	6.34−01	−0.843	C+	2
42		$^{4}\mathrm{P}^{\circ}-{}^{2}\mathrm{F}$										
				1 235.634	596 521.8–677 451.9	6–8	1.71−02	5.23−04	1.28−02	−2.503	E+	2
				1 229.568	597 065.7–678 395.1	4–6	1.38−01	4.69−03	7.59−02	−1.727	D+	2
				1 221.399	596 521.8–678 395.1	6–6	1.73−01	3.86−03	9.31−02	−1.635	D+	2
43		$^{4}\mathrm{P}^{\circ}-{}^{4}\mathrm{P}$		*1 222.35*	*596 880–678 690*	12–12	7.17+00	1.61−01	7.76+00	0.286	B	2
				1 210.962	596 521.8–679 100.8	6–6	3.79+00	8.34−02	1.99+00	−0.301	B	2
				1 229.066	597 065.7–678 428.3	4–4	7.49−01	1.70−02	2.74−01	−1.167	C	2
				1 243.837	597 583.6–677 980.0	2–2	1.86+00	4.31−02	3.53−01	−1.064	C+	2
				1 220.904	596 521.8–678 428.3	6–4	3.25+00	4.84−02	1.17+00	−0.537	B	2
				1 235.875	597 065.7–677 980.0	4–2	7.04+00	8.06−02	1.31+00	−0.492	B	2
				1 218.990	597 065.7–679 100.8	4–6	2.25+00	7.52−02	1.21+00	−0.522	B	2
				1 236.939	597 583.6–678 428.3	2–4	3.88+00	1.78−01	1.45+00	−0.449	B	2
44		$^{4}\mathrm{P}^{\circ}-{}^{2}\mathrm{D}$										
				1 198.646	597 065.7–680 493.2	4–6	1.93−01	6.22−03	9.82−02	−1.604	D+	2
				1 212.855	597 583.6–680 033.7	2–4	1.11−01	4.89−03	3.91−02	−2.010	D	2
				1 190.882	596 521.8–680 493.2	6–6	2.79−01	5.92−03	1.39−01	−1.450	D+	2
				1 205.284	597 065.7–680 033.7	4–4	1.28−02	2.80−04	4.44−03	−2.951	E+	2
				1 197.434	596 521.8–680 033.7	6–4	6.44−02	9.23−04	2.18−02	−2.257	D	2
45		$^{4}\mathrm{D}^{\circ}-{}^{4}\mathrm{D}$		*1 489.14*	*603 892–671 045*	20–20	2.72+00	9.05−02	8.87+00	0.258	B	2
				1 478.240	603 138.1–670 786.1	8–8	2.92+00	9.57−02	3.73+00	−0.116	B	2
				1 491.965	604 003.1–671 028.8	6–6	1.50+00	4.99−02	1.47+00	−0.524	B	2
				1 500.123	604 662.9–671 324.1	4–4	9.01−01	3.04−02	6.01−01	−0.915	C+	2

TABLE 52. Transition probabilities of allowed lines for Mg IV (references for this table are as follows: 1=Butler and Zeippen,[14] 2=Tachiev and Froese Fischer,[96] 3=Tachiev and Froese Fischer,[92] and 4=Biémont[7])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})$^{\text{a}}$	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				1 502.948	605 033.5–671 569.4	2–2	1.02+00	3.47−02	3.43−01	−1.159	C	2
				1 472.956	603 138.1–671 028.8	8–6	7.02−01	1.71−02	6.64−01	−0.864	C+	2
				1 485.421	604 003.1–671 324.1	6–4	9.86−01	2.18−02	6.38−01	−0.883	C+	2
				1 494.623	604 662.9–671 569.4	4–2	1.19+00	2.00−02	3.93−01	−1.097	C+	2
				1 497.387	604 003.1–670 786.1	6–8	2.65−01	1.19−02	3.52−01	−1.146	C+	2
				1 506.798	604 662.9–671 028.8	4–6	3.91−01	2.00−02	3.96−01	−1.097	C+	2
				1 508.510	605 033.5–671 324.1	2–4	4.25−01	2.90−02	2.88−01	−1.237	C	2
46		^{4}D$^\circ$–^{4}F		*1 383.58*	*603 892–676 169*	20–28	1.40+01	5.61−01	5.11+01	1.050	B+	2
				1 384.426	603 138.1–675 370.2	8–10	1.45+01	5.20−01	1.90+01	0.619	B+	2
				1 387.498	604 003.1–676 075.3	6–8	1.19+01	4.58−01	1.25+01	0.439	B+	2
				1 385.742	604 662.9–676 826.4	4–6	1.07+01	4.60−01	8.40+00	0.265	B+	2
				1 382.545	605 033.5–677 363.9	2–4	1.02+01	5.87−01	5.34+00	0.070	B+	2
				1 371.042	603 138.1–676 075.3	8–8	1.31+00	3.71−02	1.34+00	−0.528	B	2
				1 373.187	604 003.1–676 826.4	6–6	3.08+00	8.70−02	2.36+00	−0.282	B	2
				1 375.497	604 662.9–677 363.9	4–4	3.92+00	1.11−01	2.01+00	−0.353	B	2
				1 357.068	603 138.1–676 826.4	8–6	5.32−02	1.10−03	3.94−02	−2.056	D+	2
				1 363.126	604 003.1–677 363.9	6–4	1.92−01	3.57−03	9.62−02	−1.669	C	2
47		^{4}D$^\circ$–^{2}F										
				1 361.493	604 003.1–677 451.9	6–8	1.08+00	4.02−02	1.08+00	−0.618	C+	2
				1 356.260	604 662.9–678 395.1	4–6	7.22−01	2.99−02	5.33−01	−0.922	C	2
				1 345.645	603 138.1–677 451.9	8–8	2.21−01	6.00−03	2.13−01	−1.319	C	2
				1 344.231	604 003.1–678 395.1	6–6	3.06−02	8.29−04	2.20−02	−2.303	D	2
				1 328.780	603 138.1–678 395.1	8–6	5.07−02	1.01−03	3.52−02	−2.093	D	2
48		^{4}D$^\circ$–^{4}P		*1 336.94*	*603 892–678 690*	20–12	8.35−01	1.34−02	1.18+00	−0.572	C	2
				1 316.436	603 138.1–679 100.8	8–6	4.05−01	7.89−03	2.74−01	−1.200	C	2
				1 343.631	604 003.1–678 428.3	6–4	1.62−01	2.92−03	7.74−02	−1.756	C	2
				1 363.938	604 662.9–677 980.0	4–2	8.55−02	1.19−03	2.14−02	−2.322	D	2
				1 331.599	604 003.1–679 100.8	6–6	4.21−01	1.12−02	2.94−01	−1.173	C	2
				1 355.649	604 662.9–678 428.3	4–4	2.56−01	7.05−03	1.26−01	−1.550	C	2
				1 370.868	605 033.5–677 980.0	2–2	3.70−01	1.04−02	9.41−02	−1.682	C	2
				1 343.402	604 662.9–679 100.8	4–6	1.39−01	5.65−03	9.99−02	−1.646	C	2
				1 362.494	605 033.5–678 428.3	2–4	3.90−01	2.17−02	1.95−01	−1.363	C	2
49		^{4}D$^\circ$–^{2}D										
				1 307.359	604 003.1–680 493.2	6–6	3.44−03	8.80−05	2.27−03	−3.277	E	2
				1 326.774	604 662.9–680 033.7	4–4	4.82−02	1.27−03	2.22−02	−2.294	D	2
				1 292.740	603 138.1–680 493.2	8–6	2.86−02	5.37−04	1.83−02	−2.367	D	2
				1 315.260	604 003.1–680 033.7	6–4	1.07−02	1.85−04	4.82−03	−2.955	E+	2
				1 318.734	604 662.9–680 493.2	4–6	1.18−02	4.62−04	8.02−03	−2.733	E+	2
				1 333.330	605 033.5–680 033.7	2–4	8.50−02	4.53−03	3.98−02	−2.043	D	2
50		^{2}D$^\circ$–^{4}D										
				1 583.855	607 891.7–671 028.8	6–6	1.83−02	6.88−04	2.15−02	−2.384	D	2
				1 612.427	609 305.8–671 324.1	4–4	2.19−03	8.54−05	1.81−03	−3.466	E	2
				1 576.481	607 891.7–671 324.1	6–4	1.07−02	2.66−04	8.29−03	−2.797	E+	2
				1 606.075	609 305.8–671 569.4	4–2	3.21−03	6.21−05	1.31−03	−3.605	E	2
				1 589.967	607 891.7–670 786.1	6–8	1.77−03	8.94−05	2.81−03	−3.271	E	2
				1 620.142	609 305.8–671 028.8	4–6	1.37−04	8.07−06	1.72−04	−4.491	E	2
51		^{2}D$^\circ$–^{4}F										
				1 466.628	607 891.7–676 075.3	6–8	1.09+00	4.68−02	1.36+00	−0.552	C+	2
				1 481.029	609 305.8–676 826.4	4–6	4.25−01	2.09−02	4.08−01	−1.078	C	2

TABLE 52. Transition probabilities of allowed lines for Mg IV (references for this table are as follows: 1=Butler and Zeippen,[14] 2=Tachiev and Froese Fischer,[96] 3=Tachiev and Froese Fischer,[92] and 4=Biémont[7])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				1 450.648	607 891.7–676 826.4	6–6	6.03−02	1.90−03	5.45−02	−1.943	D	2
				1 469.333	609 305.8–677 363.9	4–4	5.44−03	1.76−04	3.41−03	−3.152	E	2
				1 439.425	607 891.7–677 363.9	6–4	8.62−04	1.79−05	5.08−04	−3.969	E	2
52		$^2D^\circ-^2F$		*1 440.95*	*608 457–677 856*	10–14	1.18+01	5.14−01	2.44+01	0.711	B+	2
				1 437.604	607 891.7–677 451.9	6–8	1.21+01	4.99−01	1.42+01	0.476	B+	2
				1 447.402	609 305.8–678 395.1	4–6	9.27+00	4.37−01	8.33+00	0.243	B+	2
				1 418.371	607 891.7–678 395.1	6–6	2.21+00	6.66−02	1.87+00	−0.398	B	2
53		$^2D^\circ-^4P$										
				1 417.704	607 891.7–678 428.3	6–4	3.56−02	7.15−04	2.00−02	−2.368	D	2
				1 456.151	609 305.8–677 980.0	4–2	1.14−02	1.82−04	3.48−03	−3.138	E	2
				1 404.315	607 891.7–679 100.8	6–6	2.95−03	8.73−05	2.42−03	−3.281	E	2
				1 446.707	609 305.8–678 428.3	4–4	5.74−02	1.80−03	3.43−02	−2.143	D	2
				1 432.767	609 305.8–679 100.8	4–6	9.91−01	4.58−02	8.64−01	−0.737	C+	2
54		$^2D^\circ-^2D$		*1 391.75*	*608 457–680 309*	10–10	3.50+00	1.02−01	4.66+00	0.009	B	2
				1 377.382	607 891.7–680 493.2	6–6	1.91+00	5.43−02	1.48+00	−0.487	B	2
				1 413.869	609 305.8–680 033.7	4–4	3.30+00	9.88−02	1.84+00	−0.403	B	2
				1 386.155	607 891.7–680 033.7	6–4	6.31−01	1.21−02	3.32−01	−1.139	C	2
				1 404.743	609 305.8–680 493.2	4–6	1.23+00	5.47−02	1.01+00	−0.660	C+	2
55		$^2D^\circ-^2P$		*1 359.95*	*608 457–681 990*	10–6	7.58−01	1.26−02	5.65−01	−0.900	C	2
				1 340.822	607 891.7–682 472.8	6–4	2.78−01	4.99−03	1.32−01	−1.524	C	2
				1 394.360	609 305.8–681 023.3	4–2	9.76−01	1.42−02	2.61−01	−1.246	C	2
				1 366.736	609 305.8–682 472.8	4–4	3.40−01	9.51−03	1.71−01	−1.420	C	2
56		$^2P^\circ-^4F$										
				1 506.462	610 983.2–677 363.9	2–4	4.31−02	2.93−03	2.91−02	−2.232	D	2
57		$^2P^\circ-^4P$										
				1 482.687	610 983.2–678 428.3	2–4	9.55−02	6.29−03	6.14−02	−1.900	D	2
				1 492.609	610 983.2–677 980.0	2–2	1.33−02	4.43−04	4.36−03	−3.053	E+	2
58		$^4S^\circ-^2F$										
				1 511.426	612 232.4–678 395.1	4–6	2.20−01	1.13−02	2.25−01	−1.345	C	2
59		$^4S^\circ-^4P$		*1 504.72*	612 232.4–*678 690*	4–12	6.04+00	6.15−01	1.22+01	0.391	B+	2
				1 495.475	612 232.4–679 100.8	4–6	6.08+00	3.06−01	6.02+00	0.088	B+	2
				1 510.668	612 232.4–678 428.3	4–4	6.07+00	2.08−01	4.13+00	−0.080	B+	2
				1 520.968	612 232.4–677 980.0	4–2	5.87+00	1.02−01	2.04+00	−0.389	B	2
60		$^4S^\circ-^2D$										
				1 464.970	612 232.4–680 493.2	4–6	1.09+00	5.27−02	1.02+00	−0.676	C+	2
				1 474.898	612 232.4–680 033.7	4–4	3.25−01	1.06−02	2.06−01	−1.373	C	2
61		$^4S^\circ-^2P$										
				1 423.682	612 232.4–682 472.8	4–4	4.70−02	1.43−03	2.68−02	−2.243	D	2
				1 453.681	612 232.4–681 023.3	4–2	5.15−02	8.16−04	1.56−02	−2.486	E+	2
62		$^2P^\circ-^4F$										
				1 554.610	612 501.6–676 826.4	4–6	5.70−02	3.10−03	6.35−02	−1.907	D+	2
				1 541.728	612 501.6–677 363.9	4–4	2.94−02	1.05−03	2.13−02	−2.377	D	2
63		$^2P^\circ-^4P$										

TABLE 52. Transition probabilities of allowed lines for Mg IV (references for this table are as follows: 1=Butler and Zeippen,[14] 2=Tachiev and Froese Fischer,[96] 3=Tachiev and Froese Fischer,[92] and 4=Biémont[7])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				1 516.836	612 501.6–678 428.3	4–4	2.51−01	8.67−03	1.73−01	−1.460	C	2
				1 527.221	612 501.6–677 980.0	4–2	1.09−01	1.90−03	3.82−02	−2.119	D	2
				1 501.520	612 501.6–679 100.8	4–6	7.92−01	4.02−02	7.94−01	−0.794	C+	2
64		^{2}P°−^{2}D				4–10						
				1 470.770	612 501.6–680 493.2	4–6	6.90+00	3.36−01	6.50+00	0.128	B	2
				1 480.777	612 501.6–680 033.7	4–4	1.80+00	5.93−02	1.16+00	−0.625	C+	2
65		^{2}P°−^{2}P				4–6						
				1 429.159	612 501.6–682 472.8	4–4	2.48+00	7.60−02	1.43+00	−0.517	C+	2
				1 459.392	612 501.6–681 023.3	4–2	1.13+00	1.81−02	3.47−01	−1.140	C	2
66		^{2}S°−^{4}F										
				1 552.303	612 943.5–677 363.9	2–4	2.61−02	1.89−03	1.93−02	−2.423	D	2
67	$2p^4(^3\mathrm{P})3p$−$2p^4(^1\mathrm{D})3d$	^{2}D°−^{2}P		*968.45*	*608 457–711 715*	10–6	2.56−01	2.16−03	6.88−02	−1.666	E+	2,4
				963.939	607 891.7–711 632.7	6–4	1.29−01	1.20−03	2.28−02	−2.143	D	2
				974.899	609 305.8–711 880.5	4–2	1.80−01	1.28−03	1.65−02	−2.291	E	4
				977.260	609 305.8–711 632.7	4–4	1.61−01	2.30−03	2.96−02	−2.036	D	2
68		^{2}D°−^{2}D		*951.82*	*608 457–713 520*	10–10	4.26−01	5.78−03	1.81−01	−1.238	D+	2
				947.694	607 891.7–713 411.0	6–6	3.75−01	5.05−03	9.46−02	−1.519	C	2
				958.068	609 305.8–713 682.5	4–4	2.95−01	4.06−03	5.13−02	−1.789	D+	2
				945.262	607 891.7–713 682.5	6–4	4.46−02	3.98−04	7.43−03	−2.622	D	2
				960.567	609 305.8–713 411.0	4–6	1.06−01	2.20−03	2.78−02	−2.056	D+	2
69		^{2}P°−^{2}P				4–6						
				1 008.765	612 501.6–711 632.7	4–4	2.75+00	4.20−02	5.58−01	−0.775	C+	2
				1 006.250	612 501.6–711 880.5	4–2	2.62+00	1.99−02	2.63−01	−1.099	D+	4
70		^{2}P°−^{2}D				4–10						
				990.988	612 501.6–713 411.0	4–6	9.82−01	2.17−02	2.83−01	−1.061	C	2
				988.329	612 501.6–713 682.5	4–4	3.01−01	4.40−03	5.73−02	−1.754	D+	2
71	$2p^4(^3\mathrm{P})3p$−$2p^4(^3\mathrm{P})4s$	^{4}P°−^{4}P		*808.45*	*596 880–720 574*	12–12	9.74+00	9.54−02	3.05+00	0.059	C	4
				811.273	596 521.8–719 784.8	6–6	7.90+00	7.80−02	1.25+00	−0.330	C+	4
				806.595	597 065.7–721 043.6	4–4	1.44+00	1.41−02	1.49−01	−1.249	D	4
				803.741	597 583.6–722 001.8	2–2	1.24+00	1.20−02	6.35−02	−1.620	D	4
				803.072	596 521.8–721 043.6	6–4	2.84+00	1.83−02	2.90−01	−0.959	D+	4
				800.409	597 065.7–722 001.8	4–2	6.12+00	2.94−02	3.10−01	−0.930	D+	4
				814.869	597 065.7–719 784.8	4–6	3.58+00	5.34−02	5.74−01	−0.670	C	4
				809.979	597 583.6–721 043.6	2–4	3.94+00	7.74−02	4.13−01	−0.810	C	4
72		^{4}D°−^{4}P		*857.03*	*603 892–720 574*	20–12	1.49+01	9.86−02	5.56+00	0.295	C	4
				857.290	603 138.1–719 784.8	8–6	1.20+01	9.93−02	2.24+00	−0.100	B	4
				854.405	604 003.1–721 043.6	6–4	1.07+01	7.80−02	1.32+00	−0.330	C+	4
				852.232	604 662.9–722 001.8	4–2	8.95+00	4.87−02	5.47−01	−0.710	C	4
				863.694	604 003.1–719 784.8	6–6	1.83+00	2.05−02	3.50−01	−0.910	C	4
				859.249	604 662.9–721 043.6	4–4	4.21+00	4.66−02	5.27−01	−0.730	C	4
				854.932	605 033.5–722 001.8	2–2	7.93+00	8.69−02	4.89−01	−0.760	C	4
				868.644	604 662.9–719 784.8	4–6	1.38−01	2.33−03	2.67−02	−2.031	E+	4
				861.994	605 033.5–721 043.6	2–4	5.38−01	1.20−02	6.81−02	−1.620	D	4
73		^{2}D°−^{2}P		*867.10*	*608 457–723 784*	10–6	1.43+01	9.69−02	2.77+00	−0.014	C+	4

TABLE 52. Transition probabilities of allowed lines for Mg IV (references for this table are as follows: 1=Butler and Zeippen,[14] 2=Tachiev and Froese Fischer,[96] 3=Tachiev and Froese Fischer,[92] and 4=Biémont[7])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				866.734	607 891.7–723 267.3	6–4	1.28+01	9.59−02	1.64+00	−0.240	C+	4
				865.722	609 305.8–724 816.3	4–2	1.23+01	6.89−02	7.85−01	−0.560	C	4
				877.489	609 305.8–723 267.3	4–4	2.54+00	2.94−02	3.39−01	−0.930	C	4
74		^{4}S$^\circ-^4$P		*923.01*	612 232.4–*720 574*	4–12	2.56+00	9.81−02	1.19+00	−0.406	C	4
				929.779	612 232.4–719 784.8	4–6	2.29+00	4.45−02	5.44−01	−0.750	C	4
				919.023	612 232.4–721 043.6	4–4	2.60+00	3.30−02	3.99−01	−0.879	C	4
				911.001	612 232.4–722 001.8	4–2	3.34+00	2.08−02	2.49−01	−1.080	D+	4
75		^{2}P$^\circ-^2$P				4–6						
				902.807	612 501.6–723 267.3	4–4	6.18+00	7.55−02	8.98−01	−0.520	C	4
				890.355	612 501.6–724 816.3	4–2	5.30+00	3.15−02	3.69−01	−0.900	D+	4
76	$2p^4(^3\text{P})3p-2p^4(^3\text{P})4d$	^{4}D$^\circ-^4$F				20–28						
				614.15	604 662.9–767 489	4–6	2.57+00	2.18−02	1.76−01	−1.059	D	4
				[612.5]	605 033.5–768 294	2–4	2.39+00	2.69−02	1.08−01	−1.269	D	4
				611.67	604 003.1–767 489	6–6	6.21−01	3.48−03	4.21−02	−1.680	E+	4
				[611.1]	604 662.9–768 294	4–4	3.63−01	2.03−03	1.64−02	−2.090	E	4
				608.45	603 138.1–767 489	8–6	3.96−02	1.65−04	2.64−03	−2.879	E	LS
				[608.7]	604 003.1–768 294	6–4	6.21−03	2.30−05	2.77−04	−3.860	E	4
77		^{4}S$^\circ-^4$P		*641.6*	612 232.4–*768 086*	4–12	1.99+00	3.68−02	3.11−01	−0.832	D	4
				639.77	612 232.4–768 539	4–6	1.67+00	1.54−02	1.30−01	−1.210	D	4
				642.89	612 232.4–767 780	4–4	1.98+00	1.22−02	1.04−01	−1.312	D	4
				[644.7]	612 232.4–767 339	4–2	2.91+00	9.08−03	7.71−02	−1.440	D	4
78		^{2}P$^\circ-^2$D				4–10						
				634.62	612 501.6–770 075	4–6	5.26+00	4.76−02	3.98−01	−0.720	D+	4
				637.27	612 501.6–769 421	4–4	2.65+00	1.61−02	1.35−01	−1.191	E	4
79	$2p^4(^1\text{S})3s-2p^4(^1\text{S})3p$	^{2}S$-^2$P$^\circ$		*1 701.63*	624 109.6–*682 877*	2–6	5.48+00	7.13−01	7.99+00	0.154	B+	2
				1 701.262	624 109.6–682 889.5	2–4	5.48+00	4.75−01	5.33+00	−0.022	B+	2
				1 702.368	624 109.6–682 851.3	2–2	5.47+00	2.38−01	2.66+00	−0.322	B	2
80	$2p^4(^1\text{D})3p-2p^4(^3\text{P})3d$	^{2}D$^\circ-^2$F	*3 017.8*	*3 018.7*	*644 729–677 856*	10–14	2.32−03	4.44−04	4.41−02	−2.353	D	2
			3 060.44	3 061.33	644 786.4–677 451.9	6–8	1.16+03	2.18−04	1.32−02	−2.883	D	2
			2 961.95	2 962.81	644 643.4–678 395.1	4–6	1.09−03	2.16−04	8.42−03	−3.063	D	2
			2 974.55	2 975.42	644 786.4–678 395.1	6–6	2.89−03	3.84−04	2.25−02	−2.638	D+	2
81		^{2}D$^\circ-^2$D	*2 809.7*	*2 810.6*	*644 729–680 309*	10–10	2.00−02	2.36−03	2.19−01	−1.627	C	2
			2 799.76	2 800.59	644 786.4–680 493.2	6–6	1.60−02	1.88−03	1.04−01	−1.948	C	2
			2 824.80	2 825.63	644 643.4–680 033.7	4–4	1.97−02	2.35−03	8.76−02	−2.027	C	2
			2 836.26	2 837.10	644 786.4–680 033.7	6–4	5.61−03	4.51−04	2.53−02	−2.568	D+	2
			2 788.59	2 789.42	644 643.4–680 493.2	4–6	3.17−04	5.55−05	2.04−03	−3.654	E+	2
82		^{2}D$^\circ-^2$P	*2 683.0*	*2 683.8*	*644 729–681 990*	10–6	1.51−02	9.79−04	8.65−02	−2.009	D+	2
			2 652.69	2 653.48	644 786.4–682 472.8	6–4	8.39−03	5.91−04	3.10−02	−2.450	D+	2
			2 747.96	2 748.77	644 643.4–681 023.3	4–2	1.54−02	8.70−04	3.15−02	−2.458	D+	2
			2 642.66	2 643.45	644 643.4–682 472.8	4–4	6.59−03	6.90−04	2.40−02	−2.559	D+	2
83		^{2}P$^\circ-^4$F										
			3 735.19	3 736.25	650 061.6–676 826.4	4–6	2.77−03	8.70−04	4.28−02	−2.458	D	2
			3 805.54	3 806.62	651 093.9–677 363.9	2–4	1.75−03	7.60−04	1.90−02	−2.818	D	2
			3 661.65	3 662.70	650 061.6–677 363.9	4–4	6.87−04	1.38−04	6.66−03	−3.258	E+	2

TABLE 52. Transition probabilities of allowed lines for Mg IV (references for this table are as follows: 1=Butler and Zeippen,[14] 2=Tachiev and Froese Fischer,[96] 3=Tachiev and Froese Fischer,[92] and 4=Biémont[7])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
84		$^2P^\circ-{}^4P$										
			3 524.25	3 525.26	650 061.6–678 428.3	4–4	1.67−03	3.11−04	1.44−02	−2.905	E+	2
			3 718.34	3 719.39	651 093.9–677 980.0	2–2	4.25−05	8.81−06	2.16−04	−4.754	E	2
			3 580.85	3 581.87	650 061.6–677 980.0	4–2	1.28−04	1.23−05	5.81−04	−4.308	E	2
			3 442.63	3 443.62	650 061.6–679 100.8	4–6	6.85−03	1.83−03	8.28−02	−2.135	D+	2
			3 657.35	3 658.39	651 093.9–678 428.3	2–4	1.34−03	5.36−04	1.29−02	−2.970	E+	2
85		$^2P^\circ-{}^2D$	*3 343.1*	*3 344.1*	*650 406–680 309*	6–10	1.52−01	4.24−02	2.80+00	−0.594	C+	2
			3 285.11	3 286.06	650 061.6–680 493.2	4–6	1.60−01	3.89−02	1.69+00	−0.808	B	2
			3 454.46	3 455.45	651 093.9–680 033.7	2–4	9.24−02	3.31−02	7.53−01	−1.179	C+	2
			3 335.48	3 336.44	650 061.6–680 033.7	4–4	4.95−02	8.26−03	3.63−01	−1.481	C	2
86		$^2P^\circ-{}^2P$	*3 165.3*	*3 166.2*	*650 406–681 990*	6–6	7.00−02	1.05−02	6.58−01	−1.201	C	2
			3 084.46	3 085.35	650 061.6–682 472.8	4–4	2.47−02	3.53−03	1.43−01	−1.850	C	2
			3 340.24	3 341.20	651 093.9–681 023.3	2–2	2.87−02	4.80−03	1.06−01	−2.018	C	2
			3 228.86	3 229.80	650 061.6–681 023.3	4–2	1.71−02	1.34−03	5.69−02	−2.271	D+	2
			3 185.93	3 186.85	651 093.9–682 472.8	2–4	5.50−02	1.68−02	3.52−01	−1.474	C	2
87	$2p^4(^1D)3p-2p^4(^1D)3d$	$^2F^\circ-{}^2G$		*1 407.33*	*638 013–709 069*	14–18	1.36+01	5.20−01	3.37+01	0.862	B+	2
				1 409.340	638 112.9–709 068.1	8–10	1.36+01	5.05−01	1.87+01	0.606	B+	2
				1 404.662	637 879.7–709 071.2	6–8	1.32+01	5.20−01	1.44+01	0.494	B+	2
				1 409.278	638 112.9–709 071.2	8–8	4.98−01	1.48−02	5.51−01	−0.927	C+	2
88		$^2F^\circ-{}^2D$		*1 324.39*	*638 013–713 520*	14–10	7.33−01	1.38−02	8.41−01	−0.714	C	2
				1 328.055	638 112.9–713 411.0	8–6	5.96−01	1.18−02	4.14−01	−1.025	C+	2
				1 319.212	637 879.7–713 682.5	6–4	7.78−01	1.35−02	3.52−01	−1.092	C+	2
				1 323.954	637 879.7–713 411.0	6–6	1.09−01	2.86−03	7.48−02	−1.765	C	2
89		$^2F^\circ-{}^2F$		*1 310.05*	*638 013–714 346*	14–14	5.77+00	1.48−01	8.96+00	0.316	B	2
				1 311.649	638 112.9–714 352.8	8–8	5.53+00	1.43−01	4.93+00	0.058	B+	2
				1 307.930	637 879.7–714 336.4	6–6	5.52+00	1.42−01	3.66+00	−0.070	B	2
				1 311.931	638 112.9–714 336.4	8–6	3.63−01	7.02−03	2.42−01	−1.251	C	2
				1 307.649	637 879.7–714 352.8	6–8	1.52−01	5.19−03	1.34−01	−1.507	C	2
90		$^2D^\circ-{}^2P$		*1 492.85*	*644 729–711 715*	10–6	2.77+00	5.55−02	2.73+00	−0.256	C+	2,4
				1 495.969	644 786.4–711 632.7	6–4	2.51+00	5.62−02	1.66+00	−0.472	B	2
				1 487.274	644 643.4–711 880.5	4–2	2.28+00	3.78−02	7.41−01	−0.820	C	4
				1 492.776	644 643.4–711 632.7	4–4	4.98−01	1.66−02	3.27−01	−1.178	C	2
91		$^2D^\circ-{}^2D$		*1 453.69*	*644 729–713 520*	10–10	8.07+00	2.56−01	1.22+01	0.408	B	2
				1 457.203	644 786.4–713 411.0	6–6	7.01+00	2.23−01	6.43+00	0.126	B+	2
				1 448.455	644 643.4–713 682.5	4–4	6.94+00	2.18−01	4.16+00	−0.059	B+	2
				1 451.461	644 786.4–713 682.5	6–4	7.69−01	1.62−02	4.64−01	−1.012	C+	2
				1 454.173	644 643.4–713 411.0	4–6	1.29+00	6.15−02	1.18+00	−0.609	B	2
92		$^2D^\circ-{}^2F$		*1 436.44*	*644 729–714 346*	10–14	8.92+00	3.86−01	1.83+01	0.587	B+	2
				1 437.476	644 786.4–714 352.8	6–8	9.03+00	3.73−01	1.06+01	0.350	B+	2
				1 434.864	644 643.4–714 336.4	4–6	7.81+00	3.62−01	6.83+00	0.161	B+	2
				1 437.815	644 786.4–714 336.4	6–6	9.69−01	3.00−02	8.53−01	−0.745	C+	2
93		$^2P^\circ-{}^2P$		*1 631.07*	*650 406–711 715*	6–6	5.97+00	2.38−01	7.67+00	0.155	B	2,4
				1 624.139	650 061.6–711 632.7	4–4	4.80+00	1.90−01	4.06+00	−0.119	B+	2
				1 645.099	651 093.9–711 880.5	2–2	2.89+00	1.17−01	1.27+00	−0.631	C+	4

TABLE 52. Transition probabilities of allowed lines for Mg IV (references for this table are as follows: 1=Butler and Zeippen,[14] 2=Tachiev and Froese Fischer,[96] 3=Tachiev and Froese Fischer,[92] and 4=Biémont[7])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				1 617.628	650 061.6–711 880.5	4–2	3.51+00	6.89−02	1.47+00	−0.560	C+	4
				1 651.833	651 093.9–711 632.7	2–4	9.77−01	7.99−02	8.69−01	−0.796	C+	2
94		$^2P^\circ-{}^2S$		*1 620.25*	*650 406*–712 124.5	6–2	6.70+00	8.79−02	2.81+00	−0.278	B	2
				1 611.269	650 061.6–712 124.5	4–2	1.21+00	2.35−02	4.98−01	−1.027	C+	2
				1 638.522	651 093.9–712 124.5	2–2	5.33+00	2.14−01	2.31+00	−0.369	B	2
95		$^2P^\circ-{}^2D$		*1 584.44*	*650 406–713 520*	6–10	3.00+00	1.88−01	5.89+00	0.052	B	2
				1 578.547	650 061.6–713 411.0	4–6	2.81+00	1.57−01	3.27+00	−0.202	B	2
				1 597.735	651 093.9–713 682.5	2–4	2.50+00	1.92−01	2.02+00	−0.416	B	2
				1 571.811	650 061.6–713 682.5	4–4	7.79−01	2.88−02	5.97−01	−0.939	C+	2
96	$2p^4(^1D)3p-2p^4(^3P)4s$	$^2P^\circ-{}^2P$		*1 362.81*	*650 406–723 784*	6–6	4.97+00	1.38−01	3.72+00	−0.082	C+	4
				1 366.014	650 061.6–723 267.3	4–4	3.99+00	1.12−01	2.01+00	−0.349	C+	4
				1 356.440	651 093.9–724 816.3	2–2	3.53+00	9.75−02	8.71−01	−0.710	C	4
				1 337.709	650 061.6–724 816.3	4–2	2.00+00	2.68−02	4.72−01	−0.970	C	4
				1 385.552	651 093.9–723 267.3	2–4	7.06−01	4.06−02	3.71−01	−1.090	D+	4
97	$2p^4(^1D)3p-2p^4(^1S)3d$	$^2F^\circ-{}^2D$		*869.98*	*638 013–752 958*	14–10	1.86−01	1.50−03	6.03−02	−1.678	D+	3
				870.938	638 112.9–752 931.7	8–6	1.78−01	1.52−03	3.48−02	−1.915	D+	3
				868.676	637 879.7–752 997.4	6–4	1.85−01	1.40−03	2.40−02	−2.076	D+	3
				869.172	637 879.7–752 931.7	6–6	8.08−03	9.16−05	1.57−03	−3.260	E+	3
98		$^2D^\circ-{}^2D$		*923.97*	*644 729–752 958*	10–10	1.12−01	1.43−03	4.35−02	−1.845	D	3
				924.682	644 786.4–752 931.7	6–6	1.10−01	1.41−03	2.57−02	−2.073	D+	3
				922.901	644 643.4–752 997.4	4–4	9.09−02	1.16−03	1.41−02	−2.333	D	3
				924.120	644 786.4–752 997.4	6–4	1.01−02	8.60−05	1.57−03	−3.287	E+	3
				923.461	644 643.4–752 931.7	4–6	8.97−03	1.72−04	2.09−03	−3.162	E+	3
99		$^2P^\circ-{}^2D$		*975.11*	*650 406–752 958*	6–10	1.27−01	3.03−03	5.83−02	−1.740	D+	3
				972.100	650 061.6–752 931.7	4–6	1.03−01	2.19−03	2.80−02	−2.057	D+	3
				981.321	651 093.9–752 997.4	2–4	1.36−01	3.94−03	2.55−02	−2.103	D+	3
				971.479	650 061.6–752 997.4	4–4	2.68−02	3.80−04	4.86−03	−2.818	D	3
100	$2p^4(^1D)3p-2p^4(^1D)4s$	$^2F^\circ-{}^2D$		*841.35*	*638 013–756 870*	14–10	1.25+01	9.48−02	3.68+00	0.123	C+	4
				842.083	638 112.9–756 866.1	8–6	1.19+01	9.48−02	2.10+00	−0.120	B	4
				840.364	637 879.7–756 875.8	6–4	1.24+01	8.75−02	1.45+00	−0.280	C+	4
				840.432	637 879.7–756 866.1	6–6	6.87−01	7.28−03	1.21−01	−1.360	D	4
101		$^2D^\circ-{}^2D$		*891.74*	*644 729–756 870*	10–10	8.52+00	1.02−01	2.98+00	0.009	C+	4
				892.222	644 786.4–756 866.1	6–6	7.85+00	9.37−02	1.65+00	−0.250	C+	4
				891.008	644 643.4–756 875.8	4–4	8.17+00	9.73−02	1.14+00	−0.410	C+	4
				892.145	644 786.4–756 875.8	6–4	9.80−01	7.80−03	1.37−01	−1.330	D	4
				891.085	644 643.4–756 866.1	4–6	2.43−01	4.34−03	5.10−02	−1.760	E+	4
102		$^2P^\circ-{}^2D$		*939.28*	*650 406–756 870*	6–10	7.96+00	1.75−01	3.26+00	0.021	C+	4
				936.290	650 061.6–756 866.1	4–6	8.38+00	1.65−01	2.04+00	−0.180	C+	4
				945.341	651 093.9–756 875.8	2–4	6.62+00	1.77−01	1.10+00	−0.451	C+	4
				936.205	650 061.6–756 875.8	4–4	7.07−01	9.29−03	1.15−01	−1.430	D	4
103	$2p^4(^1D)3p-2p^4(^3P)4d$	$^2P^\circ-{}^2P$		*833.3*	*650 406–770 417*	6–6	3.78+00	3.93−02	6.47−01	−0.627	D	4
				827.22	650 061.6–770 948	4–4	5.98−01	6.14−03	6.68−02	−1.610	E	4
				845.58	651 093.9–769 356	2–2	1.73+00	1.86−02	1.03−01	−1.429	D	4
				838.26	650 061.6–769 356	4–2	8.84−01	4.66−03	5.14−02	−1.730	E+	4

TABLE 52. Transition probabilities of allowed lines for Mg IV (references for this table are as follows: 1=Butler and Zeippen,[14] 2=Tachiev and Froese Fischer,[96] 3=Tachiev and Froese Fischer,[92] and 4=Biémont[7])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				834.35	651 093.9–770 948	2–4	3.71+00	7.74−02	4.25−01	−0.810	D	4
104		$^2P^\circ-^2D$		*837.5*	*650 406–769 813*	6–10	5.45+00	9.55−02	1.58+00	−0.242	D+	4
				833.24	650 061.6–770 075	4–6	5.55+00	8.67−02	9.51−01	−0.460	C	4
				845.11	651 093.9–769 421	2–4	2.56+00	5.48−02	3.05−01	−0.960	D	4
				837.81	650 061.6–769 421	4–4	2.79+00	2.94−02	3.24−01	−0.930	D	4
105	$2p^4(^1D)3p-2p^4(^1S)4s$	$^2P^\circ-^2S$		*681.9*	*650 406–797 056*	6–2	4.56+00	1.06−02	1.43−01	−1.197	D	4
				680.30	650 061.6–797 056	4–2	3.00+00	1.04−02	9.34−02	−1.381	D	4
				685.11	651 093.9–797 056	2–2	1.55+00	1.09−02	4.93−02	−1.662	E+	4
106	$2p^4(^1D)3p-2p^4(^1D)4d$	$^2D^\circ-^2P$		*634.8*	*644 729–802 265*	10–6	1.51+00	5.48−03	1.14−01	−1.261	E+	4
				635.09	644 786.4–802 244	6–4	1.34+00	5.39−03	6.77−02	−1.490	D	4
				634.27	644 643.4–802 306	4–2	1.12+00	3.37−03	2.82−02	−1.870	E+	4
				634.52	644 643.4–802 244	4–4	3.69−01	2.23−03	1.86−02	−2.050	E+	4
107		$^2D^\circ-^2D$		*631.9*	*644 729–802 994*	10–10	2.61+00	1.56−02	3.25−01	−0.807	D	4
				632.24	644 786.4–802 954	6–6	1.92+00	1.15−02	1.44−01	−1.161	D	4
				631.27	644 643.4–803 054	4–4	1.96+00	1.17−02	9.72−02	−1.330	D	4
				631.84	644 786.4–803 054	6–4	2.40−01	9.59−04	1.20−02	−2.240	E	4
				631.67	644 643.4–802 954	4–6	9.66−01	8.67−03	7.21−02	−1.460	D	4
108		$^2P^\circ-^2P$		*658.5*	*650 406–802 265*	6–6	9.64+00	6.27−02	8.15−01	−0.425	D+	4
				657.11	650 061.6–802 244	4–4	7.53+00	4.87−02	4.22−01	−0.710	C	4
				661.32	651 093.9–802 306	2–2	6.49+00	4.26−02	1.85−01	−1.070	D+	4
				656.84	650 061.6–802 306	4–2	3.87+00	1.25−02	1.08−01	−1.301	D	4
				661.59	651 093.9–802 244	2–4	1.74+00	2.29−02	9.96−02	−1.339	D	4
109		$^2P^\circ-^2D$		*655.4*	*650 406–802 994*	6–10	4.29+00	4.61−02	5.96−01	−0.558	D+	4
				654.05	650 061.6–802 954	4–6	3.76+00	3.61−02	3.11−01	−0.840	D+	4
				658.07	651 093.9–803 054	2–4	3.94+00	5.12−02	2.22−01	−0.990	D+	4
				653.63	650 061.6–803 054	4–4	1.15+00	7.38−03	6.35−02	−1.530	D	4
110		$^2P^\circ-^2S$		*652.1*	*650 406–803 754*	6–2	8.19+00	1.74−02	2.24−01	−0.981	D	4
				650.65	650 061.6–803 754	4–2	5.09+00	1.61−02	1.38−01	−1.191	D	4
				655.05	651 093.9–803 754	2–2	3.09+00	1.99−02	8.59−02	−1.400	D	4
111	$2p^4(^3P)3d-2p^4(^1S)3p$	$^2D-^2P^\circ$		*2 568 cm^{-1}*	*680 309–682 877*	10–6	3.29−06	4.49−05	5.76−02	−3.348	D	2
				2 396.3 cm^{-1}	680 493.2–682 889.5	6–4	2.12−06	3.68−05	3.03−02	−3.656	D+	2
				2 817.6 cm^{-1}	680 033.7–682 851.3	4–2	3.41−06	3.22−05	1.51−02	−3.890	D	2
				2 855.8 cm^{-1}	680 033.7–682 889.5	4–4	1.43−06	2.64−05	1.22−02	−3.976	D	2
112		$^2P-^2P^\circ$		*887* cm^{-1}	*681 990–682 877*	6–6	1.32−07	2.52−05	5.60−02	−3.820	D	2
				416.7cm^{-1}	682 472.8–682 889.5	4–4	7.19−09	6.21−06	1.96−02	−4.605	D	2
				1 828.0 cm^{-1}	681 023.3–682 851.3	2–2	8.53−07	3.83−05	1.38−02	−4.116	D	2
				378.5 cm^{-1}	682 472.8–682 851.3	4–2	9.67−01	5.06−06	1.76−02	−4.694	D	2
				1 866.2 cm^{-1}	681 023.3–682 889.5	2–4	1.65−07	1.42−05	5.01−03	−4.547	D	2
113	$2p^4(^3P)3d-2p^4(^3P_2)4f$	$^4F-^2[5]^\circ$										1
				1 041.740	675 370.2–771 363.4	10–12	3.97+01	7.75−01	2.66+01	0.889	C+	LS′
114		$^4P-^2[1]^\circ$										1
				1 068.592	677 980.0–771 561.1	2–2	2.68+01	4.59−01	3.23+00	−0.037	D+	LS′
				1 073.736	678 428.3–771 561.1	4–2	5.28+00	4.56−02	6.45−01	−0.739	E+	LS′
115	$2p^4(^3P)3d-2p^4(^3P_2)5f$	$^4F-^2[5]^\circ$										1

TABLE 52. Transition probabilities of allowed lines for Mg IV (references for this table are as follows: 1=Butler and Zeippen,[14] 2=Tachiev and Froese Fischer,[96] 3=Tachiev and Froese Fischer,[92] and 4=Biémont[7])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				737.724	675 370.2–810 922.2	10–12	1.50+01	1.47−01	3.57+00	0.167	D+	LS′
116	$2p^4(^1S)3p-2p^4(^1D)3d$	$^2P^\circ-^2S$	*3 418.1*	*3 419.1*	*682 877*–712 124.5	6–2	2.77−02	1.62−03	1.09−01	−2.012	D	2,3
			3 419.58	3 420.56	682 889.5–712 124.5	4–2	1.74−02	1.53−03	6.88−02	−2.213	D+	2
			3 415.11	3 416.09	682 851.3–712 124.5	2–2	1.03−02	1.80−03	4.05−02	−2.444	D	3
117		$^2P^\circ-^2D$	*3 262.5*	*3 263.4*	*682 877–713 520*	6–10	3.85−03	1.02−03	6.60−02	−2.213	D+	2
			3 275.43	3 276.38	682 889.5–713 411.0	4–6	3.35−03	8.10−04	3.49−02	−2.489	D+	2
			3 242.53	3 243.47	682 851.3–713 682.5	2–4	3.96−03	1.25−03	2.67−02	−2.602	D+	2
			3 246.55	3 247.49	682 889.5–713 682.5	4–4	6.54−04	1.03−04	4.42−03	−3.385	E+	2
118	$2p^4(^1S)3p-2p^4(^3P)4s$	$^2P^\circ-^2P$	*2 443.8*	*2 444.6*	*682 877–723 784*	6–6	5.57−02	4.99−03	2.41−01	−1.524	D	4
			2 475.86	2 476.61	682 889.5–723 267.3	4–4	4.21−02	3.87−03	1.26−01	−1.810	D	4
			2 382.21	2 382.94	682 851.3–724 816.3	2–2	5.48−02	4.67−03	7.32−02	−2.030	D	4
			2 384.38	2 385.11	682 889.5–724 816.3	4–2	6.73−03	2.87−04	9.02−03	−2.940	E	4
			2 473.52	2 474.27	682 851.3–723 267.3	2–4	1.08−02	1.99−03	3.24−02	−2.400	E+	4
119	$2p^4(^1S)3p-2p^4(^1S)3d$	$^2P^\circ-^2D$		*1 426.92*	*682 877–752 958*	6–10	1.34+01	6.80−01	1.92+01	0.611	B+	3
				1 427.711	682 889.5–752 931.7	4–6	1.34+01	6.12−01	1.15+01	0.389	B+	3
				1 425.596	682 851.3–752 997.4	2–4	1.12+01	6.80−01	6.39+00	0.134	B+	3
				1 426.373	682 889.5–752 997.4	4–4	2.23+00	6.80−02	1.28+00	−0.565	B	3
120	$2p^4(^1S)3p-2p^4(^1D)4s$	$^2P^\circ-^2D$		*1 351.48*	*682 877–756 870*	6–10	6.66−01	3.04−02	8.12−01	−0.739	D+	4
				1 351.779	682 889.5–756 866.1	4–6	6.23−01	2.56−02	4.55−01	−0.990	C	4
				1 350.904	682 851.3–756 875.8	2–4	6.32−01	3.46−02	3.08−01	−1.160	D+	4
				1 351.602	682 889.5–756 875.8	4–4	1.00−01	2.74−03	4.88−02	−1.960	E+	4
121	$2p^4(^1S)3p-2p^4(^1S)4s$	$^2P^\circ-^2S$		*875.8*	*682 877*–797 056	6–2	2.62+01	1.00−01	1.74+00	−0.222	C	4
				875.91	682 889.5–797 056	4–2	1.73+01	9.95−02	1.15+00	−0.400	C+	4
				875.62	682 851.3–797 056	2–2	8.88+00	1.02−01	5.89−01	−0.690	C	4
122	$2p^4(^1S)3p-2p^4(^1D)4d$	$^2P^\circ-^2S$		*827.3*	*682 877*–803 754	6–2	2.43+00	8.30−03	1.36−01	−1.303	D	4
				827.37	682 889.5–803 754	4–2	1.69+00	8.67−03	9.44−02	−1.460	D	4
				827.11	682 851.3–803 754	2–2	7.38−01	7.57−03	4.12−02	−1.820	E+	4
123	$2p^4(^1S)3p-2p^4(^1S)4d$?	$^2P^\circ-^2D$?		*[619.0]*	*682 877–844 424*	6–10	5.26+00	5.03−02	6.16−01	−0.520	D+	4
				619.06	682 889.5–844 424	4–6	5.66−01	4.87−03	3.97−02	−1.710	E+	4
				618.92	682 851.3–844 424	2–4	4.56+00	5.24−02	2.13−01	−0.980	D+	4
				619.06	682 889.5–844 424	4–4	7.74+00	4.45−02	3.62−01	−0.750	C	4
124	$2p^4(^1D)3d-2p^4(^1D_2)4f$	$^2P-^2[1]^\circ$										1
				1 058.994	711 880.5–806 309.7	2–2	1.18+01	1.98−01	1.38+00	−0.402	D	LS′
				1 056.223	711 632.7–806 309.7	4–2	5.94+00	4.97−02	6.91−01	–	E+	LS′
125		$^2S-^2[1]^\circ$										1
				1 061.738	712 124.5–806 309.7	2–2	1.84+01	3.11−01	2.17+00	−0.206	D+	LS′
126	$2p^4(^3P)4d-2p^4(^3P_2)4f$	$^4P-^2[1]^\circ$										1
				[4 222]	767 339–771 561.1	2–2	7.53−03	6.33−02	9.87+00	−0.898	C	LS′
				3 781 cm^{-1}	767 780–771 561.1	4–2	1.08−03	5.67−03	1.97+00	−1.644	D	LS′
127	$2p^4(^1S)4s-2p^4(^1D_2)4f$	$^2S-^2[1]^\circ$										1
			10 804	10 806	797 056–806 309.7	2–2	6.91−03	1.21−02	8.61−01	−1.616	D	LS′
128	$2p^4(^1D)4d-2p^4(^1D_2)4f$	$^2P-^2[1]^\circ$										1
				4 004 cm^{-1}	802 306–806 309.7	2–2	2.62−03	2.45−02	4.03+00	−1.310	D+	LS′

TABLE 52. Transition probabilities of allowed lines for Mg IV (references for this table are as follows: 1=Butler and Zeippen,[14] 2=Tachiev and Froese Fischer,[96] 3=Tachiev and Froese Fischer,[92] and 4=Biémont[7])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				4 066 cm^{-1}	802 244–806 309.7	4–2	1.37−03	6.22−03	2.01+00	−1.604	D	LS′
129		^{2}D−^{2}[1]$^\circ$										1
				3 256 cm^{-1}	803 054–806 309.7	4–2	3.08−04	2.18−03	8.82−01	−2.059	D	LS′
130		^{2}S−^{2}[1]$^\circ$										1
				2 556 cm^{-1}	803 754–806 309.7	2–2	9.58−04	2.20−02	5.67+00	−1.357	C	LS′
131	$2s^22p^4(^1\mathrm{D})5s$–$2s2p^5(^3\mathrm{P}^\circ)3s$	^{2}D−^{2}P$^\circ$	*4 824*	*4 825*	*822 734–843 458*	10–6	1.76−01	3.69−02	5.86+00	−0.433	D+	1
			[4 925]	[4 926]	822 734–843 034	6–4	1.49−01	3.61−02	3.51+00	−0.664	D+	LS
			[4 634]	[4 636]	822 734–844 306	4–2	1.99−01	3.20−02	1.95+00	−0.893	D	LS
			[4 925]	[4 926]	822 734–843 034	4–4	1.65−02	6.02−03	3.91−01	−1.618	E+	LS
132	$2s2p^5(^3\mathrm{P}^\circ)3s$–$2s^22p^4(^1\mathrm{D})5d$?	^{2}P$^\circ$−^{2}P?				4–6						1
				[940]	843 034–843 974	4–4	6.48−06	1.10−03	1.54+00	−2.357	D	LS
				[1 002]	843 034–844 036	4–2	3.15−06	2.35−04	3.09−01	−3.027	E+	LS

[a] Wavelengths (Å) are always given unless cm^{-1} is indicated.

11.4.3. Forbidden Transitions for Mg IV

The only reference-quality data are from Tachiev and Froese Fischer,[92,96] which are the product of extensive MCHF calculations with Breit-Pauli corrections to order α^2.

We divided the transitions into two groups having upper levels with energies below and above 610 000 cm^{-1}. We estimated the accuracies for each group by isoelectronically scaling the pooling fit parameters of allowed lines of Na III involving the lower-lying and higher-lying levels, respectively. Thus the assigned accuracies are only rough estimates.

11.4.4. References for Forbidden Transitions for Mg IV

[92] G. Tachiev and C. Froese Fischer, http://www.vuse.vanderbilt.edu/~cff/mchf_collection/ (MCHF, *ab initio*, downloaded on Mar. 28, 2002).

[96] G. Tachiev and C. Froese Fischer, http://www.vuse.vanderbilt.edu/~cff/mchf_collection/ (MCHF, energy adjusted, downloaded on Sept. 3, 2003).

TABLE 53. Wavelength finding list for forbidden lines for Mg IV

Wavelength (vac) (Å)	Mult. No.	Wavelength (vac) (Å)	Mult. No.	Wavelength (vac) (Å)	Mult. No.	Wavelength (vac) (Å)	Mult. No.
160.228	6	931.328	28	1 558.329	16	1 744.680	24
171.651	5	940.369	28	1 558.404	16	1 749.484	26
171.655	5	943.785	28	1 578.522	16	1 757.763	25
172.310	5	953.071	28	1 593.521	16	1 797.28	23
172.314	5	960.558	28	1 607.097	39	1 800.16	38
180.069	4	1 026.401	29	1 607.510	39	1 800.68	38
180.614	4	1 037.393	29	1 610.799	39	1 807.75	38
181.344	4	1 055.747	29	1 611.214	39	1 808.28	38
183.165	3	1 444.604	20	1 614.562	16	1 844.15	23
183.440	3	1 453.886	19	1 630.973	15	1 853.09	23
183.918	3	1 459.183	40	1 640.891	15	1 856.56	14
184.193	3	1 459.524	40	1 658.851	15	1 874.58	14
184.675	3	1 459.598	18	1 669.563	15	1 893.89	14
320.994	2	1 474.798	20	1 679.958	15	1 902.96	23
350.221	8	1 481.499	40	1 683.000	15	1 906.72	14
350.890	8	1 481.850	40	1 686.984	27	1 925.74	14
368.941	7	1 484.472	19	1 698.788	15	1 946.12	14
368.962	7	1 486.706	17	1 699.654	26	1 946.76	22
718.550	30	1 490.428	18	1 701.262	53	1 956.55	14
718.748	30	1 502.715	19	1 703.360	15	1 960.91	22
725.943	30	1 508.819	18	1 707.467	25	1 977.60	14
726.144	30	1 518.704	17	1 722.721	15	1 986.61	22
730.278	30	1 524.730	16	1 724.123	15		

TABLE 53. Wavelength finding list for forbidden lines for Mg IV—Continued

Wavelength (air) (Å)	Mult. No.	Wavelength (air) (Å)	Mult. No.	Wavelength (air) (Å)	Mult. No.	Wavelength (air) (Å)	Mult. No.
2 020.69	22	3 292.31	37	4 452.08	33	9 797.1	10
2 026.88	22	3 339.14	36	4 523.52	33	10 051.8	10
2 054.37	22	3 340.93	36	4 526.79	33	10 650.7	10
2 276.29	21	3 457.75	13	4 662.72	33	11 722.2	10
2 303.46	21	3 459.66	13	4 666.20	33	12 280.0	42
2 332.70	21	3 517.54	35	4 858.74	33	12 547.1	42
2 395.98	21	3 519.53	35	4 862.53	33	12 965.4	10
2 427.63	21	3 670.50	13	6 655.4	32	13 159.1	42
2 572.70	12	3 738.18	34	6 662.5	32	13 363.0	42
2 573.76	12	3 740.42	34	6 893.1	32	13 419.3	42
2 670.09	12	3 852.18	52	6 900.7	32	14 121.8	42
2 671.23	12	3 946.88	34	7 161.7	32	14 410.7	42
2 729.72	12	3 949.37	34	7 169.9	32	15 110.1	42
3 290.57	37	4 448.91	33	8 612.4	51	18 853	44

Wavenumber (cm^{-1})	Mult. No.	Wavenumber (cm^{-1})	Mult. No.	Wavenumber (cm^{-1})	Mult. No.	Wavenumber (cm^{-1})	Mult. No.
4 753.6	44	3 195.8	46	1 032.3	56	370.6	43
4 642.9	44	2 228	1	865.0	43	233.2	54
4 609.9	46	1 960.3	49	817.8	9	143.0	55
4 272.3	44	1 675.8	11	659.8	43	38.2	57
3 888.6	44	1 518.4	48	543.9	41	16	31
3 637.7	47	1 417.2	9	517.9	41		
3 228.8	44	1 414.1	45	441.9	50		

TABLE 54. Transition probabilities of forbidden lines for Mg IV (references for this table are as follows: 1=Tachiev and Froese Fischer[96] and 2=Tachiev and Froese Fischer[92])

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i–E_k (cm^{-1})	g_i–g_k	Type	A_{ki} (s^{-1})	S (a.u.)	Acc.	Source
1	$2p^5-2p^5$	$^2P^\circ-^2P^\circ$									
				2 228 cm^{-1}	0–2 228	4–2	M1	1.99−01	1.33+00	B	1
				2 228 cm^{-1}	0–2 228	4–2	E2	6.54−07	2.13−01	B	1
2	$2s^22p^5-2s2p^6$	$^2P^\circ-^2S$									
				320.994	0–311 532	4–2	M2	2.31+01	1.06+01	B	1
3	$2p^5-2p^4(^3P)3s$	$^2P^\circ-^4P$									
				183.440	0–545 137.6	4–4	M2	1.64+00	9.13−02	C	1
				183.165	0–545 955.4	4–2	M2	6.40+00	1.77−01	C	1
				183.918	0–543 720.4	4–6	M2	2.63+01	2.23+00	C+	1
				184.193	2 228–545 137.6	2–4	M2	1.82+01	1.03+00	C+	1
				184.675	2 228–543 720.4	2–6	M2	6.57+00	5.68−01	C	1
4		$^2P^\circ-^2P$									
				180.614	0–553 666.1	4–4	M2	3.95+00	2.04−01	C	1
				180.069	0–555 341.9	4–2	M2	4.12+00	1.05−01	C	1
				181.344	2 228–553 666.1	2–4	M2	2.70+00	1.42−01	C	1
5	$2p^5-2p^4(^1D)3s$	$^2P^\circ-^2D$									
				172.314	2 228–582 562.4	2–6	M2	1.82+01	1.11+00	C+	1
				171.655	0–582 562.4	4–6	M2	1.39+01	8.33−01	C+	1
				172.310	2 228–582 578.4	2–4	M2	1.14+00	4.66−02	D+	1
				171.651	0–582 578.4	4–4	M2	4.11+00	1.64−01	C	1
6	$2p^5-2p^4(^1S)3s$	$^2P^\circ-^2S$									

TABLE 54. Transition probabilities of forbidden lines for Mg IV (references for this table are as follows: 1=Tachiev and Froese Fischer[96] and 2=Tachiev and Froese Fischer[92])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	Type	A_{ki} (s^{-1})	S (a.u.)	Acc.	Source
				160.228	0–624 109.6	4–2	M2	4.70+01	6.65−01	D+	1
7	$2s2p^6-2s^22p^4(^1D)3s$	$^2S-^2D$									
				368.962	311 532–582 562.4	2–6	E2	4.64+02	1.70−02	C	2
				368.941	311 532–582 578.4	2–4	M1	6.39−06	4.76−11	E	2
				368.941	311 532–582 578.4	2–4	E2	4.66+02	1.14−02	C	2
8	$2s2p^6-2s^22p^4(^3P)3p$	$^2S-^4P^\circ$									
				350.890	311 532–596 521.8	2–6	M2	4.10−03	8.77−03	D	2
				350.221	311 532–597 065.7	2–4	M2	1.02−03	1.45−03	E+	2
9	$2p^4(^3P)3s-2p^4(^3P)3s$	^4P									
				1 417.2 cm^{-1}	543 720.4–545 137.6	6–4	M1	6.87−02	3.58+00	B+	2
				817.8 cm^{-1}	545 137.6–545 955.4	4–2	M1	2.45−02	3.32+00	B+	2
10		$^4P-^2P$									
			11 722.2	11 725.4	545 137.6–553 666.1	4–4	M1	5.92−02	1.41−02	C	2
			10 650.7	10 653.6	545 955.4–555 341.9	2–2	M1	8.83−02	7.91−03	C	2
			10 051.8	10 054.6	543 720.4–553 666.1	6–4	M1	1.36−01	2.05−02	C	2
			9 797.1	9 799.8	545 137.6–555 341.9	4–2	M1	6.92−03	4.83−04	D+	2
			12 965.4	12 969.0	545 955.4–553 666.1	2–4	M1	2.93−02	9.47−03	C	2
11		$^2P-^2P$									
				1 675.8 cm^{-1}	553 666.1–555 341.9	4–2	M1	8.46−02	1.33+00	B	2
12	$2p^4(^3P)3s-2p^4(^1D)3s$	$^4P-^2D$									
			2 671.23	2 672.02	545 137.6–582 562.4	4–6	M1	2.44−01	1.04−03	D+	2
			2 729.72	2 730.52	545 955.4–582 578.4	2–4	M1	1.71−01	5.15−04	D+	2
			2 573.76	2 574.53	543 720.4–582 562.4	6–6	M1	1.82+00	6.91−03	C	2
			2 670.09	2 670.88	545 137.6–582 578.4	4–4	M1	7.95−01	2.25−03	D+	2
			2 572.70	2 573.47	543 720.4–582 578.4	6–4	M1	1.98−01	4.99−04	D+	2
13		$^2P-^2D$									
			3 459.66	3 460.65	553 666.1–582 562.4	4–6	M1	3.47−01	3.20−03	C	2
			3 670.50	3 671.54	555 341.9–582 578.4	2–4	M1	2.12−01	1.56−03	D+	2
			3 457.75	3 458.74	553 666.1–582 578.4	4–4	M1	7.65−01	4.70−03	C	2
14	$2p^4(^3P)3s-2p^4(^3P)3p$	$^4P-^4P^\circ$									
				1 893.89	543 720.4–596 521.8	6–6	M2	5.78−03	5.66+01	B+	2
				1 925.74	545 137.6–597 065.7	4–4	M2	2.12−03	1.51+01	B	2
				1 856.56	543 720.4–597 583.6	6–2	M2	2.53−03	7.48+00	B	2
				1 874.58	543 720.4–597 065.7	6–4	M2	3.37−04	2.09+00	C+	2
				1 906.72	545 137.6–597 583.6	4–2	M2	1.91−03	6.47+00	B	2
				1 946.12	545 137.6–596 521.8	4–6	M2	1.38−05	1.55−01	C	2
				1 956.55	545 955.4–597 065.7	2–4	M2	6.30−04	4.85+00	B	2
				1 977.60	545 955.4–596 521.8	2–6	M2	3.68−04	4.48+00	B	2
15		$^4P-^4D^\circ$									
				1 724.123	545 137.6–603 138.1	4–8	M2	3.14−03	2.57+01	B+	2
				1 722.721	545 955.4–604 003.1	2–6	M2	2.23−03	1.36+01	B	2
				1 683.000	543 720.4–603 138.1	6–8	M2	8.30−03	6.01+01	B+	2
				1 698.788	545 137.6–604 003.1	4–6	M2	4.13−03	2.35+01	B+	2
				1 703.360	545 955.4–604 662.9	2–4	M2	4.07−03	1.57+01	B	2
				1 658.851	543 720.4–604 003.1	6–6	M2	1.49−05	7.51−02	C	2
				1 679.958	545 137.6–604 662.9	4–4	M2	8.63−07	3.10−03	D	2
				1 640.891	543 720.4–604 662.9	6–4	M2	1.31−03	4.18+00	B	2
				1 669.563	545 137.6–605 033.5	4–2	M2	3.63−03	6.32+00	B	2
				1 630.973	543 720.4–605 033.5	6–2	M2	7.49−04	1.16+00	C+	2
16		$^4P-^2D^\circ$									

TABLE 54. Transition probabilities of forbidden lines for Mg IV (references for this table are as follows: 1=Tachiev and Froese Fischer[96] and 2=Tachiev and Froese Fischer[92])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})$^{\mathrm{a}}$	E_i-E_k (cm^{-1})	g_i-g_k	Type	A_{ki} (s^{-1})	S (a.u.)	Acc.	Source
				1 614.562	545 955.4–607 891.7	2–6	M2	1.76−03	7.79+00	C+	2
				1 593.521	545 137.6–607 891.7	4–6	M2	8.02−03	3.32+01	B+	2
				1 578.522	545 955.4–609 305.8	2–4	M2	1.23−02	3.23+01	B+	2
				1 558.329	543 720.4–607 891.7	6–6	M2	8.25−03	3.05+01	B	2
				1 558.404	545 137.6–609 305.8	4–4	M2	1.26−02	3.10+01	B	2
				1 524.730	543 720.4–609 305.8	6–4	M2	5.55−03	1.23+01	B	2
17		^{4}P$-$^{2}P$^\circ$									
				1 486.706	543 720.4–610 983.2	6–2	M2	3.06−02	2.98+01	B	2
				1 518.704	545 137.6–610 983.2	4–2	M2	1.68−03	1.82+00	C	2
18		^{4}P$-$^{4}S$^\circ$									
				1 459.598	543 720.4–612 232.4	6–4	M2	8.48−03	1.51+01	B	2
				1 490.428	545 137.6–612 232.4	4–4	M2	4.65−03	9.17+00	B	2
				1 508.819	545 955.4–612 232.4	2–4	M2	8.04−04	1.69+00	C	2
19		^{4}P$-$^{2}P$^\circ$									
				1 484.472	545 137.6–612 501.6	4–4	M2	6.75−05	1.31−01	E+	2
				1 453.886	543 720.4–612 501.6	6–4	M2	1.65−02	2.88+01	B	2
				1 502.715	545 955.4–612 501.6	2–4	M2	2.81−03	5.79+00	C+	2
20		^{4}P$-$^{2}S$^\circ$									
				1 444.604	543 720.4–612 943.5	6–2	M2	2.43−04	2.05−01	D	2
				1 474.798	545 137.6–612 943.5	4–2	M2	1.69−02	1.58+01	B	2
21		^{2}P$-$^{4}P$^\circ$									
			2 303.46	2 304.17	553 666.1–597 065.7	4–4	M2	1.08−04	1.88+00	C+	2
			2 276.29	2 277.00	553 666.1–597 583.6	4–2	M2	4.80−04	3.94+00	B	2
			2 332.70	2 333.41	553 666.1–596 521.8	4–6	M2	1.43−03	3.98+01	B+	2
			2 395.98	2 396.71	555 341.9–597 065.7	2–4	M2	8.04−04	1.71+01	B	2
			2 427.63	2 428.37	555 341.9–596 521.8	2–6	M2	2.21−04	7.53+00	B	2
22		^{2}P$-$^{4}D$^\circ$									
			2 020.69	2 021.35	553 666.1–603 138.1	4–8	M2	4.81−03	8.71+01	B+	2
			2 054.37	2 055.03	555 341.9–604 003.1	2–6	M2	1.58−03	2.32+01	B+	2
				1 986.61	553 666.1–604 003.1	4–6	M2	6.38−04	7.95+00	B	2
			2 026.88	2 027.53	555 341.9–604 662.9	2–4	M2	8.07−04	7.42+00	B	2
				1 960.91	553 666.1–604 662.9	4–4	M2	1.28−04	9.98−01	C+	2
				1 946.76	553 666.1–605 033.5	4–2	M2	3.23−04	1.21+00	C+	2
23		^{2}P$-$^{2}D$^\circ$									
				1 902.96	555 341.9–607 891.7	2–6	M2	1.33−03	1.34+01	B	2
				1 844.15	553 666.1–607 891.7	4–6	M2	3.47−04	2.98+00	C	2
				1 853.09	555 341.9–609 305.8	2–4	M2	1.20−04	7.03−01	D+	2
				1 797.28	553 666.1–609 305.8	4–4	M2	3.29−04	1.66+00	C	2
24		^{2}P$-$^{2}P$^\circ$									
				1 744.680	553 666.1–610 983.2	4–2	M2	1.90−04	4.11−01	D	2
25		^{2}P$-$^{4}S$^\circ$									
				1 707.467	553 666.1–612 232.4	4–4	M2	3.69−03	1.44+01	B	2
				1 757.763	555 341.9–612 232.4	2–4	M2	3.44−03	1.55+01	B	2
26		^{2}P$-$^{2}P$^\circ$									
				1 699.654	553 666.1–612 501.6	4–4	M2	1.31−03	4.97+00	C+	2
				1 749.484	555 341.9–612 501.6	2–4	M2	3.57−04	1.57+00	C	2
27		^{2}P$-$^{2}S$^\circ$									
				1 686.984	553 666.1–612 943.5	4–2	M2	2.85−03	5.23+00	C+	2
28	$2p^4(^3\mathrm{P})3s-2p^4(^1\mathrm{D})3p$	^{4}P$-$^{2}P$^\circ$									

TABLE 54. Transition probabilities of forbidden lines for Mg IV (references for this table are as follows: 1 = Tachiev and Froese Fischer[96] and 2 = Tachiev and Froese Fischer[92])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	Type	A_{ki} (s^{-1})	S (a.u.)	Acc.	Source
				953.071	545 137.6–650 061.6	4–4	M2	2.08−03	4.40−01	D	2
				931.328	543 720.4–651 093.9	6–2	M2	2.62−02	2.46+00	C	2
				940.369	543 720.4–650 061.6	6–4	M2	4.79−02	9.45+00	B	2
				943.785	545 137.6–651 093.9	4–2	M2	4.54−02	4.56+00	C+	2
				960.558	545 955.4–650 061.6	2–4	M2	3.73−03	8.18−01	D+	2
29		$^{2}\mathrm{P}-{}^{2}\mathrm{P}^{\circ}$									
				1 037.393	553 666.1–650 061.6	4–4	M2	6.27−03	2.02+00	C	2
				1 026.401	553 666.1–651 093.9	4–2	M2	6.11−03	9.34−01	D+	2
				1 055.747	555 341.9–650 061.6	2–4	M2	2.11−03	7.42−01	D+	2
30	$2p^4(^3\mathrm{P})3s-2p^4(^1\mathrm{S})3p$	$^{4}\mathrm{P}-{}^{2}\mathrm{P}^{\circ}$									
				725.943	545 137.6–682 889.5	4–4	M2	3.40−04	1.84−02	E	2
				718.748	543 720.4–682 851.3	6–2	M2	5.09−03	1.31−01	E+	2
				718.550	543 720.4–682 889.5	6–4	M2	7.78−03	4.00−01	D	2
				726.144	545 137.6–682 851.3	4–2	M2	8.85−03	2.40−01	D	2
				730.278	545 955.4–682 889.5	2–4	M2	5.19−04	2.89−02	E	2
31	$2p^4(^1\mathrm{D})3s-2p^4(^1\mathrm{D})3s$	$^{2}\mathrm{D}-{}^{2}\mathrm{D}$									
				16.0 cm^{-1}	582 562.4–582 578.4	6–4	M1	6.62−08	2.40+00	B+	2
32	$2p^4(^1\mathrm{D})3s-2p^4(^3\mathrm{P})3p$	$^{2}\mathrm{D}-{}^{4}\mathrm{P}^{\circ}$									
			6 655.4	6 657.3	582 562.4–597 583.6	6–2	M2	2.90−11	5.08−05	E	2
			6 893.1	6 895.0	582 562.4–597 065.7	6–4	M2	8.40−10	3.51−03	D	2
			6 662.5	6 664.4	582 578.4–597 583.6	4–2	M2	2.07−08	3.64−02	D+	2
			7 161.7	7 163.6	582 562.4–596 521.8	6–6	M2	2.70−09	2.05−02	D+	2
			6 900.7	6 902.6	582 578.4–597 065.7	4–4	M2	1.41−08	5.94−02	D+	2
			7 169.9	7 171.9	582 578.4–596 521.8	4–6	M2	4.38−09	3.34−02	D+	2
33		$^{2}\mathrm{D}-{}^{4}\mathrm{D}^{\circ}$									
			4 662.72	4 664.03	582 562.4–604 003.1	6–6	M2	4.72−09	4.19−03	D	2
			4 526.79	4 528.06	582 578.4–604 662.9	4–4	M2	1.12−08	5.70−03	D	2
			4 448.91	4 450.16	582 562.4–605 033.5	6–2	M2	2.09−08	4.89−03	D	2
			4 523.52	4 524.78	582 562.4–604 662.9	6–4	M2	1.70−08	8.65−03	D	2
			4 452.08	4 453.33	582 578.4–605 033.5	4–2	M2	4.14−09	9.72−04	E+	2
			4 858.74	4 860.10	582 562.4–603 138.1	6–8	M2	1.28−09	1.86−03	E+	2
			4 666.20	4 667.51	582 578.4–604 003.1	4–6	M2	7.88−09	7.03−03	D	2
			4 862.53	4 863.88	582 578.4–603 138.1	4–8	M2	4.68−10	6.84−04	E+	2
34		$^{2}\mathrm{D}-{}^{2}\mathrm{D}^{\circ}$									
			3 946.88	3 948.00	582 562.4–607 891.7	6–6	M2	4.97−07	1.92−01	D	2
			3 740.42	3 741.48	582 578.4–609 305.8	4–4	M2	4.86−07	9.56−02	E+	2
			3 738.18	3 739.24	582 562.4–609 305.8	6–4	M2	2.80−06	5.49−01	D+	2
			3 949.37	3 950.49	582 578.4–607 891.7	4–6	M2	2.27−07	8.79−02	E+	2
35		$^{2}\mathrm{D}-{}^{2}\mathrm{P}^{\circ}$									
			3 517.54	3 518.55	582 562.4–610 983.2	6–2	M2	5.07−05	3.67+00	C+	2
			3 519.53	3 520.53	582 578.4–610 983.2	4–2	M2	2.17−06	1.57−01	E+	2
36		$^{2}\mathrm{D}-{}^{2}\mathrm{P}^{\circ}$									
			3 339.14	3 340.10	582 562.4–612 501.6	6–4	M2	7.55−05	8.41+00	B	2
			3 340.93	3 341.89	582 578.4–612 501.6	4–4	M2	1.51−05	1.69+00	C	2
37		$^{2}\mathrm{D}-{}^{2}\mathrm{S}^{\circ}$									
			3 290.57	3 291.52	582 562.4–612 943.5	6–2	M2	1.33−04	6.89+00	C+	2
			3 292.31	3 293.25	582 578.4–612 943.5	4–2	M2	5.92−06	3.08−01	D	2
38	$2p^4(^1\mathrm{D})3s-2p^4(^1\mathrm{D})3p$	$^{2}\mathrm{D}-{}^{2}\mathrm{F}^{\circ}$									
				1 800.68	582 578.4–638 112.9	4–8	M2	1.10−02	1.12+02	B+	2
				1 800.16	582 562.4–638 112.9	6–8	M2	6.33−03	6.42+01	B+	2

TABLE 54. Transition probabilities of forbidden lines for Mg IV (references for this table are as follows: 1=Tachiev and Froese Fischer[96] and 2=Tachiev and Froese Fischer[92])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	Type	A_{ki} (s^{-1})	S (a.u.)	Acc.	Source
				1 808.28	582 578.4–637 879.7	4–6	M2	1.19−03	9.23+00	B	2
				1 807.75	582 562.4–637 879.7	6–6	M2	2.16−03	1.68+01	B	2
39		$^2D-^2D^\circ$									
				1 607.097	582 562.4–644 786.4	6–6	M2	1.42−02	6.12+01	B+	2
				1 611.214	582 578.4–644 643.4	4–4	M2	2.76−03	8.04+00	C+	2
				1 610.799	582 562.4–644 643.4	6–4	M2	1.37−02	3.98+01	B+	2
				1 607.510	582 578.4–644 786.4	4–6	M2	8.45−03	3.65+01	B+	2
40		$^2D-^2P^\circ$									
				1 459.183	582 562.4–651 093.9	6–2	M2	3.89−02	3.45+01	B+	2
				1 481.499	582 562.4–650 061.6	6–4	M2	1.27−02	2.43+01	B	2
				1 459.524	582 578.4–651 093.9	4–2	M2	1.74−03	1.54+00	C	2
				1 481.850	582 578.4–650 061.6	4–4	M2	2.61−03	5.01+00	C+	2
41	$2p^4(^3P)3p-2p^4(^3P)3p$	$^4P^\circ-^4P^\circ$									
				543.9 cm^{-1}	596 521.8–597 065.7	6–4	M1	3.91−03	3.60+00	B+	2
				517.9 cm^{-1}	597 065.7–597 583.6	4–2	M1	6.21−03	3.31+00	B+	2
42		$^4P^\circ-^4D^\circ$									
			15 110.1	15 114.2	596 521.8–603 138.1	6–8	M1	6.44−02	6.59−02	C+	2
			14 410.7	14 414.6	597 065.7–604 003.1	4–6	M1	4.90−03	3.27−03	C	2
			14 121.8	14 125.7	597 583.6–604 662.9	2–4	M1	3.46−03	1.45−03	D+	2
			13 363.0	13 366.7	596 521.8–604 003.1	6–6	M1	4.14−02	2.20−02	C	2
			13 159.1	13 162.7	597 065.7–604 662.9	4–4	M1	8.45−02	2.86−02	C	2
			13 419.3	13 423.0	597 583.6–605 033.5	2–2	M1	1.26−01	2.26−02	C	2
			12 280.0	12 283.4	596 521.8–604 662.9	6–4	M1	5.56−02	1.53−02	C	2
			12 547.1	12 550.5	597 065.7–605 033.5	4–2	M1	9.38−02	1.38−02	C	2
43		$^4D^\circ-^4D^\circ$									
				865.0 cm^{-1}	603 138.1–604 003.1	8–6	M1	1.91−02	6.58+00	B+	2
				659.8 cm^{-1}	604 003.1–604 662.9	6–4	M1	1.58−02	8.16+00	B+	2
				370.6 cm^{-1}	604 662.9–605 033.5	4–2	M1	4.05−03	5.91+00	B+	2
44		$^4D^\circ-^2D^\circ$									
				3 888.6 cm^{-1}	604 003.1–607 891.7	6–6	M1	1.33−02	5.04−02	D	2
				4 642.9 cm^{-1}	604 662.9–609 305.8	4–4	M1	1.72−02	2.55−02	D	2
				4 753.6 cm^{-1}	603 138.1–607 891.7	8–6	M1	1.00−01	2.07−01	C	2
			18 853	18 858	604 003.1–609 305.8	6–4	M1	1.39−03	1.38−03	E	2
				3 228.8 cm^{-1}	604 662.9–607 891.7	4–6	M1	1.82−02	1.20−01	D+	2
				4 272.3 cm^{-1}	605 033.5–609 305.8	2–4	M1	3.56−02	6.77−02	D	2
45		$^2D^\circ-^2D^\circ$									
				1 414.1 cm^{-1}	607 891.7–609 305.8	6–4	M1	4.59−02	2.40+00	B	2
46		$^2D^\circ-^2P^\circ$									
				4 609.9 cm^{-1}	607 891.7–612 501.6	6–4	M1	3.62−02	5.49−02	D	2
				3 195.8 cm^{-1}	609 305.8–612 501.6	4–4	M1	2.16−02	9.80−02	D+	2
47		$^2D^\circ-^2S^\circ$									
				3 637.7 cm^{-1}	609 305.8–612 943.5	4–2	M1	1.34−02	2.06−02	D	2
48		$^2P^\circ-^2P^\circ$									
				1 518.4 cm^{-1}	610 983.2–612 501.6	2–4	M1	1.15−02	4.88−01	C	2
49		$^2P^\circ-^2S^\circ$									
				1 960.3 cm^{-1}	610 983.2–612 943.5	2–2	M1	6.32−02	6.22−01	C	2
50		$^2P^\circ-^2S^\circ$									
				441.9 cm^{-1}	612 501.6–612 943.5	4–2	M1	9.44−04	8.11−01	C+	2

TABLE 54. Transition probabilities of forbidden lines for Mg IV (references for this table are as follows: 1=Tachiev and Froese Fischer[96] and 2=Tachiev and Froese Fischer[92])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	Type	A_{ki} (s^{-1})	S (a.u.)	Acc.	Source
51	$2p^4(^3P)3p-2p^4(^1S)3s$	$^2P^\circ-^2S$									
			8 612.4	8 614.7	612 501.6–624 109.6	4–2	M2	1.63−07	1.04+00	D+	2
52	$2p^4(^1S)3s-2p^4(^1D)3p$	$^2S-^2P^\circ$									
			3 852.18	3 853.27	624 109.6–650 061.6	2–4	M2	9.85−07	2.25−01	D	2
53	$2p^4(^1S)3s-2p^4(^1S)3p$	$^2S-^2P^\circ$									
				1 701.262	624 109.6–682 889.5	2–4	M2	2.25−02	8.59+01	B+	2
54	$2p^4(^1D)3p-2p^4(^1D)3p$	$^2F^\circ-^2F^\circ$									
				233.2 cm^{-1}	637 879.7–638 112.9	6–8	M1	1.46−04	3.42+00	B	2
55		$^2D^\circ-^2D^\circ$									
				143.0 cm^{-1}	644 643.4–644 786.4	4–6	M1	3.14−05	2.39+00	B	2
56		$^2P^\circ-^2P^\circ$									
				1 032.3 cm^{-1}	650 061.6–651 093.9	4–2	M1	1.97−02	1.33+00	C+	2
57	$2p^4(^1S)3p-2p^4(^1S)3p$	$^2P^\circ-^2P^\circ$									
				38.2 cm^{-1}	682 851.3–682 889.5	2–4	M1	5.01−07	1.33+00	C+	2

[a] Wavelengths (Å) are always given unless cm^{-1} is indicated.

11.5. Mg V

Oxygen isoelectronic sequence
Ground state: $1s^2 2s^2 2p^4\ ^3P_2$
Ionization energy: 141.270 eV=1 139 420 cm^{-1}

11.5.1. Allowed Transitions for Mg V

Only OP (Ref. 14) calculations were available for lines from energy levels above the $2p^3 3d$. Wherever available we have used the data of Tachiev and Froese Fischer,[100,101] which are the product of extensive MCHF calculations with Breit-Pauli corrections to order α^2. Second-order MBPT results from Vilkas *et al.*[119] were also available for some of the lowest transitions. Bogdanovich *et al.*[9] used a Hartree-Fock-Pauli approximation with correlation effects estimated by configuration interaction using a basis of transformed radial orbitals.

To estimate accuracies, we pooled the relative standard deviation of the mean (RSDM) for each of the lines with transition rates published in two or more references,[9,14,100,101,119] as described in the introduction (data from Tachiev and Froese Fischer[101] are cited only for lines not listed in Tachiev and Froese Fischer[100]). For this purpose the spin-allowed (non-OP) and intercombination data were treated separately and each of these was in turn divided into two upper-level energy groups below and above 700 000 cm^{-1}. OP lines constituted a fifth group and have been used only when more accurate sources were not available, because spin-orbit effects are often significant for this spectrum.

Agreement between Tachiev and Froese Fischer[100] and Bogdanovich *et al.*[9] was significantly stronger than for other spectra, and this was particularly notable for transitions from higher-lying levels. This could indicate that MCHF calculations are generally more accurate than we have observed in comparisons with data sources for other spectra, or this degree of agreement might arise primarily from an underlying similarity of the two methods. We have chosen to treat uncertainties with each spectrum according to the degree of agreement of transitions found within it.

A NIST compilation of far-UV lines of Mg V was published recently.[78] The estimated accuracies are different in some cases because a different method of evaluation was used.

11.5.2. References for Allowed Transitions for Mg V

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[119] M. J. Vilkas, G. Merkelis, R. Kisielius, G. Gaigalas, A. Bernotas, and Z. Rudzikas, Phys. Scr. **49**, 592 (1994).

TABLE 55. Wavelength finding list for allowed lines for Mg V

Wavelength (vac) (Å)	Mult. No.
92.432	50
92.584	50
92.648	50
95.554	51
95.798	48
95.896	47
95.917	47
95.962	48
96.030	48
96.060	47
96.081	47
96.149	47
97.392	46
97.561	46
97.632	46
98.232	42
98.269	42
98.404	42
98.441	42
98.476	42
98.626	41
98.629	41
98.635	41
98.800	41
98.803	41
98.872	41
99.066	49
101.670	45
101.781	44
102.073	43
103.902	38
103.906	38
103.938	36
103.939	36
103.942	36
104.099	38
104.131	36
104.132	36
104.179	38
104.211	36
104.447	39
107.653	37
109.162	40
109.800	35
110.015	35
110.104	35
110.771	29
110.802	29
110.846	29
110.929	28
110.990	29
111.022	29
111.081	29
111.149	28
111.189	27
111.239	27
111.410	27
111.460	27
111.486	27
111.552	27
113.194	57
113.202	57
113.210	57
113.277	20
113.402	57
113.409	57
113.515	57
113.699	19
113.821	33
113.930	19
113.946	18
113.988	17
114.026	19
114.052	17
114.178	18
114.197	17
114.220	17
114.284	17
114.317	17
114.488	16
114.722	16
114.759	15
114.764	15
114.782	15
114.819	16
114.994	15
114.999	15
115.016	32
115.092	15
115.362	31
115.396	31
115.443	31
115.534	30
118.083	25
118.809	24
118.856	23
118.925	23
119.399	22
119.443	34
119.694	21
119.699	21
119.719	21
121.645	14
121.656	14
121.658	14
121.921	14
121.923	14
122.033	14
125.600	26
126.282	56

TABLE 55. Wavelength finding list for allowed lines for Mg V—Continued

Wavelength (vac) (Å)	Mult. No.
126.540	56
126.682	56
132.163	10
132.176	10
132.475	10
132.488	10
132.492	10
132.618	10
135.628	55
135.647	55
135.661	55
135.945	55
135.959	55
136.122	55
137.230	12
137.404	8
137.407	8
137.411	8
137.741	8
137.745	8
137.882	8
138.751	11
138.766	11
142.935	9
145.486	13
146.083	7
146.465	7
146.623	7
151.807	54
152.021	54
152.152	54
152.180	54
152.385	54
152.527	54
251.584	2
252.717	2
253.190	2
264.451	52
276.582	4
312.302	6
338.554	67
338.623	67
338.647	67
338.685	67
338.716	67
338.753	67
338.784	67
341.553	60
341.578	60
341.674	60
341.698	60
341.720	60
341.785	60
341.807	60
345.000	68
345.072	68
345.143	68
345.582	68
345.654	68
345.797	68
351.089	1
352.201	1
353.092	1
353.300	1
354.225	1
355.329	1
373.283	72
373.569	72
373.653	72
374.138	72
374.222	72
374.306	72
376.665	53
378.160	73
378.246	73
378.586	73
378.672	73
378.758	73
378.954	73
378.959	62
378.999	62
379.041	73
379.075	62
379.105	62
379.107	62
379.213	62
387.457	58
388.496	58
390.765	58
395.076	63
395.099	63
395.219	63
401.764	3
404.390	3
465.437	59
466.895	59
466.936	59
470.130	59
470.177	59
470.219	59
481.813	5
537.438	61
539.377	61
539.438	61
539.657	61
543.824	61
544.046	61
671.01	89
671.28	89
671.55	89

TABLE 55. Wavelength finding list for allowed lines for Mg V—Continued

Wavelength (vac) (Å)	Mult. No.
672.72	89
672.99	89
707.06	83
714.61	83
718.15	83
844.81	71
845.54	71
847.36	71
848.10	71
848.64	71
849.96	71
850.49	71
967.02	82
977.03	81
979.23	81
981.20	82
987.89	82
991.51	81
993.78	81
1 000.64	81
1 158.33	80
1 178.74	80
1 183.57	85
1 188.41	80
1 289.47	79
1 295.82	79
1 314.82	79
1 321.42	79
1 326.86	79
1 360.88	78
1 361.51	78
1 362.58	78
1 389.14	78
1 389.80	78
1 402.58	78
1 403.63	64
1 416.69	64
1 417.35	64
1 444.40	64
1 447.35	64
1 448.04	64
1 530.20	65
1 534.94	65
1 546.53	65
1 550.84	65
1 570.99	65
1 583.13	65
1 584.31	66
1 601.82	66
1 625.09	93
1 627.05	93
1 629.78	93
1 641.12	66
1 740.04	88
1 751.62	88
1 994.0	77

Wavelength (air) (Å)	Mult. No.
2 054.6	77
2 084.1	77
2 289.1	69
2 314.8	69
2 325.8	69
2 348.1	69
2 409.7	69
2 433.5	69
2 507.5	70
2 535.1	70
2 551.7	70
2 610.4	70
2 635.0	70
2 652.9	70
3 074.1	94
3 096.0	94
3 135.5	74
3 204.8	74
3 341.1	84
3 352.6	84
3 360.9	84
3 366.1	74
4 251.4	92
4 264.8	92
4 283.7	92
4 452.1	91
4 466.8	91
4 487.5	91
4 498.2	91
4 513.2	91
4 545.0	76
4 552.9	76
4 614.4	75
4 616.8	75
4 622.8	75
4 885.5	76
4 956.5	75
4 959.2	75
5 056.0	76
5 132.0	75
14 959	86
15 090	86
15 193	86
15 329	86
15 409	86
15 504	86
15 536	90
15 587	86
15 717	90
15 975	90

TABLE 55. Wavelength finding list for allowed lines for Mg V—Continued

Wavenumber (cm^{-1})	Mult. No.
2 902	87
2 799	87
2 725	87
2 419	87
2 345	87

TABLE 56. Transition probabilities of allowed lines for Mg V (references for this table are as follows: 1=Butler and Zeippen,[14] 2=Tachiev and Froese Fischer,[100] 3=Tachiev and Froese Fischer,[101] 4=Vilkas *et al.*,[119] and 5=Bogdanovich *et al.*[9])

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
1	$2s^22p^4-2s2p^5$	$^3P-^3P^\circ$		*353.16*	*875–284 029*	9–9	8.16+01	1.53−01	1.60+00	0.139	B+	2,4
				353.092	0.0–283 212.3	5–5	6.12+01	1.14−01	6.65−01	−0.244	B+	2,4
				353.300	1 783.1–284 828.3	3–3	2.04+01	3.81−02	1.33−01	−0.942	B+	2,4
				351.089	0.0–284 828.3	5–3	3.46+01	3.84−02	2.22−01	−0.717	B+	2,4
				352.201	1 783.1–285 712.0	3–1	8.23+01	5.10−02	1.77−01	−0.815	B+	2,4
				355.329	1 783.1–283 212.3	3–5	2.00+01	6.31−02	2.22−01	−0.723	B+	2,4
				354.225	2 521.8–284 828.3	1–3	2.69+01	1.52−01	1.77−01	−0.818	B+	2,4
2		$^3P-^1P^\circ$										
				252.717	1 783.1–397 482	3–3	5.93−03	5.67−06	1.42−05	−4.769	D	2,4
				251.584	0.0–397 482	5–3	3.08−01	1.75−04	7.26−04	−3.058	C	2,4
				253.190	2 521.8–397 482	1–3	1.15−02	3.32−05	2.77−05	−4.479	D+	2,4
3		$^1D-^3P^\circ$										
				401.764	35 926–284 828.3	5–3	2.65−03	3.85−06	2.54−05	−4.716	D	2,4
				404.390	35 926–283 212.3	5–5	4.01−02	9.83−05	6.54−04	−3.308	C	2,4
4		$^1D-^1P^\circ$		276.582	35 926–397 482	5–3	3.12+02	2.15−01	9.79−01	0.031	B+	2,4
5		$^1S-^3P^\circ$										
				481.813	77 279–284 828.3	1–3	5.79−03	6.04−05	9.59−05	−4.219	D+	2,4
6		$^1S-^1P^\circ$		312.302	77 279–397 482	1–3	1.89+01	8.27−02	8.50−02	−1.082	B+	2,4
7	$2p^4-2p^3(^4S^\circ)3s$	$^3P-^3S^\circ$		*146.27*	*875*–684 541	9–3	5.19+02	5.55−02	2.40−01	−0.301	C+	2,5
				146.083	0.0–684 541	5–3	2.92+02	5.60−02	1.35−01	−0.553	C+	2,5
				146.465	1 783.1–684 541	3–3	1.70+02	5.48−02	7.93−02	−0.784	C+	2,5
				146.623	2 521.8–684 541	1–3	5.65+01	5.47−02	2.64−02	−1.262	C	2,5
8	$2p^4-2p^3(^2D^\circ)3s$	$^3P-^3D^\circ$		*137.57*	*875–727 757*	9–15	1.63+02	7.71−02	3.14−01	−0.159	C+	2,5
				137.411	0.0–727 742	5–7	1.63+02	6.48−02	1.47−01	−0.489	C+	2,5
				137.745	1 783.1–727 763	3–5	1.15+02	5.45−02	7.41−02	−0.786	C+	2,5
				137.882	2 521.8–727 782	1–3	8.46+01	7.23−02	3.28−02	−1.141	C	2,5
				137.407	0.0–727 763	5–5	4.79+01	1.36−02	3.07−02	−1.167	C	2,5
				137.741	1 783.1–727 782	3–3	7.21+01	2.05−02	2.79−02	−1.211	C	2,5
				137.404	0.0–727 782	5–3	5.68+00	9.65−04	2.18−03	−2.317	D+	2,5
9		$^1D-^1D^\circ$		142.935	35 926–735 546	5–5	4.20+02	1.29−01	3.02−01	−0.190	C+	2,5
10	$2p^4-2p^3(^2P^\circ)3s$	$^3P-^3P^\circ$		*132.32*	*875–756 605*	9–9	1.66+02	4.37−02	1.71−01	−0.405	C	2,5
				132.163	0.0–756 641	5–5	1.17+02	3.05−02	6.64−02	−0.817	C+	2,5
				132.488	1 783.1–756 566	3–3	3.98+01	1.05−02	1.37−02	−1.502	C	2,5
				132.176	0.0–756 566	5–3	6.38+01	1.00−02	2.18−02	−1.301	C	2,5
				132.492	1 783.1–756 545	3–1	1.66+02	1.45−02	1.90−02	−1.362	C	2,5
				132.475	1 783.1–756 641	3–5	4.98+01	2.18−02	2.86−02	−1.184	C	2,5
				132.618	2 521.8–756 566	1–3	6.30+01	4.98−02	2.17−02	−1.303	C	2,5
11		$^1D-^3P^\circ$										

TABLE 56. Transition probabilities of allowed lines for Mg V (references for this table are as follows: 1=Butler and Zeippen,[14] 2=Tachiev and Froese Fischer,[100] 3=Tachiev and Froese Fischer,[101] 4=Vilkas *et al.*,[119] and 5=Bogdanovich *et al.*[9])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				138.766	35 926–756 566	5–3	9.49−02	1.64−05	3.75−05	−4.086	E	2
				138.751	35 926–756 641	5–5	2.48+00	7.15−04	1.63−03	−2.447	D	2,5
12		$^{1}\mathrm{D}-^{1}\mathrm{P}^{\circ}$		137.230	35 926–764 628	5–3	2.03+02	3.44−02	7.76−02	−0.764	C+	2,5
13		$^{1}\mathrm{S}-^{1}\mathrm{P}^{\circ}$		145.486	77 279–764 628	1–3	1.92+02	1.83−01	8.76−02	−0.738	C+	2,5
14	$2p^4-2p^3(^4\mathrm{S}^{\circ})3d$	$^{3}\mathrm{P}-^{3}\mathrm{D}^{\circ}$		*121.78*	*875–822 022*	9–15	7.33+02	2.72−01	9.80−01	0.389	C+	2,5
				121.645	0.0–822 066	5–7	7.41+02	2.30−01	4.61−01	0.061	B	2,5
				121.921	1 783.1–821 989	3–5	5.40+02	2.01−01	2.42−01	−0.220	C+	2,5
				122.033	2 521.8–821 974	1–3	3.99+02	2.67−01	1.07−01	−0.573	C+	2,5
				121.656	0.0–821 989	5–5	1.87+02	4.16−02	8.33−02	−0.682	C+	2,5
				121.923	1 783.1–821 974	3–3	3.03+02	6.75−02	8.13−02	−0.694	C+	2,5
				121.658	0.0–821 974	5–3	2.04+01	2.71−03	5.43−03	−1.868	D	2
15	$2p^4-2p^3(^2\mathrm{D}^{\circ})3d$	$^{3}\mathrm{P}-^{3}\mathrm{D}^{\circ}$		*114.89*	*875–871 298*	9–15	7.51+02	2.48−01	8.44−01	0.349	C+	2,5
				114.782	0.0–871 216	5–7	7.91+02	2.19−01	4.14−01	0.039	B	2,5
				114.999	1 783.1–871 357	3–5	5.71+02	1.89−01	2.14−01	−0.246	C+	2,5
				115.092	2 521.8–871 390	1–3	4.02+02	2.39−01	9.07−02	−0.622	C+	2,5
				114.764	0.0–871 357	5–5	1.65+02	3.25−02	6.14−02	−0.789	C+	2,5
				114.994	1 783.1–871 390	3–3	2.69+02	5.34−02	6.06−02	−0.795	C+	2,5
				114.759	0.0–871 390	5–3	1.40+01	1.66−03	3.13−03	−2.081	C	2,5
16		$^{3}\mathrm{P}-^{1}\mathrm{P}^{\circ}$										
				114.722	1 783.1–873 456	3–3	2.02+01	3.99−03	4.52−03	−1.922	D	2,5
				114.488	0.0–873 456	5–3	1.41+01	1.66−03	3.14−03	−2.081	D	2,5
				114.819	2 521.8–873 456	1–3	1.66+00	9.87−04	3.73−04	−3.006	E	2
17		$^{3}\mathrm{P}-^{3}\mathrm{P}^{\circ}$		*114.13*	*875–877 032*	9–9	1.43+03	2.79−01	9.44−01	0.400	C+	2,5
				114.052	0.0–876 795	5–5	1.13+03	2.21−01	4.15−01	0.043	B	2,5
				114.220	1 783.1–877 283	3–3	2.88+02	5.63−02	6.35−02	−0.772	C+	2,5
				113.988	0.0–877 283	5–3	7.00+02	8.19−02	1.54−01	−0.388	B	2,5
				114.197	1 783.1–877 463	3–1	1.36+03	8.83−02	9.96−02	−0.577	C+	2,5
				114.284	1 783.1–876 795	3–5	3.37+02	1.10−01	1.24−01	−0.481	C+	2,5
				114.317	2 521.8–877 283	1–3	3.95+02	2.32−01	8.73−02	−0.635	C+	2,5
18		$^{3}\mathrm{P}-^{1}\mathrm{D}^{\circ}$										
				114.178	1 783.1–877 611	3–5	2.60+00	8.45−04	9.53−04	−2.596	E+	2,5
				113.946	0.0–877 611	5–5	1.15+01	2.23−03	4.19−03	−1.953	D	2,5
19		$^{3}\mathrm{P}-^{3}\mathrm{S}^{\circ}$		*113.81*	*875–879 515*	9–3	1.50+03	9.74−02	3.28−01	−0.057	B	2,5
				113.699	0.0–879 515	5–3	7.55+02	8.78−02	1.64−01	−0.358	B	2,5
				113.930	1 783.1–879 515	3–3	5.49+02	1.07−01	1.20−01	−0.493	B	2,5
				114.026	2 521.8–879 515	1–3	2.00+02	1.17−01	4.38−02	−0.932	B	2,5
20		$^{3}\mathrm{P}-^{1}\mathrm{F}^{\circ}$										
				113.277	0.0–882 791	5–7	6.34+00	1.71−03	3.18−03	−2.068	D	2,5
21		$^{1}\mathrm{D}-^{3}\mathrm{D}^{\circ}$										
				119.699	35 926–871 357	5–5	3.72−01	7.99−05	1.57−04	−3.398	E+	2,5
				119.694	35 926–871 390	5–3	5.37+00	6.92−04	1.36−03	−2.461	D	2,5
				119.719	35 926–871 216	5–7	1.51−01	4.53−05	8.92−05	−3.645	E	2
22		$^{1}\mathrm{D}-^{1}\mathrm{P}^{\circ}$		119.399	35 926–873 456	5–3	7.54+02	9.66−02	1.90−01	−0.316	C+	2,5
23		$^{1}\mathrm{D}-^{3}\mathrm{P}^{\circ}$										
				118.856	35 926–877 283	5–3	1.42+01	1.81−03	3.54−03	−2.043	D	2,5
				118.925	35 926–876 795	5–5	5.63+00	1.19−03	2.34−03	−2.225	D	2,5

TABLE 56. Transition probabilities of allowed lines for Mg V (references for this table are as follows: 1=Butler and Zeippen,[14] 2=Tachiev and Froese Fischer,[100] 3=Tachiev and Froese Fischer,[101] 4=Vilkas *et al.*,[119] and 5=Bogdanovich *et al.*[9])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
24		^{1}D–^{1}D$^\circ$		118.809	35 926–877 611	5–5	9.01+02	1.91−01	3.73−01	−0.020	B	2,5
25		^{1}D–^{1}F$^\circ$		118.083	35 926–882 791	5–7	1.39+03	4.05−01	7.88−01	0.306	B	2,5
26		^{1}S–^{1}P$^\circ$		125.600	77 279–873 456	1–3	1.11+02	7.88−02	3.26−02	−1.103	C+	2,5
27	$2p^4-2p^3(^2\mathrm{P}^\circ)3d$	^{3}P–^{3}P$^\circ$		*111.32*	*875–899 165*	9–9	2.77+02	5.14−02	1.70−01	−0.335	C+	2,5
				111.189	0.0–899 369	5–5	1.80+02	3.33−02	6.09−02	−0.779	C+	2,5
				111.460	1 783.1–898 962	3–3	1.06+02	1.98−02	2.18−02	−1.226	C+	2,5
				111.239	0.0–898 962	5–3	9.99+01	1.11−02	2.04−02	−1.256	C+	2,5
				111.486	1 783.1–898 757	3–1	3.69+02	2.29−02	2.52−02	−1.163	C+	2,5
				111.410	1 783.1–899 369	3–5	5.06+01	1.57−02	1.73−02	−1.327	C+	2,5
				111.552	2 521.8–898 962	1–3	1.17+02	6.55−02	2.40−02	−1.184	C+	2,5
28		^{3}P–^{1}D$^\circ$										
				111.149	1 783.1–901 474	3–5	2.60+02	8.02−02	8.81−02	−0.619	C	3,5
				110.929	0.0–901 474	5–5	5.96+01	1.10−02	2.01−02	−1.260	D+	3,5
29		^{3}P–^{3}D$^\circ$		*110.92*	*875–902 394*	9–15	5.53+02	1.70−01	5.59−01	0.185	C+	2,5
				110.846	0.0–902 152	5–7	6.06+02	1.56−01	2.85−01	−0.108	C+	2,5
				111.022	1 783.1–902 509	3–5	2.89+02	8.90−02	9.75−02	−0.573	C+	2,5
				111.081	2 521.8–902 766	1–3	4.23+02	2.35−01	8.58−02	−0.629	C+	2,5
				110.802	0.0–902 509	5–5	7.99+01	1.47−02	2.68−02	−1.134	C	2,5
				110.990	1 783.1–902 766	3–3	2.97+02	5.49−02	6.02−02	−0.783	C	2,5
				110.771	0.0–902 766	5–3	1.69+01	1.86−03	3.39−03	−2.032	D+	2,5
30		^{1}D–^{1}D$^\circ$		115.534	35 926–901 474	5–5	3.68+02	7.36−02	1.40−01	−0.434	C+	3,5
31		^{1}D–^{3}D$^\circ$										
				115.396	35 926–902 509	5–5	5.01+00	9.99−04	1.90−03	−2.301	E+	2
				115.362	35 926–902 766	5–3	5.16+02	6.18−02	1.17−01	−0.510	D+	2
				115.443	35 926–902 152	5–7	1.49−01	4.17−05	7.92−05	−3.681	E	2
32		^{1}D–^{1}F$^\circ$		115.016	35 926–905 370	5–7	9.91+02	2.75−01	5.21−01	0.138	B	2,5
33		^{1}D–^{1}P$^\circ$		113.821	35 926–914 500	5–3	6.53+01	7.61−03	1.43−02	−1.420	C	2,5
34		^{1}S–^{1}P$^\circ$		119.443	77 279–914 500	1–3	1.73+03	1.11+00	4.37−01	0.045	B	2,5
35	$2p^4-2p^3(^4\mathrm{S}^\circ)4s$	^{3}P–^{3}S$^\circ$		*109.91*	*875*–910 750	9–3	1.79+02	1.08−02	3.51−02	−1.012	D	1
				109.800	0.0–910 750	5–3	9.96+01	1.08−02	1.95−02	−1.268	D	LS
				110.015	1 783.1–910 750	3–3	5.95+01	1.08−02	1.17−02	−1.489	E+	LS
				110.104	2 521.8–910 750	1–3	1.96+01	1.07−02	3.88−03	−1.971	E	LS
36	$2p^4-2p^3(^2\mathrm{D}^\circ)4s$	^{3}P–^{3}D$^\circ$		*104.03*	*875–962 092*	9–15	5.76+02	1.56−01	4.80−01	0.147	C	1
				103.942	0.0–962 075	5–7	5.78+02	1.31−01	2.24−01	−0.184	C	LS
				104.132	1 783.1–962 103	3–5	4.32+02	1.17−01	1.20−01	−0.455	C	LS
				104.211	2 521.8–962 114	1–3	3.17+02	1.55−01	5.32−02	−0.810	D+	LS
				103.939	0.0–962 103	5–5	1.44+02	2.33−02	3.99−02	−0.934	D+	LS
				104.131	1 783.1–962 114	3–3	2.39+02	3.88−02	3.99−02	−0.934	D+	LS
				103.938	0.0–962 114	5–3	1.61+01	1.56−03	2.67−03	−2.108	E	LS
37		^{1}D–^{1}D$^\circ$		107.653	35 926–964 836	5–5	1.39+02	2.42−02	4.29−02	−0.917	D+	1
38	$2p^4-2p^3(^4\mathrm{S}^\circ)4d$	^{3}P–^{3}D$^\circ$		*104.00*	*875–962 425*	9–15	5.77+02	1.56−01	4.80−01	0.147	C	1
				103.902	0.0–962 445	5–7	5.78+02	1.31−01	2.24−01	−0.184	C	LS
				104.099	1 783.1–962 407	3–5	4.32+02	1.17−01	1.20−01	−0.455	C	LS
				104.179	2 521.8–962 407	1–3	3.18+02	1.55−01	5.32−02	−0.810	D+	LS

TABLE 56. Transition probabilities of allowed lines for Mg V (references for this table are as follows: 1=Butler and Zeippen,[14] 2=Tachiev and Froese Fischer,[100] 3=Tachiev and Froese Fischer,[101] 4=Vilkas *et al.*,[119] and 5=Bogdanovich *et al.*[9])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				103.906	0.0–962 407	5–5	1.45+02	2.34−02	4.00−02	−0.932	D+	LS
				104.099	1 783.1–962 407	3–3	2.39+02	3.89−02	4.00−02	−0.933	D+	LS
				103.906	0.0–962 407	5–3	1.61+01	1.56−03	2.67−03	−2.108	E	LS
39	$2p^4$–$2p^3(^2P^\circ)4s$	^1D–$^1P^\circ$		104.447	35 926–993 349	5–3	8.01+01	7.86−03	1.35−02	−1.406	D	1
40		^1S–$^1P^\circ$		109.162	77 279–993 349	1–3	7.18+01	3.85−02	1.38−02	−1.415	D	1
41	$2p^4$–$2p^3(^2D^\circ)4d$	^3P–$^3D^\circ$		*98.72*	*875–1 013 877*	9–15	1.60+02	3.90−02	1.14−01	−0.455	D	1
				98.635	0.0–1 013 839	5–7	1.61+02	3.28−02	5.33−02	−0.785	D+	LS
				98.803	1 783.1–1 013 897	3–5	1.20+02	2.92−02	2.85−02	−1.057	D	LS
				98.872	2 521.8–1 013 931	1–3	8.85+01	3.89−02	1.27−02	−1.410	E+	LS
				98.629	0.0–1 013 897	5–5	4.02+01	5.86−03	9.51−03	−1.533	E+	LS
				98.800	1 783.1–1 013 931	3–3	6.66+01	9.74−03	9.50−03	−1.534	E+	LS
				98.626	0.0–1 013 931	5–3	4.46+00	3.90−04	6.33−04	−2.710	E	LS
42		^3P–$^3P^\circ$				9–9						1
				98.269	0.0–1 017 620	5–5	2.07+02	2.99−02	4.84−02	−0.825	D+	LS
				98.404	1 783.1–1 018 000	3–3	6.86+01	9.96−03	9.68−03	−1.525	E+	LS
				98.232	0.0–1 018 000	5–3	1.15+02	9.98−03	1.61−02	−1.302	D	LS
				98.441	1 783.1–1 017 620	3–5	6.86+01	1.66−02	1.61−02	−1.303	D	LS
				98.476	2 521.8–1 018 000	1–3	9.13+01	3.98−02	1.29−02	−1.400	E+	LS
43		^1D–$^1P^\circ$		102.073	35 926–1 015 615	5–3	3.86+02	3.62−02	6.08−02	−0.742	D+	1
44		^1D–$^1D^\circ$		101.781	35 926–1 018 430	5–5	6.34+02	9.85−02	1.65−01	−0.308	C	1
45		^1D–$^1F^\circ$		101.670	35 926–1 019 500	5–7	7.24+02	1.57−01	2.63−01	−0.105	C+	1
46	$2p^4$–$2p^3(^4S^\circ)5d$?	^3P–$^3D^\circ$?		*[97.5]*	*875–1 026 780*	9–15	2.33+02	5.52−02	1.59−01	−0.304	D+	1
				97.392	0.0–1 026 780	5–7	2.33+02	4.64−02	7.44−02	−0.635	D+	LS
				97.561	1 783.1–1 026 780	3–5	1.74+02	4.14−02	3.99−02	−0.906	D+	LS
				97.632	2 521.8–1 026 780	1–3	1.29+02	5.51−02	1.77−02	−1.259	D	LS
				97.392	0.0–1 026 780	5–5	5.83+01	8.29−03	1.33−02	−1.382	E+	LS
				97.561	1 783.1–1 026 780	3–3	9.67+01	1.38−02	1.33−02	−1.383	E+	LS
				97.392	0.0–1 026 780	5–3	6.48+00	5.53−04	8.87−04	−2.558	E	LS
47	$2p^4$–$2p^3(^2P^\circ)4d$?	^3P–$^3P^\circ$?				9–9						1
				95.896	0.0–1 042 800	5–5	1.33+02	1.83−02	2.89−02	−1.039	D	LS
				96.081	1 783.1–1 042 570	3–3	4.39+01	6.08−03	5.77−03	−1.739	E+	LS
				95.917	0.0–1 042 570	5–3	7.36+01	6.09−03	9.62−03	−1.516	E+	LS
				96.060	1 783.1–1 042 800	3–5	4.38+01	1.01−02	9.58−03	−1.519	E+	LS
				96.149	2 521.8–1 042 570	1–3	5.84+01	2.43−02	7.69−03	−1.614	E+	LS
48		^3P–$^3D^\circ$?		*[95.9]*	*875–1 043 860*	9–15	3.27+02	7.52−02	2.14−01	−0.170	D+	1
				95.798	0.0–1 043 860	5–7	3.28+02	6.32−02	9.97−02	−0.500	C	LS
				95.962	1 783.1–1 043 860	3–5	2.45+02	5.64−02	5.35−02	−0.772	D+	LS
				96.030	2 521.8–1 043 860	1–3	1.81+02	7.51−02	2.37−02	−1.124	D	LS
				95.798	0.0–1 043 860	5–5	8.21+01	1.13−02	1.78−02	−1.248	D	LS
				95.962	1 783.1–1 043 860	3–3	1.36+02	1.88−02	1.78−02	−1.249	D	LS
				95.798	0.0–1 043 860	5–3	9.12+00	7.53−04	1.19−03	−2.424	E	LS
49		^1D–$^1F^\circ$		[99.07]	35 926–1 045 350	5–7	4.36+02	8.99−02	1.47−01	−0.347	C	1
50	$2p^4$–$2p^3(^2D^\circ)5d$?	^3P–$^3P^\circ$?				9–9						1
				92.432	0.0–1 081 880	5–5	2.26+02	2.90−02	4.41−02	−0.839	D+	LS
				92.584	1 783.1–1 081 880	3–3	7.50+01	9.64−03	8.81−03	−1.539	E+	LS

TABLE 56. Transition probabilities of allowed lines for Mg V (references for this table are as follows: 1=Butler and Zeippen,[14] 2=Tachiev and Froese Fischer,[100] 3=Tachiev and Froese Fischer,[101] 4=Vilkas *et al.*,[119] and 5=Bogdanovich *et al.*[9])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				92.432	0.0–1 081 880	5–3	1.26+02	9.66−03	1.47−02	−1.316	D	LS
				92.584	1 783.1–1 081 880	3–5	7.52+01	1.61−02	1.47−02	−1.316	D	LS
				92.648	2 521.8–1 081 880	1–3	9.97+01	3.85−02	1.17−02	−1.415	E+	LS
51		$^1D-{}^1F^\circ$		[95.55]	35 926–1 082 450	5–7	6.42+02	1.23−01	1.93−01	−0.211	C	1
52	$2s2p^5-2p^6$	$^3P^\circ-{}^1S$		264.451	284 828.3–662 970	3–1	6.58−02	2.30−05	6.01−05	−4.161	D	2,4
53		$^1P^\circ-{}^1S$		376.665	397 482–662 970	3–1	2.20+02	1.56−01	5.81−01	−0.330	B+	2,4
54	$2s2p^5-2s2p^4(^4P)3s$	$^3P^\circ-{}^3P$		*152.17*	*284 029–941 190*	9–9	2.94+02	1.02−01	4.60−01	−0.037	C	1
				152.152	283 212.3–940 449	5–5	2.20+02	7.65−02	1.92−01	−0.417	C	LS
				152.180	284 828.3–941 944	3–3	7.34+01	2.55−02	3.83−02	−1.116	D+	LS
				151.807	283 212.3–941 944	5–3	1.23+02	2.56−02	6.40−02	−0.893	D+	LS
				152.021	284 828.3–942 634	3–1	2.94+02	3.40−02	5.10−02	−0.991	D+	LS
				152.527	284 828.3–940 449	3–5	7.29+01	4.24−02	6.39−02	−0.896	D+	LS
				152.385	285 712.0–941 944	1–3	9.77+01	1.02−01	5.12−02	−0.991	D+	LS
55	$2s2p^5-2s2p^4(^2D)3s$	$^3P^\circ-{}^3D$		*135.79*	*284 029–1 020 452*	9–15	1.68+02	7.74−02	3.11−01	−0.157	D+	1
				135.628	283 212.3–1 020 522	5–7	1.69+02	6.51−02	1.45−01	−0.487	C	LS
				135.945	284 828.3–1 020 419	3–5	1.26+02	5.80−02	7.79−02	−0.759	D+	LS
				136.122	285 712.0–1 020 345	1–3	9.26+01	7.72−02	3.46−02	−1.112	D	LS
				135.647	283 212.3–1 020 419	5–5	4.21+01	1.16−02	2.59−02	−1.237	D	LS
				135.959	284 828.3–1 020 345	3–3	6.96+01	1.93−02	2.59−02	−1.237	D	LS
				135.661	283 212.3–1 020 345	5–3	4.68+00	7.75−04	1.73−03	−2.412	E	LS
56	$2s2p^5–2s2p^4(^4P)3d$?	$^3P^\circ-{}^3D$?		*[126.4]*	*284 029–1 075 090*	9–15	1.10+03	4.38−01	1.64+00	0.596	C+	1
				126.282	283 212.3–1 075 090	5–7	1.10+03	3.68−01	7.65−01	0.265	B	LS
				126.540	284 828.3–1 075 090	3–5	8.20+02	3.28−01	4.10−01	−0.007	C+	LS
				126.682	285 712.0–1 075 090	1–3	6.05+02	4.37−01	1.82−01	−0.360	C	LS
				126.282	283 212.3–1 075 090	5–5	2.75+02	6.57−02	1.37−01	−0.483	C	LS
				126.540	284 828.3–1 075 090	3–3	4.54+02	1.09−01	1.36−01	−0.485	C	LS
				126.282	283 212.3–1 075 090	5–3	3.05+01	4.38−03	9.10−03	−1.660	E+	LS
57	$2s2p^5-2s2p^4(^2D)3d$	$^3P^\circ-{}^3D$		*113.31*	*284 029–1 166 574*	9–15	3.37+02	1.08−01	3.63−01	−0.012	C	1
				[113.21]	283 212.3–1 166 530	5–7	3.38+02	9.08−02	1.69−01	−0.343	C	LS
				[113.41]	284 828.3–1 166 590	3–5	2.52+02	8.09−02	9.06−02	−0.615	C	LS
				[113.52]	285 712.0–1 166 650	1–3	1.86+02	1.08−01	4.04−02	−0.967	D+	LS
				[113.20]	283 212.3–1 166 590	5–5	8.43+01	1.62−02	3.02−02	−1.092	D	LS
				[113.40]	284 828.3–1 166 650	3–3	1.40+02	2.70−02	3.02−02	−1.092	D	LS
				[113.19]	283 212.3–1 166 650	5–3	9.37+00	1.08−03	2.01−03	−2.268	E	LS
58	$2s^22p^3(^4S^\circ)3s–2s2p^4(^4P)3s$	$^3S^\circ-{}^3P$		*389.64*	684 541–*941 190*	3–9	2.51+01	1.72−01	6.61−01	−0.287	C+	1
				390.765	684 541–940 449	3–5	2.49+01	9.51−02	3.67−01	−0.545	C+	LS
				388.496	684 541–941 944	3–3	2.54+01	5.74−02	2.20−01	−0.764	C	LS
				387.457	684 541–942 634	3–1	2.56+01	1.92−02	7.35−02	−1.240	D+	LS
59	$2s^22p^3(^2D^\circ)3s–2s2p^4(^4P)3s$	$^3D^\circ-{}^3P$		*468.53*	*727 757–941 190*	15–9	3.70+00	7.30−03	1.69−01	−0.961	D+	1
				470.130	727 742–940 449	7–5	3.08+00	7.28−03	7.89−02	−1.293	D+	LS
				466.895	727 763–941 944	5–3	2.80+00	5.49−03	4.22−02	−1.561	D+	LS
				465.437	727 782–942 634	3–1	3.77+00	4.08−03	1.88−02	−1.912	D	LS
				470.177	727 763–940 449	5–5	5.49−01	1.82−03	1.41−02	−2.041	D	LS
				466.936	727 782–941 944	3–3	9.33−01	3.05−03	1.41−02	−2.039	D	LS
				470.219	727 782–940 449	3–5	3.66−02	2.02−04	9.38−04	−3.218	E	LS

TABLE 56. Transition probabilities of allowed lines for Mg V (references for this table are as follows: 1=Butler and Zeippen,[14] 2=Tachiev and Froese Fischer,[100] 3=Tachiev and Froese Fischer,[101] 4=Vilkas *et al.*,[119] and 5=Bogdanovich *et al.*[9])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
60	$2s^22p^3(^2D^\circ)3s$– $2s2p^4(^2D)3s$	$^3D^\circ-^3D$		*341.65*	*727 757–1 020 452*	15–15	5.79+01	1.01−01	1.71+00	0.180	C+	1
				341.553	727 742–1 020 522	7–7	5.15+01	9.00−02	7.08−01	−0.201	B	LS
				341.698	727 763–1 020 419	5–5	4.02+01	7.04−02	3.96−01	−0.453	C+	LS
				341.807	727 782–1 020 345	3–3	4.33+01	7.59−02	2.56−01	−0.643	C+	LS
				341.674	727 742–1 020 419	7–5	9.04+00	1.13−02	8.90−02	−1.102	C	LS
				341.785	727 763–1 020 345	5–3	1.45+01	1.52−02	8.55−02	−1.119	C	LS
				341.578	727 763–1 020 522	5–7	6.45+00	1.58−02	8.88−02	−1.102	C	LS
				341.720	727 782–1 020 419	3–5	8.67+00	2.53−02	8.54−02	−1.120	C	LS
61	$2s^22p^3(^2P^\circ)3s$– $2s2p^4(^4P)3s$	$^3P^\circ-^3P$		*541.76*	*756 605–941 190*	9–9	1.60+00	7.03−03	1.13−01	−1.199	D	1
				544.046	756 641–940 449	5–5	1.18+00	5.25−03	4.70−02	−1.581	D+	LS
				539.438	756 566–941 944	3–3	4.03−01	1.76−03	9.38−03	−2.277	E+	LS
				539.657	756 641–941 944	5–3	6.72−01	1.76−03	1.56−02	−2.056	D	LS
				537.438	756 566–942 634	3–1	1.64+00	2.36−03	1.25−02	−2.150	E+	LS
				543.824	756 566–940 449	3–5	3.95−01	2.92−03	1.57−02	−2.057	D	LS
				539.377	756 545–941 944	1–3	5.40−01	7.06−03	1.25−02	−2.151	E+	LS
62	$2s^22p^3(^2P^\circ)3s$– $2s2p^4(^2D)3s$	$^3P^\circ-^3D$		*379.01*	*756 605–1 020 452*	9–15	3.49+00	1.25−02	1.41−01	−0.949	D	1
				378.959	756 641–1 020 522	5–7	3.48+00	1.05−02	6.55−02	−1.280	D+	LS
				378.999	756 566–1 020 419	3–5	2.62+00	9.41−03	3.52−02	−1.549	D	LS
				379.075	756 545–1 020 345	1–3	1.93+00	1.25−02	1.56−02	−1.903	D	LS
				379.107	756 641–1 020 419	5–5	8.73−01	1.88−03	1.17−02	−2.027	E+	LS
				379.105	756 566–1 020 345	3–3	1.46+00	3.14−03	1.18−02	−2.026	E+	LS
				379.213	756 641–1 020 345	5–3	9.66−02	1.25−04	7.80−04	−3.204	E	LS
63	$2s^22p^3(^4S^\circ)3d$– $2s2p^4(^4P)3d$?	$^3D^\circ-^3D$?		*[395.1]*	*822 022–1 075 090*	15–15	3.04+01	7.12−02	1.39+00	0.029	C+	1
				395.219	822 066–1 075 090	7–7	2.70+01	6.32−02	5.76−01	−0.354	B	LS
				395.099	821 989–1 075 090	5–5	2.12+01	4.95−02	3.22−01	−0.606	C+	LS
				395.076	821 974–1 075 090	3–3	2.28+01	5.34−02	2.08−01	−0.795	C	LS
				395.219	822 066–1 075 090	7–5	4.73+00	7.92−03	7.21−02	−1.256	D+	LS
				395.099	821 989–1 075 090	5–3	7.62+00	1.07−02	6.96−02	−1.272	D+	LS
				395.099	821 989–1 075 090	5–7	3.39+00	1.11−02	7.22−02	−1.256	D+	LS
				395.076	821 974–1 075 090	3–5	4.56+00	1.78−02	6.95−02	−1.272	D+	LS
64	$2s^22p^3(^2D^\circ)3d$– $2s2p^4(^4P)3s$	$^3D^\circ-^3P$		*1 430.8*	*871 298–941 190*	15–9	1.57−01	2.88−03	2.04−01	−1.365	D+	1
				1 444.40	871 216–940 449	7–5	1.28−01	2.86−03	9.52−02	−1.699	C	LS
				1 416.69	871 357–941 944	5–3	1.21−01	2.18−03	5.08−02	−1.963	D+	LS
				1 403.63	871 390–942 634	3–1	1.66−01	1.63−03	2.26−02	−2.311	D	LS
				1 447.35	871 357–940 449	5–5	2.27−02	7.13−04	1.70−02	−2.448	D	LS
				1 417.35	871 390–941 944	3–3	4.02−02	1.21−03	1.69−02	−2.440	D	LS
				1 448.04	871 390–940 449	3–5	1.51−03	7.91−05	1.13−03	−3.625	E	LS
65		$^3P^\circ-^3P$		*1 558.6*	*877 032–941 190*	9–9	2.34−01	8.54−03	3.94−01	−1.114	D+	1
				1 570.99	876 795–940 449	5–5	1.72−01	6.35−03	1.64−01	−1.498	C	LS
				1 546.53	877 283–941 944	3–3	6.00−02	2.15−03	3.28−02	−2.190	D	LS
				1 534.94	876 795–941 944	5–3	1.02−01	2.17−03	5.48−02	−1.965	D+	LS
				1 530.20	877 283–942 634	3–1	2.48−01	2.90−03	4.38−02	−2.060	D+	LS
				1 583.13	877 283–940 449	3–5	5.59−02	3.50−03	5.47−02	−1.979	D+	LS
				1 550.84	877 463–941 944	1–3	7.93−02	8.58−03	4.38−02	−2.067	D+	LS

TABLE 56. Transition probabilities of allowed lines for Mg V (references for this table are as follows: 1=Butler and Zeippen,[14] 2=Tachiev and Froese Fischer,[100] 3=Tachiev and Froese Fischer,[101] 4=Vilkas *et al.*,[119] and 5=Bogdanovich *et al.*[9])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
66		^{3}S$^\circ$–^{3}P		*1 621.4*	879 515–*941 190*	3–9	7.80−02	9.22−03	1.48−01	−1.558	D+	1
				1 641.12	879 515–940 449	3–5	7.52−02	5.06−03	8.20−02	−1.819	D+	LS
				1 601.82	879 515–941 944	3–3	8.08−02	3.11−03	4.92−02	−2.030	D+	LS
				1 584.31	879 515–942 634	3–1	8.37−02	1.05−03	1.64−02	−2.502	D	LS
67	$2s^22p^3(^2D^\circ)3d$– $2s2p^4(^2D)3d$	^{3}D$^\circ$–^{3}D		*338.67*	*871 298–1 166 574*	15–15	1.29+01	2.22−02	3.71−01	−0.478	D+	1
				[338.62]	871 216–1 166 530	7–7	1.15+01	1.97−02	1.54−01	−0.860	C	LS
				[338.72]	871 357–1 166 590	5–5	8.95+00	1.54−02	8.59−02	−1.114	C	LS
				[338.69]	871 390–1 166 650	3–3	9.71+00	1.67−02	5.59−02	−1.300	D+	LS
				[338.55]	871 216–1 166 590	7–5	2.01+00	2.47−03	1.93−02	−1.762	D	LS
				[338.65]	871 357–1 166 650	5–3	3.23+00	3.33−03	1.86−02	−1.779	D	LS
				[338.78]	871 357–1 166 530	5–7	1.44+00	3.46−03	1.93−02	−1.762	D	LS
				[338.75]	871 390–1 166 590	3–5	1.94+00	5.55−03	1.86−02	−1.779	D	LS
68		^{3}P$^\circ$–^{3}D		*345.37*	*877 032–1 166 574*	9–15	1.76+01	5.23−02	5.35−01	−0.327	C	1
				[345.14]	876 795–1 166 530	5–7	1.76+01	4.40−02	2.50−01	−0.658	C+	LS
				[345.65]	877 283–1 166 590	3–5	1.31+01	3.92−02	1.34−01	−0.930	C	LS
				[345.80]	877 463–1 166 650	1–3	9.71+00	5.22−02	5.94−02	−1.282	D+	LS
				[345.07]	876 795–1 166 590	5–5	4.40+00	7.85−03	4.46−02	−1.406	D+	LS
				[345.58]	877 283–1 166 650	3–3	7.32+00	1.31−02	4.47−02	−1.406	D+	LS
				[345.00]	876 795–1 166 650	5–3	4.89−01	5.24−04	2.98−03	−2.582	E	LS
69	$2s^22p^3(^2P^\circ)3d$– $2s2p^4(^4P)3s$	^{3}P$^\circ$–^{3}P	*2 379*	*2 380*	*899 165–941 1 90*	9–9	1.14−02	9.68−04	6.83−02	−2.060	E+	1
			2 433.5	2 434.3	899 369–940 449	5–5	7.99−03	7.10−04	2.84−02	−2.450	D	LS
			2 325.8	2 326.6	898 962–941 944	3–3	3.06−03	2.48−04	5.70−03	−3.128	E+	LS
			2 348.1	2 348.8	899 369–941 944	5–3	4.94−03	2.45−04	9.47−03	−2.912	E+	LS
			2 289.1	2 289.8	898 962–942 634	3–1	1.28−02	3.35−04	7.58−03	−2.998	E+	LS
			2 409.7	2 410.4	898 962–940 449	3–5	2.74−03	3.98−04	9.47−03	−2.923	E+	LS
			2 314.8	2 315.5	898 757–941 944	1–3	4.13−03	9.95−04	7.58−03	−3.002	E+	LS
70		^{3}D$^\circ$–^{3}P	*2 577*	*2 578*	*902 394–941 190*	15–9	2.29−02	1.37−03	1.75−01	−1.687	D+	1
			2 610.4	2 611.2	902 152–940 449	7–5	1.85−02	1.35−03	8.12−02	−2.025	D+	LS
			2 535.1	2 535.8	902 509–941 944	5–3	1.82−02	1.05−03	4.38−02	−2.280	D+	LS
			2 507.5	2 508.3	902 766–942 634	3–1	2.49−02	7.83−04	1.94−02	−2.629	D	LS
			2 635.0	2 635.7	902 509–940 449	5–5	3.22−03	3.35−04	1.45−02	−2.776	D	LS
			2 551.7	2 552.5	902 766–941 944	3–3	5.91−03	5.77−04	1.45−02	−2.762	D	LS
			2 652.9	2 653.7	902 766–940 449	3–5	2.10−04	3.70−05	9.70−04	−3.955	E	LS
71	$2s^22p^3(^2P^\circ)3d$– $2s2p^4(^2D)3s$	^{3}D$^\circ$–^{3}D		*847.0*	*902 394–1 020 452*	15–15	1.78−01	1.92−03	8.02−02	−1.541	D	1
				844.81	902 152–1 020 522	7–7	1.60−01	1.71−03	3.33−02	−1.922	D	LS
				848.10	902 509–1 020 419	5–5	1.23−01	1.33−03	1.86−02	−2.177	D	LS
				850.49	902 766–1 020 345	3–3	1.32−01	1.43−03	1.20−02	−2.368	E+	LS
				845.54	902 152–1 020 419	7–5	2.80−02	2.14−04	4.17−03	−2.824	E+	LS
				848.64	902 509–1 020 345	5–3	4.43−02	2.87−04	4.01−03	−2.843	E	LS
				847.36	902 509–1 020 522	5–7	1.98−02	2.99−04	4.17−03	−2.825	E+	LS
				849.96	902 766–1 020 419	3–5	2.65−06	4.78−04	4.01−03	−2.843	E	LS
72	$2s^22p^3(^2P^\circ)3d$– $2s2p^4(^2D)3d$	^{3}P$^\circ$–^{3}D		*373.96*	*899 165–1 166 574*	9–15	2.98+00	1.04−02	1.15−01	−1.029	D	1
				[374.31]	899 369–1 166 530	5–7	2.97+00	8.73−03	5.38−02	−1.360	D+	LS
				[373.65]	898 962–1 166 590	3–5	2.24+00	7.80−03	2.88−02	−1.631	D	LS

TABLE 56. Transition probabilities of allowed lines for Mg V (references for this table are as follows: 1=Butler and Zeippen,[14] 2=Tachiev and Froese Fischer,[100] 3=Tachiev and Froese Fischer,[101] 4=Vilkas *et al.*,[119] and 5=Bogdanovich *et al.*[9])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				[373.28]	898 757–1 166 650	1–3	1.66+00	1.04−02	1.28−02	−1.983	E+	LS
				[374.22]	899 369–1 166 590	5–5	7.43−01	1.56−03	9.61−03	−2.108	E+	LS
				[373.57]	898 962–1 166 650	3–3	1.24+00	2.60−03	9.59−03	−2.108	E+	LS
				[374.14]	899 369–1 166 650	5–3	8.26−02	1.04−04	6.40−04	−3.284	E	LS
73		$^3D^\circ-^3D$		*378.53*	*902 394–1 166 574*	15–15	4.66+00	1.00−02	1.87−01	−0.824	D	1
				[378.25]	902 152–1 166 530	7–7	4.15+00	8.90−03	7.76−02	−1.206	D+	LS
				[378.67]	902 509–1 166 590	5–5	3.24+00	6.96−03	4.34−02	−1.458	D+	LS
				[378.95]	902 766–1 166 650	3–3	3.48+00	7.50−03	2.81−02	−1.648	D	LS
				[378.16]	902 152–1 166 590	7–5	7.31−01	1.12−03	9.76−03	−2.106	E+	LS
				[378.59]	902 509–1 166 650	5–3	1.16+00	1.50−03	9.35−03	−2.125	E+	LS
				[378.76]	902 509–1 166 530	5–7	5.18−01	1.56−03	9.73−03	−2.108	E+	LS
				[379.04]	902 766–1 166 590	3–5	6.96−01	2.50−03	9.36−03	−2.125	E+	LS
74	$2s^22p^3(^4S^\circ)4s$– $2s2p^4(^4P)3s$	$^3S^\circ-^3P$	*3 284*	*3 285*	910 750–*941 190*	3–9	2.85−02	1.38−02	4.48−01	−1.383	C	1
			3 366.1	3 367.1	910 750–940 449	3–5	2.64−02	7.48−03	2.49−01	−1.649	C+	LS
			3 204.8	3 205.7	910 750–941 944	3–3	3.06−02	4.72−03	1.49−01	−1.849	C	LS
			3 135.5	3 136.4	910 750–942 634	3–1	3.28−02	1.61−03	4.99−02	−2.316	D+	LS
75	$2s2p^4(^4P)3s$– $2s^22p^3(^2D^\circ)4s$	$^3P-^3D^\circ$	*4 783*	*4 784*	*941 190–962 092*	9–15	2.09−02	1.20−02	1.69+00	−0.967	C+	1
			4 622.8	4 624.1	940 449–962 075	5–7	2.32−02	1.04−02	7.92−01	−1.284	B	LS
			4 959.2	4 960.6	941 944–962 103	3–5	1.41−02	8.65−03	4.24−01	−1.586	C+	LS
			5 132.0	5 133.5	942 634–962 114	1–3	9.37−03	1.11−02	1.88−01	−1.955	C	LS
			4 616.8	4 618.1	940 449–962 103	5–5	5.82−03	1.86−03	1.41−01	−2.032	C	LS
			4 956.5	4 957.9	941 944–962 114	3–3	7.82−03	2.88−03	1.41−01	−2.063	C	LS
			4 614.4	4 615.7	940 449–962 114	5–3	6.47−04	1.24−04	9.42−03	−3.208	E+	LS
76	$2s2p^4(^4P)3s$– $2s^22p^3(^4S^\circ)4d$	$^3P-^3D^\circ$	*4 708*	*4 709*	*941 190–962 425*	9–15	2.19−02	1.22−02	1.70+00	−0.959	C+	1
			4 545.0	4 546.3	940 449–962 445	5–7	2.44−02	1.06−02	7.93−01	−1.276	B	LS
			4 885.5	4 886.9	941 944–962 407	3–5	1.47−02	8.78−03	4.24−01	−1.579	C+	LS
			5 056.0	5 057.4	942 634–962 407	1–3	9.82−03	1.13−02	1.88−01	−1.947	C	LS
			4 552.9	4 554.1	940 449–962 407	5–5	6.05−03	1.88−03	1.41−01	−2.027	C	LS
			4 885.5	4 886.9	941 944–962 407	3–3	8.18−03	2.93−03	1.41−01	−2.056	C	LS
			4 552.9	4 554.1	940 449–962 407	5–3	6.75−04	1.26−04	9.45−03	−3.201	E+	LS
77	$2s2p^4(^4P)3s$– $2s^22p^3(^2P^\circ)4s$	$^3P-^3P^\circ$	*2 023*	*2 024*	*941 190–990 600*	9–9	3.36−01	2.07−02	1.24+00	−0.730	C	1
				[1 994]	940 449–990 600	5–5	2.63−01	1.57−02	5.15−01	−1.105	C+	LS
			[2 055]	[2 055]	941 944–990 600	3–3	8.04−02	5.09−03	1.03−01	−1.816	C	LS
				[1 994]	940 449–990 600	5–3	1.47−01	5.25−03	1.72−01	−1.581	C	LS
			[2 055]	[2 055]	941 944–990 600	3–1	3.22−01	6.79−03	1.38−01	−1.691	C	LS
			[2 055]	[2 055]	941 944–990 600	3–5	8.04−02	8.49−03	1.72−01	−1.594	C	LS
			[2 084]	[2 084]	942 634–990 600	1–3	1.03−01	2.01−02	1.38−01	−1.697	C	LS
78	$2s2p^4(^4P)3s$– $2s^22p^3(^2D^\circ)4d$	$^3P-^3D^\circ$		*1 375.8*	*941 190–1 013 877*	9–15	4.74−01	2.24−02	9.13−01	−0.696	C	1
				1 362.58	940 449–1 013 839	5–7	4.88−01	1.90−02	4.26−01	−1.022	C+	LS
				1 389.80	941 944–1 013 897	3–5	3.44−01	1.66−02	2.28−01	−1.303	C	LS
				1 402.58	942 634–1 013 931	1–3	2.49−01	2.20−02	1.02−01	−1.658	C	LS
				1 361.51	940 449–1 013 897	5–5	1.22−01	3.40−03	7.62−02	−1.770	D+	LS
				1 389.14	941 944–1 013 931	3–3	1.92−01	5.55−03	7.61−02	−1.779	D+	LS
				1 360.88	940 449–1 013 931	5–3	1.36−02	2.27−04	5.08−03	−2.945	E+	LS

TABLE 56. Transition probabilities of allowed lines for Mg V (references for this table are as follows: 1=Butler and Zeippen,[14] 2=Tachiev and Froese Fischer,[100] 3=Tachiev and Froese Fischer,[101] 4=Vilkas *et al.*,[119] and 5=Bogdanovich *et al.*[9])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	$E_i - E_k$ (cm^{-1})	$g_i - g_k$	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
79		$^3P-{}^3P^\circ$				9–9						1
				1 295.82	940 449–1 017 620	5–5	2.94+00	7.39−02	1.58+00	−0.432	B+	LS
				1 314.82	941 944–1 018 000	3–3	9.38−01	2.43−02	3.16−01	−1.137	C+	LS
				1 289.47	940 449–1 018 000	5–3	1.65+00	2.47−02	5.24−01	−0.908	C+	LS
				1 321.42	941 944–1 017 620	3–5	9.24−01	4.03−02	5.26−01	−0.918	C+	LS
				1 326.86	942 634–1 018 000	1–3	1.21+00	9.62−02	4.20−01	−1.017	C+	LS
80	$2s2p^4(^4P)3s$– $2s^22p^3(^4S^\circ)5d$?	$^3P-{}^3D^\circ$?		*[1 168]*	*941 190–1 026 780*	9–15	3.37−01	1.15−02	3.98−01	−0.985	C	1
				1 158.33	940 449–1 026 780	5–7	3.46−01	9.73−03	1.86−01	−1.313	C	LS
				1 178.74	941 944–1 026 780	3–5	2.46−01	8.54−03	9.94−02	−1.591	C	LS
				1 188.41	942 634–1 026 780	1–3	1.78−01	1.13−02	4.42−02	−1.947	D+	LS
				1 158.33	940 449–1 026 780	5–5	8.65−02	1.74−03	3.32−02	−2.060	D	LS
				1 178.74	941 944–1 026 780	3–3	1.37−01	2.85−03	3.32−02	−2.068	D	LS
				1 158.33	940 449–1 026 780	5–3	9.61−03	1.16−04	2.21−03	−3.237	E	LS
81	$2s2p^4(^4P)3s$– $2s^22p^3(^2P^\circ)4d$?	$^3P-{}^3P^\circ$?				9–9						1
				977.03	940 449–1 042 800	5–5	5.03−01	7.20−03	1.16−01	−1.444	C	LS
				993.78	941 944–1 042 570	3–3	1.59−01	2.36−03	2.32−02	−2.150	D	LS
				979.23	940 449–1 042 570	5–3	2.77−01	2.39−03	3.85−02	−1.923	D+	LS
				991.51	941 944–1 042 800	3–5	1.60−01	3.94−03	3.86−02	−1.927	D+	LS
				1 000.64	942 634–1 042 570	1–3	2.08−01	9.37−03	3.09−02	−2.028	D	LS
82		$^3P-{}^3D^\circ$?		*[974]*	*941 190–1 043 860*	9–15	7.83−01	1.86−02	5.36−01	−0.776	C	1
				967.02	940 449–1 043 860	5–7	8.00−01	1.57−02	2.50−01	−1.105	C+	LS
				981.20	941 944–1 043 860	3–5	5.74−01	1.38−02	1.34−01	−1.383	C	LS
				987.89	942 634–1 043 860	1–3	4.17−01	1.83−02	5.95−02	−1.738	D+	LS
				967.02	940 449–1 043 860	5–5	2.00−01	2.81−03	4.47−02	−1.852	D+	LS
				981.20	941 944–1 043 860	3–3	3.19−01	4.61−03	4.47−02	−1.859	D+	LS
				967.02	940 449–1 043 860	5–3	2.22−02	1.87−04	2.98−03	−3.029	E	LS
83	$2s2p^4(^4P)3s$– $2s^22p^3(^2D^\circ)5d$?	$^3P-{}^3P^\circ$?				9–9						1
				707.06	940 449–1 081 880	5–5	2.74−01	2.05−03	2.39−02	−1.989	D	LS
				714.61	941 944–1 081 880	3–3	8.82−02	6.75−04	4.76−03	−2.694	E+	LS
				707.06	940 449–1 081 880	5–3	1.52−01	6.82−04	7.94−03	−2.467	E+	LS
				714.61	941 944–1 081 880	3–5	8.78−02	1.12−03	7.90−03	−2.474	E+	LS
				718.15	942 634–1 081 880	1–3	1.16−01	2.69−03	6.36−03	−2.570	E+	LS
84	$2s^22p^3(^2P^\circ)4s$– $2s2p^4(^2D)3s$	$^3P^\circ-{}^3D$	*3 349*	*3 350*	*990 600–1 020 452*	9–15	2.86−01	8.01−02	7.95+00	−0.142	B+	1
			[3 341]	[3 342]	990 600–1 020 522	5–7	2.88−01	6.74−02	3.71+00	−0.472	B+	LS
			[3 353]	[3 354]	990 600–1 020 419	3–5	2.14−01	6.00−02	1.99+00	−0.745	B+	LS
			[3 361]	[3 362]	990 600–1 020 345	1–3	1.57−01	7.98−02	8.83−01	−1.098	B	LS
			[3 353]	[3 354]	990 600–1 020 419	5–5	7.12−02	1.20−02	6.62−01	−1.222	B	LS
			[3 361]	[3 362]	990 600–1 020 345	3–3	1.17−01	1.99−02	6.61−01	−1.224	B	LS
			[3 361]	[3 362]	990 600–1 020 345	5–3	7.85−03	7.98−04	4.42−02	−2.399	D+	LS
85	$2s^22p^3(^2P^\circ)4s$– $2s2p^4(^4P)3d$?	$^3P^\circ-{}^3D$?		*[1 184]*	*990 600–1 075 090*	9–15	1.28−01	4.48−03	1.57−01	−1.394	D+	1
				[1 183.6]	990 600–1 075 090	5–7	1.28−01	3.76−03	7.33−02	−1.726	D+	LS
				[1 183.6]	990 600–1 075 090	3–5	9.60−02	3.36−03	3.93−02	−1.997	D+	LS
				[1 183.6]	990 600–1 075 090	1–3	7.11−02	4.48−03	1.75−02	−2.349	D	LS

TABLE 56. Transition probabilities of allowed lines for Mg V (references for this table are as follows: 1 = Butler and Zeippen,[14] 2 = Tachiev and Froese Fischer,[100] 3 = Tachiev and Froese Fischer,[101] 4 = Vilkas *et al.*,[119] and 5 = Bogdanovich *et al.*[9])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})$^{\mathrm{a}}$	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				[1 183.6]	990 600–1 075 090	5–5	3.20−02	6.72−04	1.31−02	−2.474	E+	LS
				[1 183.6]	990 600–1 075 090	3–3	5.33−02	1.12−03	1.31−02	−2.474	E+	LS
				[1 183.6]	990 600–1 075 090	5–3	3.56−03	4.48−05	8.73−04	−3.650	E	LS
86	$2s^22p^3(^2\mathrm{D}^\circ)4d$– $2s2p^4(^2\mathrm{D})3s$	$^3\mathrm{D}^\circ$–$^3\mathrm{D}$	*15 200*	*15 209*	*1 013 877–1 020 452*	15–15	5.27−04	1.83−03	1.37+00	−1.561	C+	1
			14 959	14 963	1 013 839–1 020 522	7–7	4.92−04	1.65−03	5.69−01	−1.937	B	LS
			15 329	15 333	1 013 897–1 020 419	5–5	3.57−04	1.26−03	3.18−01	−2.201	C+	LS
			15 587	15 591	1 013 931–1 020 345	3–3	3.68−04	1.34−03	2.06−01	−2.396	C	LS
			15 193	15 198	1 013 839–1 020 419	7–5	8.25−05	2.04−04	7.14−02	−2.845	D+	LS
			15 504	15 509	1 013 897–1 020 345	5–3	1.24−04	2.69−04	6.87−02	−2.871	D+	LS
			15 090	15 094	1 013 897–1 020 522	5–7	6.02−05	2.88−04	7.16−02	−2.842	D+	LS
			15 409	15 413	1 013 931–1 020 419	3–5	7.61−05	4.52−04	6.88−02	−2.868	D+	LS
87		$^3\mathrm{P}^\circ$–$^3\mathrm{D}$				9–15						1
				2 902 cm^{-1}	1 017 620–1 020 522	5–7	1.42−05	3.54−04	2.01−01	−2.752	C	LS
				2 419 cm^{-1}	1 018 000–1 020 419	3–5	6.16−06	2.63−04	1.07−01	−3.103	C	LS
				2 799 cm^{-1}	1 017 620–1 020 419	5–5	3.18−06	6.09−05	3.58−02	−3.516	D	LS
				2 345 cm^{-1}	1 018 000–1 020 345	3–3	3.12−02	8.51−05	3.58−02	−3.593	D	LS
				2 725 cm^{-1}	1 017 620–1 020 345	5–3	3.26−07	3.95−06	2.39−03	−4.704	E	LS
88	$2s^22p^3(^2\mathrm{D}^\circ)4d$– $2s2p^4(^4\mathrm{P})3d$?	$^3\mathrm{P}^\circ$–$^3\mathrm{D}$?				9–15						1
				1 740.04	1 017 620–1 075 090	5–7	4.78−01	3.04−02	8.71−01	−0.818	B	LS
				1 751.62	1 018 000–1 075 090	3–5	3.52−01	2.70−02	4.67−01	−1.092	C+	LS
				1 740.04	1 017 620–1 075 090	5–5	1.20−01	5.44−03	1.56−01	−1.565	C	LS
				1 751.62	1 018 000–1 075 090	3–3	1.96−01	9.00−03	1.56−01	−1.569	C	LS
				1 740.04	1 017 620–1 075 090	5–3	1.33−02	3.62−04	1.04−02	−2.742	E+	LS
89	$2s^22p^3(^2\mathrm{D}^\circ)4d$– $2s2p^4(^2\mathrm{D})3d$	$^3\mathrm{P}^\circ$–$^3\mathrm{D}$				9–15						1
				[671.5]	1 017 620–1 166 530	5–7	2.42−01	2.29−03	2.53−02	−1.941	D	LS
				[673.0]	1 018 000–1 166 590	3–5	1.80−01	2.04−03	1.36−02	−2.213	D	LS
				[671.3]	1 017 620–1 166 590	5–5	6.05−02	4.09−04	4.52−03	−2.689	E+	LS
				[672.7]	1 018 000–1 166 650	3–3	1.00−01	6.81−04	4.52−03	−2.690	E+	LS
				[671.0]	1 017 620–1 166 650	5–3	6.74−03	2.73−05	3.02−04	−3.865	E	LS
90	$2s2p^4(^2\mathrm{D})3s$– $2s^22p^3(^4\mathrm{S}^\circ)5d$?	$^3\mathrm{D}$–$^3\mathrm{D}^\circ$?	*[15 800]*	*[15 803]*	*1 020 452–1 026 780*	15–15	5.17−05	1.94−04	1.51−01	−2.536	D	1
			15 975	15 980	1 020 522–1 026 780	7–7	4.44−05	1.70−04	6.26−02	−2.924	D+	LS
			15 717	15 721	1 020 419–1 026 780	5–5	3.64−05	1.35−04	3.49−02	−3.171	D	LS
			15 536	15 540	1 020 345–1 026 780	3–3	4.09−05	1.48−04	2.27−02	−3.353	D	LS
			15 975	15 980	1 020 522–1 026 780	7–5	7.79−06	2.13−05	7.84−03	−3.827	E+	LS
			15 717	15 721	1 020 419–1 026 780	5–3	1.31−05	2.92−05	7.56−03	−3.836	E+	LS
			15 717	15 721	1 020 419–1 026 780	5–7	5.84−02	3.03−05	7.84−03	−3.820	E+	LS
			15 536	15 540	1 020 345–1 026 780	3–5	8.15−06	4.92−05	7.55−03	−3.831	E+	LS
91	$2s2p^4(^2\mathrm{D})3s$– $2s^22p^3(^2\mathrm{P}^\circ)4d$?	$^3\mathrm{D}$–$^3\mathrm{P}^\circ$?				15–9						1
			4 487.5	4 488.7	1 020 522–1 042 800	7–5	2.47−03	5.34−04	5.52−02	−2.427	D+	LS
			4 513.2	4 514.5	1 020 419–1 042 570	5–3	2.18−03	3.99−04	2.97−02	−2.700	D	LS
			4 466.8	4 468.1	1 020 419–1 042 800	5–5	4.48−04	1.34−04	9.86−03	−3.174	E+	LS
			4 498.2	4 499.4	1 020 345–1 042 570	3–3	7.31−04	2.22−04	9.87−03	−3.177	E+	LS
			4 452.1	4 453.4	1 020 345–1 042 800	3–5	3.03−05	1.50−05	6.60−04	−4.347	E	LS

TABLE 56. Transition probabilities of allowed lines for Mg V (references for this table are as follows: 1=Butler and Zeippen,[14] 2=Tachiev and Froese Fischer,[100] 3=Tachiev and Froese Fischer,[101] 4=Vilkas *et al.*,[119] and 5=Bogdanovich *et al.*[9])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
92		^{3}D$-^3$D$^\circ$?	*[4 271]*	*[4 272]*	*1 020 452–1 043 860*	15–15	3.40−02	9.31−03	1.96+00	−0.855	C+	1
			4 283.7	4 284.9	1 020 522–1 043 860	7–7	3.00−02	8.25−03	8.15−01	−1.238	B	LS
			4 264.8	4 266.0	1 020 419–1 043 860	5–5	2.38−02	6.49−03	4.56−01	−1.489	C+	LS
			4 251.4	4 252.6	1 020 345–1 043 860	3–3	2.59−02	7.01−03	2.94−01	−1.677	C+	LS
			4 283.7	4 284.9	1 020 522–1 043 860	7–5	5.24−03	1.03−03	1.02−01	−2.142	C	LS
			4 264.8	4 266.0	1 020 419–1 043 860	5–3	8.55−03	1.40−03	9.83−02	−2.155	C	LS
			4 264.8	4 266.0	1 020 419–1 043 860	5–7	3.80−03	1.45−03	1.02−01	−2.140	C	LS
			4 251.4	4 252.6	1 020 345–1 043 860	3–5	5.18−03	2.34−03	9.83−02	−2.154	C	LS
93	$2s2p^4(^2\mathrm{D})3s-$ $2s^22p^3(^2\mathrm{D}^\circ)5d$?	^{3}D$-^3$P$^\circ$?				15–9						1
				1 629.78	1 020 522–1 081 880	7–5	6.96−01	1.98−02	7.44−01	−0.858	B	LS
				1 627.05	1 020 419–1 081 880	5–3	6.26−01	1.49−02	3.99−01	−1.128	C+	LS
				1 627.05	1 020 419–1 081 880	5–5	1.25−01	4.95−03	1.33−01	−1.606	C	LS
				1 625.09	1 020 345–1 081 880	3–3	2.09−01	8.26−03	1.33−01	−1.606	C	LS
				1 625.09	1 020 345–1 081 880	3–5	8.35−03	5.51−04	8.84−03	−2.782	E+	LS
94	$2s^22p^3(^2\mathrm{P}^\circ)4d$?$-$ $2s2p^4(^4\mathrm{P})3d$?	^{3}P$^\circ$?$-^3$D?				9–15						1
			3 096.0	3 096.9	1 042 800–1 075 090	5–7	3.36−03	6.77−04	3.45−02	−2.470	D	LS
			3 074.1	3 075.0	1 042 570–1 075 090	3–5	2.58−03	6.09−04	1.85−02	−2.738	D	LS
			3 096.0	3 096.9	1 042 800–1 075 090	5–5	8.42−04	1.21−04	6.17−03	−3.218	E+	LS
			3 074.1	3 075.0	1 042 570–1 075 090	3–3	1.43−03	2.03−04	6.17−03	−3.215	E+	LS
			3 096.0	3 096.9	1 042 800–1 075 090	5–3	9.34−05	8.06−06	4.11−04	−4.395	E	LS

[a] Wavelengths (Å) are always given unless cm^{-1} is indicated.

11.5.3. Forbidden Transitions for Mg V

The Tachiev and Froese Fischer[96] results are the product of extensive MCHF calculations with Breit-Pauli corrections to order α^2, with energy corrections. Gaigalas *et al.*[39] used a second-order MBPT to compute transition rates. As part of the Iron Project, Galavis *et al.*[40] used the SUPERSTRUCTURE code with configuration interaction, relativistic effects, and semiempirical energy corrections.

To estimate accuracies, we pooled the relative standard deviation of the mean (RSDM) of each of the lines for which a transition rate is quoted by two or more references,[39,40,92,96] as discussed in the general introduction. However, Gaigalas *et al.*[39] and Galavis *et al.*[40] contain only data for transitions from energy levels below 400 000 cm^{-1}. To estimate the accuracy of lines from higher-lying levels of Tachiev and Froese Fischer,[92] we isoelectronically averaged the logarithmic quality factors (see Sec. 4.1 of the Introduction) observed for lines from the lower-lying levels of O-like ions of Na, Mg, and Si and scaled them for lines from high-lying levels, as described in the introduction. Thus the listed accuracies for these higher-lying transitions are less well established than for those from lower levels.

11.5.4. References for Forbidden Transitions for Mg V

[39] G. Gaigalas, J. Kaniauskas, R. Kisielius, G. Merkelis, and M. J. Vilkas, Phys. Scr. **49**, 135 (1994).
[40] M. E. Galavis, C. Mendoza, and C. J. Zeippen, Astron. Astrophys., Suppl. Ser. **123**, 159 (1997).
[89] G. Tachiev and C. Froese Fischer, Astron. Astrophys. **385**, 716 (2002).
[92] G. Tachiev and C. Froese Fischer, http://www.vuse.vanderbilt.edu/~cff/mchf_collection/ (MCHF, *ab initio*, downloaded on Mar. 28, 2002). Tachiev and Froese Fischer (See Ref. 89).
[96] G. Tachiev and C. Froese Fischer, http://www.vuse.vanderbilt.edu/~cff/mchf_collection/ (MCHF, energy adjusted, downloaded on Sept. 3, 2003). See Tachiev and Froese Fischer (Ref. 89).

TABLE 57. Wavelength finding list for forbidden lines for Mg V

Wavelength (vac) (Å)	Mult. No.
130.783	17
131.088	17
132.163	16
132.176	16
132.180	16
132.475	16
132.488	16
132.605	16
135.953	14
136.284	14

TABLE 57. Wavelength finding list for forbidden lines for Mg V—Continued

Wavelength (vac) (Å)	Mult. No.
136.421	14
137.404	13
137.407	13
137.411	13
137.741	13
137.745	13
137.749	13
137.885	13
138.751	18
138.766	18
138.770	18
144.539	15
144.543	15
144.547	15
146.083	12
146.465	12
147.197	19
150.836	10
151.243	10
159.478	11
224.937	23
224.946	23
224.957	23
225.757	23
225.767	23
225.778	23
226.209	23
226.218	23
251.584	6
252.717	6
263.326	22
276.582	8
350.003	5
351.089	5
353.092	5
353.300	5
355.329	5
356.264	5
400.343	7
401.764	7
404.390	7
485.594	9
875.12	21
887.68	21
894.69	21
1 294.01	3
1 324.58	3

Wavelength (air) (Å)	Mult. No.
2 417.5	4
2 711.8	26
2 713.2	26
2 782.7	2
2 928.0	2
2 992.8	2
3 459.3	25
3 461.9	25
3 464.1	25
3 470.9	25
3 473.2	25
3 475.7	25
4 739.1	27
4 756.0	27

Wavenumber (cm^{-1})	Multi. No.
2 521.8	1
2 499.7	20
1 783.1	1
1 616.0	20
883.7	20
738.7	1
75	28

TABLE 58. Transition probabilities of forbidden lines for Mg V (reference for this table are as follow: 1=Tachiev and Froese Fischer,[96] 2=Tachiev and Froese Fischer,[92] 3=Gaigalas *et al.*,[39] and 4=Galavis *et al.*[40])

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	Type	A_{ki} (s^{-1})	S (a.u.)	Acc.	Source
1	$2p^4-2p^4$	$^3P-^3P$									
				2 521.8 cm^{-1}	0.0–2 521.8	5–1	E2	9.74−07	8.52−02	B+	1,3,4
				1 783.1 cm^{-1}	0.0–1 783.1	5–3	M1	1.27−01	2.50+00	A	1,3,4
				1 783.1 cm^{-1}	0.0–1 783.1	5–3	E2	1.28−07	1.90−01	B+	1,3
				738.7 cm^{-1}	1 783.1–2 521.8	3–1	M1	2.19−02	2.01+00	A	1,3,4
2		$^3P-^1D$									
			2 992.8	2 993.6	2 521.8–35 926	1–5	E2	5.20−05	5.58−05	C+	1,3,4
			2 928.0	2 928.9	1 783.1–35 926	3–5	M1	5.36−01	2.50−03	B	1,3,4
			2 928.0	2 928.9	1 783.1–35 926	3–5	E2	1.99−04	1.92−04	C+	1,3
			2 782.7	2 783.5	0.0–35 926	5–5	M1	1.87+00	7.49−03	B	1,3,4
			2 782.7	2 783.5	0.0–35 926	5–5	E2	1.71−03	1.28−03	B	1,3
3		$^3P-^1S$									
				1 294.01	0.0–77 279	5–1	E2	2.46−02	7.98−05	C+	1,3,4
				1 324.58	1 783.1–77 279	3–1	M1	2.15+01	1.85−03	B	1,3,4
4		$^1D-^1S$									
			2 417.5	2 418.2	35 926–77 279	5–1	E2	4.09+00	3.02−01	B+	1,3,4
5	$2s^22p^4-2s2p^5$	$^3P-^3P^{\circ}$									
				353.092	0.0–283 212.3	5–5	M2	6.60+00	1.22+01	B	2
				353.300	1 783.1–284 828.3	3–3	M2	4.31+00	4.77+00	B	2
				350.003	0.0–285 712.0	5–1	M2	4.13+00	1.45+00	B	2
				351.089	0.0–284 828.3	5–3	M2	4.79−03	5.14−03	C	2
				355.329	1 783.1–283 212.3	3–5	M2	5.70−04	1.08−03	D+	2
				356.264	2 521.8–283 212.3	1–5	M2	9.14−01	1.76+00	B	2
6		$^3P-^1P^{\circ}$									
				252.717	1 783.1–397 482	3–3	M2	1.09+01	2.26+00	B	2
				251.584	0.0–397 482	5–3	M2	3.22+01	6.54+00	B	2
7		$^1D-^3P^{\circ}$									
				400.343	35 926–285 712.0	5–1	M2	4.25+00	2.93+00	B	2
				401.764	35 926–284 828.3	5–3	M2	2.98+00	6.28+00	B	2
				404.390	35 926–283 212.3	5–5	M2	1.22+00	4.43+00	B	2
8		$^1D-^1P^{\circ}$									
				276.582	35 926–397 482	5–3	M2	3.72−01	1.21−01	C+	2
9		$^1S-^3P^{\circ}$									
				485.594	77 279–283 212.3	1–5	M2	5.52−01	5.00+00	B	2
10	$2s^22p^4-2p^6$	$^3P-^1S$									
				150.836	0.0–662 970	5–1	E2	3.57+02	2.49−05	C	2,3
				151.243	1 783.1–662 970	3–1	M1	3.15+01	4.04−06	E	2,3
11		$^1D-^1S$									
				159.478	35 926–662 970	5–1	E2	2.74+05	2.52−02	B	2,3
12	$2p^4-2p^3(^4S^{\circ})3s$	$^3P-^3S^{\circ}$									
				146.083	0.0–684 541	5–3	M2	1.43+01	1.92−01	D	2
				146.465	1 783.1–684 541	3–3	M2	4.49+00	6.10−02	E+	2
13	$2p^4-2p^3(^2D^{\circ})3s$	$^3P-^3D^{\circ}$									
				137.749	1 783.1–727 742	3–7	M2	1.54+01	3.59−01	D+	2
				137.885	2 521.8–727 763	1–5	M2	1.42+01	2.37−01	D+	2
				137.411	0.0–727 742	5–7	M2	3.22+01	7.41−01	C	2
				137.745	1 783.1–727 763	3–5	M2	1.70+01	2.82−01	D+	2
				137.407	0.0–727 763	5–5	M2	5.76−01	9.47−03	E	2
				137.741	1 783.1–727 782	3–3	M2	6.04+00	6.02−02	E+	2

TABLE 58. Transition probabilities of forbidden lines for Mg V (reference for this table are as follow: 1=Tachiev and Froese Fischer,[96] 2=Tachiev and Froese Fischer,[92] 3=Gaigalas *et al.*,[39] and 4=Galavis *et al.*[40])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	Type	A_{ki} (s^{-1})	S (a.u.)	Acc.	Source
				137.404	0.0–727 782	5–3	M2	7.27+00	7.17−02	D	2
14		$^3\mathrm{P}-{}^1\mathrm{D}^\circ$									
				136.421	2 521.8–735 546	1–5	M2	7.66+00	1.21−01	D	2
				136.284	1 783.1–735 546	3–5	M2	2.00+01	3.15−01	D+	2
				135.953	0.0–735 546	5–5	M2	1.95+01	3.04−01	D+	2
15		$^1\mathrm{D}-{}^3\mathrm{D}^\circ$									
				144.543	35 926–727 763	5–5	M2	4.75+01	1.01+00	C	2
				144.539	35 926–727 782	5–3	M2	2.03+01	2.57−01	D+	2
				144.547	35 926–727 742	5–7	M2	5.36+01	1.59+00	C	2
16	$2p^4-2p^3(^2\mathrm{P}^\circ)3s$	$^3\mathrm{P}-{}^3\mathrm{P}^\circ$									
				132.163	0.0–756 641	5–5	M2	5.84+01	7.89−01	C	2
				132.488	1 783.1–756 566	3–3	M2	4.81+01	3.95−01	D+	2
				132.180	0.0–756 545	5–1	M2	4.49+01	1.22−01	D	2
				132.176	0.0–756 566	5–3	M2	5.63−02	4.57−04	E	2
				132.475	1 783.1–756 641	3–5	M2	5.26−02	7.19−04	E	2
				132.605	2 521.8–756 641	1–5	M2	1.18+01	1.62−01	D	2
17		$^3\mathrm{P}-{}^1\mathrm{P}^\circ$									
				131.088	1 783.1–764 628	3–3	M2	2.06+01	1.61−01	D	2
				130.783	0.0–764 628	5–3	M2	6.18+01	4.76−01	D+	2
18		$^1\mathrm{D}-{}^3\mathrm{P}^\circ$									
				138.770	35 926–756 545	5–1	M2	6.91+01	2.39−01	D+	2
				138.766	35 926–756 566	5–3	M2	4.69+01	4.85−01	D+	2
				138.751	35 926–756 641	5–5	M2	1.73+01	2.98−01	D+	2
19		$^1\mathrm{S}-{}^3\mathrm{P}^\circ$									
				147.197	77 279–756 641	1–5	M2	2.74+01	6.36−01	C	2
20	$2s2p^5-2s2p^5$	$^3\mathrm{P}^\circ-{}^3\mathrm{P}^\circ$									
				2 499.7 cm^{-1}	283 212.3–285 712.0	5–1	E2	9.03−07	8.26−02	B	3
				1 616.0 cm^{-1}	283 212.3–284 828.3	5–3	M1	9.57−02	2.52+00	A	2,3
				1 616.0 cm^{-1}	283 212.3–284 828.3	5–3	E2	7.79−08	1.89−01	B	3
				883.7 cm^{-1}	284 828.3–285 712.0	3–1	M1	3.70−02	1.99+00	A	2,3
21		$^3\mathrm{P}^\circ-{}^1\mathrm{P}^\circ$									
				887.68	284 828.3–397 482	3–3	M1	1.95+00	1.52−04	C+	2,3
				887.68	284 828.3–397 482	3–3	E2	4.44−02	6.56−05	C	3
				875.12	283 212.3–397 482	5–3	M1	3.39+00	2.53−04	C+	2,3
				875.12	283 212.3–397 482	5–3	E2	1.40−02	1.93−05	C	3
				894.69	285 712.0–397 482	1–3	M1	2.54+00	2.02−04	C+	2,3
22	$2s2p^5-2p^6$	$^3\mathrm{P}^\circ-{}^1\mathrm{S}$									
				263.326	283 212.3–662 970	5–1	M2	9.02+01	7.66+00	B	2
23	$2s2p^5-$ $2s^22p^3(^2\mathrm{D}^\circ)3s$	$^3\mathrm{P}^\circ-{}^3\mathrm{D}^\circ$									
				225.778	284 828.3–727 742	3–7	E2	1.56+03	5.73−03	D	2
				226.218	285 712.0–727 763	1–5	E2	1.44+03	3.80−03	E+	2
				224.957	283 212.3–727 742	5–7	M1	2.55−04	7.55−10	E	2
				224.957	283 212.3–727 742	5–7	E2	3.16+03	1.14−02	D	2
				225.767	284 828.3–727 763	3–5	M1	1.59−05	3.38−11	E	2
				225.767	284 828.3–727 763	3–5	E2	3.08+02	8.07−04	E	2
				226.209	285 712.0–727 782	1–3	M1	4.01−05	5.17−11	E	2
				224.946	283 212.3–727 763	5–5	M1	6.75−04	1.42−09	E	2
				224.946	283 212.3–727 763	5–5	E2	2.98+03	7.66−03	D	2
				225.757	284 828.3–727 782	3–3	M1	3.35−04	4.29−10	E	2

TABLE 58. Transition probabilities of forbidden lines for Mg V (reference for this table are as follow: 1 = Tachiev and Froese Fischer,[96] 2 = Tachiev and Froese Fischer,[92] 3 = Gaigalas *et al.*,[39] and 4 = Galavis *et al.*[40])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	Type	A_{ki} (s^{-1})	S (a.u.)	Acc.	Source
				225.757	284 828.3–727 782	3–3	E2	3.38+03	5.30−03	D	2
				224.937	283 212.3–727 782	5–3	M1	2.75−04	3.47−10	E	2
				224.937	283 212.3–727 782	5–3	E2	1.34+03	2.07−03	E+	2
24	$2p^3(^2\mathrm{D}^\circ)3s$– $2p^3(^2\mathrm{D}^\circ)3s$	$^3\mathrm{D}^\circ-{}^3\mathrm{D}^\circ$									
				21 cm^{-1}	727 742–727 763	7–5	M1	2.32−07	4.65+00	B+	2
				19 cm^{-1}	727 763–727 782	5–3	M1	2.77−07	4.49+00	B+	2
25	$2p^3(^2\mathrm{D}^\circ)3s$– $2p^3(^2\mathrm{P}^\circ)3s$	$^3\mathrm{D}^\circ-{}^3\mathrm{P}^\circ$									
			3 459.3	3 460.3	727 742–756 641	7–5	M1	1.77+00	1.36−02	D	2
			3 470.9	3 471.9	727 763–756 566	5–3	M1	7.08−05	3.30−07	E	2
			3 475.7	3 476.7	727 782–756 545	3–1	M1	2.08+00	3.24−03	E+	2
			3 461.9	3 462.8	727 763–756 641	5–5	M1	1.26+00	9.69−03	D	2
			3 473.2	3 474.2	727 782–756 566	3–3	M1	2.07+00	9.65−03	D	2
			3 464.1	3 465.1	727 782–756 641	3–5	M1	3.36−01	2.59−03	E+	2
26		$^3\mathrm{D}^\circ-{}^1\mathrm{P}^\circ$									
			2 711.8	2 712.6	727 763–764 628	5–3	M1	3.98+00	8.84−03	D	2
			2 713.2	2 714.0	727 782–764 628	3–3	M1	1.35+00	3.01−03	E+	2
27		$^1\mathrm{D}^\circ-{}^3\mathrm{P}^\circ$									
			4 756.0	4 757.4	735 546–756 566	5–3	M1	7.70−01	9.22−03	D	2
			4 739.1	4 740.5	735 546–756 641	5–5	M1	1.39+00	2.75−02	D+	2
28	$2p^3(^2\mathrm{P}^\circ)3s$– $2p^3(^2\mathrm{P}^\circ)3s$	$^3\mathrm{P}^\circ-{}^3\mathrm{P}^\circ$									
				75 cm^{-1}	756 566–756 641	3–5	M1	5.67−06	2.49+00	B	2
				21 cm^{-1}	756 545–756 566	1–3	M1	1.66−07	2.00+00	B	2

[a] Wavelengths (Å) are always given unless cm^{-1} is indicated.

11.6. Mg VI

Nitrogen isoelectronic sequence
Ground state: $1s^22s^22p^3\ {}^4S^{\mathrm{o}}_{3/2}$
Ionization energy: 186.76 eV = 1 506 300 cm^{-1}

11.6.1. Allowed Transitions for Mg VI

Only OP (Ref. 11) results were available for energy levels above the $2p^23d$. Wherever available we have used the data of Tachiev and Froese Fischer,[99] which are the product of extensive MCHF calculations with Breit-Pauli corrections to order α^2. Also we found the MBPT calculations of Merkelis *et al.*[65] to agree very well with those of Tachiev and Froese Fischer,[99] though only transitions from low-lying energy levels were available.

To estimate accuracies, we pooled the relative standard deviation of the mean (RSDM) for each of the lines with transition rates published in two or more references,[11,65,95,99] as described in the general introduction (data from Tachiev and Froese Fischer[95] are cited only for lines not listed in Tachiev and Froese Fischer[99]). For this purpose the spin-allowed (non-OP) and intercombination data were treated separately and each of these were in turn divided into two upper-level energy groups below and above 700 000 cm^{-1}. OP lines constituted a fifth group.

To estimate the accuracy of lines from higher-lying levels of Tachiev and Froese Fischer[99] (and Tachiev and Froese Fischer[95] for the few lines unique to it), we isoelectronically averaged the logarithmic quality factors (see Sec. 4.1 of the Introduction) observed for lines from the lower-lying levels of N-like ions of Na, Mg, Al, and Si and scaled them for lines from high-lying levels, as described in the introduction. Thus the listed accuracies for these higher-lying transitions are less well established than for those from lower levels. All transitions involving energy levels labeled $2s2p^3(^5S^{\mathrm{o}})3s\ {}^4S^{\mathrm{o}}_{3/2}$ or $2p^2(^3P)3d\ {}^4P$ were excluded from the fitting because these yielded consistently poorer RSDM's than the other transitions.

A NIST compilation of far-UV lines of Mg VI was published recently.[78] The estimated accuracies are different in some cases because a different method of evaluation was used.

11.6.2. References for Allowed Transitions for Mg VI

[11] V. M. Burke and D. L. Lennon. http://legacy.gsfc.nasa.gov/topbase, downloaded on July 28, 1995 (Opacity Project).

[65] G. Merkelis, M. J. Vilkas, and R. Kisielius, Phys. Scr. **56**, 41 (1997).

[78] L. I. Podobedova, D. E. Kelleher, J. Reader, and W. L. Wiese, J. Phys. Chem. Ref. Data **33**, 495 (2004).

[95] G. Tachiev and C. Froese Fischer, http://www.vuse.vanderbilt.edu/~cff/mchf_collection/ (MCHF, *ab initio*, downloaded on Sept. 3, 2003).

[99] G. Tachiev and C. Froese Fischer, http://www.vuse.vanderbilt.edu/∼cff/mchf_collection/ (MCHF, energy adjusted, downloaded on Dec. 10, 2003). See G. Tachiev and C. Froese Fischer, Astron. Astrophys. **385**, 716 (2002).

TABLE 59. Wavelength finding list for allowed lines for Mg VI

Wavelength (vac) (Å)	Mult. No.
75.248	50
75.249	50
75.334	49
75.335	49
75.834	46
75.890	46
76.901	51
76.908	51
77.405	48
77.510	48
77.511	48
79.817	36
79.830	36
79.857	36
80.027	47
80.034	47
80.724	42
80.725	42
80.930	41
80.931	41
81.106	40
81.107	40
82.467	45
82.475	45
82.629	44
82.636	44
82.845	43
82.853	43
83.124	38
83.125	38
83.403	37
83.518	37
83.519	37
83.560	32
84.722	35
84.723	35
85.153	39
85.575	34
85.576	34
85.622	34
88.825	69
88.954	69
89.023	69
89.642	33
89.651	33
90.897	29
93.499	30
93.500	30
95.385	17
95.421	17
95.483	17
96.064	31
96.074	31
96.159	67
96.238	66

TABLE 59. Wavelength finding list for allowed lines for Mg VI—Continued

Wavelength (vac) (Å)	Mult. No.
96.256	25
96.258	25
96.303	25
96.311	67
96.390	66
96.391	67
96.470	66
96.670	65
96.704	65
96.797	65
96.823	65
96.857	65
96.879	65
96.904	65
96.940	24
96.942	24
96.973	24
96.975	24
97.249	23
97.251	23
97.278	23
98.497	28
98.507	28
98.978	27
98.988	27
99.026	27
99.036	27
99.279	20
99.280	20
99.335	20
99.337	20
99.712	26
99.736	26
99.746	26
100.703	19
100.902	19
100.903	19
101.491	18
101.553	18
101.555	18
102.188	22
102.236	22
102.247	22
104.519	21
104.531	21
104.587	21
104.599	21
105.405	68
105.410	68
105.502	68
107.822	64
108.013	64
108.114	64
108.148	60
108.339	60

TABLE 59. Wavelength finding list for allowed lines for Mg VI—Continued

Wavelength (vac) (Å)	Mult. No.
108.441	60
111.173	16
111.186	16
111.552	11
111.746	11
111.864	11
113.190	14
113.192	14
114.407	57
114.622	57
114.735	57
116.967	12
116.969	12
116.971	15
116.986	15
117.228	12
117.532	61
117.538	61
117.573	61
121.010	13
121.026	13
121.287	13
121.303	13
123.596	58
123.602	58
125.205	56
125.462	56
125.598	56
126.461	62
126.501	62
130.312	63
130.354	63
130.643	63
130.686	63
137.807	59
138.178	59
234.118	3
235.189	3
246.981	52
247.511	52
247.574	52
248.581	52
248.866	2
249.118	52
253.839	75
254.453	75
255.460	75
268.989	6
270.392	6
270.404	6
291.363	10
291.455	10
293.023	10
293.116	10
306.326	92

TABLE 59. Wavelength finding list for allowed lines for Mg VI—Continued

Wavelength (vac) (Å)	Mult. No.
306.965	92
307.333	92
314.562	9
314.670	9
319.816	53
322.460	53
322.504	53
339.778	98
349.117	5
349.137	5
349.168	5
349.189	5
351.902	74
352.212	74
354.258	74
354.572	74
358.847	73
360.075	73
362.096	73
365.484	113
367.607	97
368.922	97
387.788	8
387.951	8
388.014	8
394.089	77
394.477	77
395.803	54
399.281	1
399.928	54
400.667	1
403.310	1
409.752	87
411.218	87
412.490	72
413.070	87
413.514	86
414.216	86
414.559	87
415.662	90
415.731	72
416.840	90
417.136	89
417.519	90
418.323	89
419.006	89
421.124	85
421.603	85
421.852	85
422.262	85
422.333	85
425.369	88
426.040	88
426.112	88
426.603	88
426.821	88
427.277	88
427.314	88
428.357	124
431.146	123
436.142	55
437.790	91
438.443	71
438.885	91
439.874	55
440.276	71
440.567	91
441.156	55
443.302	71
444.974	55
447.507	112
456.767	122
471.676	76
478.103	78
478.675	78
484.896	96
485.390	96
486.381	96
490.436	104
491.280	104
493.389	104
512.618	4
514.859	4
514.903	4
519.232	4
519.278	4
532.652	111
535.074	110
547.885	109
548.697	109
549.813	109
594.04	138
600.49	7
600.88	7
603.63	7
603.94	126
604.03	7
604.05	140
607.13	126
610.06	7
654.88	70
655.65	81
656.73	81
658.33	81
658.98	70
659.41	81
665.78	70
666.22	95
684.65	136
689.23	136

TABLE 59. Wavelength finding list for allowed lines for Mg VI—Continued

Wavelength (vac) (Å)	Mult. No.
697.79	121
708.37	137
709.62	137
713.52	120
727.43	119
766.11	84
767.58	84
769.47	84
784.93	82
787.46	82
788.21	144
798.08	83
802.44	83
804.96	83
822.91	154
825.76	154
827.20	154
943.31	102
945.54	102
946.43	102
957.67	79
959.79	135
962.09	135
966.09	118
975.99	79
981.74	118
982.13	134
984.54	134
1 011.94	103
1 013.58	133
1 014.51	103
1 016.16	133
1 016.98	103
1 019.58	103
1 070.66	105
1 073.19	163
1 073.54	105
1 083.31	163
1 097.09	143
1 107.42	142
1 126.25	80
1 133.53	80
1 167.41	141
1 172.47	141
1 178.55	117
1 245.95	131
1 249.22	131
1 255.81	131
1 290.82	139
1 294.33	139
1 300.56	130
1 301.41	139
1 311.99	130
1 328.90	108
1 338.33	114
1 368.36	116
1 380.07	107
1 380.45	116
1 401.15	153
1 409.44	153
1 413.63	153
1 477.32	125
1 481.48	99
1 482.80	125
1 488.10	99
1 488.32	145
1 502.63	145
1 507.84	145
1 519.76	132
1 522.53	145
1 555.94	100
1 564.46	100
1 734.30	162
1 751.93	101
1 760.87	162
1 767.10	101
1 788.6	162
1 816.9	162
1 825.5	146
1 854.9	160
1 868.8	94
1 884.7	161
Wavelength (air) (Å)	**Mult. No.**
2 055.7	115
2 277.2	159
2 305.6	129
2 318.9	129
2 323.2	159
2 616.3	148
2 663.0	148
2 728.4	156
2 756.3	156
2 802.7	156
2 804.2	151
2 832.0	156
2 837.7	151
2 853.9	156
2 854.7	151
2 872.7	150
2 907.8	150
2 925.7	150
2 954.2	147
2 978.0	147
3 011.2	147
3 013.9	147
3 038.6	147
3 047.0	167
3 115.3	152

TABLE 59. Wavelength finding list for allowed lines for Mg VI—Continued

Wavelength (air) (Å)	Mult. No.
3 160.6	157
3 202.1	152
3 247.9	158
3 260.6	157
3 314.7	149
3 331.3	149
3 353.6	158
3 354.7	149
3 355.9	149
3 361.5	149
3 385.4	149
3 403.9	149
4 143.1	127
4 571.2	106
5 765	166
14 002	128
14 510	128
16 916	165
Wavenumber (cm^{-1})	**Mult. No.**
4 940	165
2 160	164
1 740	93
1 390	155
1 350	93
1 290	164
670	93
520	155

TABLE 60. Transition probabilities of allowed lines for Mg VI (reference for this table are as follows: 1=Burke and Lennon,[11] 2=Tachiev and Froese Fischer,[99] 3=Tachiev and Froese Fischer,[95] 4=Merkelis *et al.*[65])

No.	Transition aray	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
1	$2s^22p^3-2s2p^4$	$^4S^\circ-^4P$		*401.75*	0.0–*248 910*	4–12	2.71+01	1.97−01	1.04+00	−0.103	B+	2,4
				403.310	0.0–247 948	4–6	2.68+01	9.80−02	5.20−01	−0.407	B+	2,4
				400.667	0.0–249 584	4–4	2.73+01	6.58−02	3.47−01	−0.580	B+	2,4
				399.281	0.0–250 450	4–2	2.77+01	3.31−02	1.74−01	−0.878	B+	2,4
2		$^4S^\circ-^2S$										
				248.866	0.0–401 822	4–2	2.21−02	1.03−05	3.36−05	−4.385	C	2,4
3		$^4S^\circ-^2P$										
				235.189	0.0–425 190	4–4	4.31−02	3.57−05	1.11−04	−3.845	C	2,4
				234.118	0.0–427 135	4–2	1.30−02	5.33−06	1.64−05	−4.671	D	2,4
4		$^2D^\circ-^4P$										
				514.859	55 356–249 584	6–4	1.85−04	4.89−07	4.97−06	−5.533	D	2,4
				512.618	55 372.8–250 450	4–2	3.34−04	6.57−07	4.44−06	−5.580	C	2,4
				519.232	55 356–247 948	6–6	3.02−03	1.22−05	1.25−04	−4.135	C	2,4
				514.903	55 372.8–249 584	4–4	5.10−04	2.03−06	1.37−05	−5.090	D+	2,4
				519.278	55 372.8–247 948	4–6	5.15−04	3.12−06	2.14−05	−4.904	C	2,4
5		$^2D^\circ-^2D$		*349.16*	*55 363–341 768*	10–10	6.43+01	1.17−01	1.35+00	0.068	A	2,4
				349.168	55 356–341 751	6–6	6.00+01	1.10−01	7.56−01	−0.180	A	2,4
				349.137	55 372.8–341 793	4–4	6.00+01	1.10−01	5.04−01	−0.357	A	2,4
				349.117	55 356–341 793	6–4	5.76+00	7.02−03	4.84−02	−1.376	B+	2,4
				349.189	55 372.8–341 751	4–6	3.28+00	8.99−03	4.13−02	−1.444	B+	2,4
6		$^2D^\circ-^2P$		*269.92*	*55 363–425 838*	10–6	2.55+02	1.67−01	1.49+00	0.223	A	2,4
				270.392	55 356–425 190	6–4	2.31+02	1.69−01	9.01−01	0.006	A	2,4
				268.989	55 372.8–427 135	4–2	2.43+02	1.32−01	4.66−01	−0.277	A	2,4
				270.404	55 372.8–425 190	4–4	3.03+01	3.33−02	1.18−01	−0.875	A	2,4
7		$^2P^\circ-^4P$										
				604.03	84 028.4–249 584	4–4	2.31−03	1.26−05	1.01−04	−4.298	B	2,4
				600.49	83 920.0–250 450	2–2	8.74−04	4.73−06	1.87−05	−5.024	D+	2,4
				600.88	84 028.4–250 450	4–2	5.09−05	1.38−07	1.09−06	−6.258	E+	2,4

TABLE 60. Transition probabilities of allowed lines for Mg VI (reference for this table are as follows: 1=Burke and Lennon,[11] 2=Tachiev and Froese Fischer,[99] 3=Tachiev and Froese Fischer,[95] 4=Merkelis *et al.*[65])—Continued

No.	Transition aray	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				610.06	84 028.4–247 948	4–6	1.48−03	1.23−05	9.92−05	−4.308	C+	2,4
				603.63	83 920.0–249 584	2–4	1.33−05	1.46−07	5.78−07	−6.535	E+	2,4
8		$^2P^\circ-^2D$		*387.93*	*83 992–341 768*	6–10	9.09+00	3.42−02	2.62−01	−0.688	B+	2,4
				388.014	84 028.4–341 751	4–6	9.76+00	3.30−02	1.69−01	−0.879	B+	2,4
				387.788	83 920.0–341 793	2–4	7.41+00	3.34−02	8.53−02	−1.175	B+	2,4
				387.951	84 028.4–341 793	4–4	6.90−01	1.56−03	7.96−03	−2.205	B+	2,4
9		$^2P^\circ-^2S$		*314.63*	*83 992–401 822*	6–2	1.41+02	6.98−02	4.34−01	−0.378	A	2,4
				314.670	84 028.4–401 822	4–2	8.88+01	6.59−02	2.73−01	−0.579	A	2,4
				314.562	83 920.0–401 822	2–2	5.24+01	7.77−02	1.61−01	−0.809	B+	2,4
10		$^2P^\circ-^2P$		*292.53*	*83 992–425 838*	6–6	7.21+01	9.26−02	5.35−01	−0.255	B+	2,4
				293.116	84 028.4–425 190	4–4	5.38+01	6.92−02	2.67−01	−0.558	A	2,4
				291.363	83 920.0–427 135	2–2	4.23+01	5.39−02	1.03−01	−0.967	B+	2,4
				291.455	84 028.4–427 135	4–2	4.23+01	2.69−02	1.03−01	−0.968	B+	2,4
				293.023	83 920.0–425 190	2–4	1.22+01	3.15−02	6.08−02	−1.201	B+	2,4
11	$2p^3-2p^2(^3P)3s$	$^4S^\circ-^4P$		*111.67*	0.0–*895 507*	4–12	2.23+02	1.25−01	1.84−01	−0.301	C	2
				111.552	0.0–896 440	4–6	2.24+02	6.27−02	9.21−02	−0.601	C	2
				111.746	0.0–894 890	4–4	2.22+02	4.16−02	6.12−02	−0.779	C	2
				111.864	0.0–893 940	4–2	2.21+02	2.07−02	3.05−02	−1.082	D+	2
12		$^2D^\circ-^2P$		*117.05*	*55 363–909 670*	10–6	3.73+02	4.60−02	1.77−01	−0.337	C	2
				116.967	55 356–910 300	6–4	3.42+02	4.68−02	1.08−01	−0.552	C	2
				117.228	55 372.8–908 410	4–2	3.97+02	4.09−02	6.32−02	−0.786	C	2
				116.969	55 372.8–910 300	4–4	1.82+01	3.72−03	5.73−03	−1.827	D	2
13		$^2P^\circ-^2P$		*121.11*	*83 992–909 670*	6–6	2.81+02	6.18−02	1.48−01	−0.431	C	2
				121.026	84 028.4–910 300	4–4	2.40+02	5.27−02	8.39−02	−0.676	C	2
				121.287	83 920.0–908 410	2–2	1.83+02	4.03−02	3.22−02	−1.094	D+	2
				121.303	84 028.4–908 410	4–2	7.44+01	8.21−03	1.31−02	−1.484	D+	2
				121.010	83 920.0–910 300	2–4	5.30+01	2.33−02	1.85−02	−1.332	D+	2
14	$2p^3-2p^2(^1D)3s$	$^2D^\circ-^2D$		*113.19*	*55 363–938 830*	10–10	2.99+02	5.75−02	2.14−01	−0.240	C	2
				113.190	55 356–938 830	6–6	2.81+02	5.39−02	1.21−01	−0.490	C	2
				113.192	55 372.8–938 830	4–4	2.66+02	5.10−02	7.60−02	−0.690	C	2
				113.190	55 356–938 830	6–4	2.11+01	2.70−03	6.04−03	−1.790	D	2
				113.192	55 372.8–938 830	4–6	2.69+01	7.74−03	1.15−02	−1.509	D	2
15		$^2P^\circ-^2D$		*116.98*	*83 992–938 830*	6–10	1.08+02	3.68−02	8.50−02	−0.656	D+	2
				116.986	84 028.4–938 830	4–6	9.96+01	3.07−02	4.72−02	−0.911	C	2
				116.971	83 920.0–938 830	2–4	8.26+01	3.39−02	2.61−02	−1.169	D+	2
				116.986	84 028.4–938 830	4–4	3.70+01	7.59−03	1.17−02	−1.518	D	2
16	$2p^3-2p^2(^1S)3s$	$^2P^\circ-^2S$		*111.18*	*83 992*–983 420	6–2	3.92+02	2.42−02	5.32−02	−0.838	D+	2
				[111.19]	84 028.4–983 420	4–2	2.54+02	2.36−02	3.45−02	−1.025	D+	2
				[111.17]	83 920.0–983 420	2–2	1.38+02	2.55−02	1.87−02	−1.292	D+	2
17	$2p^3-2p^2(^3P)3d$	$^4S^\circ-^4P$		*95.45*	0.0–*1 047 715*	4–12	3.04+03	1.24+00	1.56+00	0.695	C+	3
				95.483	0.0–1 047 310	4–6	3.00+03	6.16−01	7.74−01	0.392	B	3
				95.421	0.0–1 047 990	4–4	3.06+03	4.17−01	5.24−01	0.222	C+	3
				95.385	0.0–1 048 380	4–2	3.10+03	2.11−01	2.65−01	−0.074	C+	3

TABLE 60. Transition probabilities of allowed lines for Mg VI (reference for this table are as follows: 1=Burke and Lennon,[11] 2=Tachiev and Froese Fischer,[99] 3=Tachiev and Froese Fischer,[95] 4=Merkelis *et al.*[65])—Continued

No.	Transition aray	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
18		^{2}D°−^{2}P		*101.53*	*55 363–1 040 267*	10–6	1.91+02	1.77−02	5.92−02	−0.752	D+	3
				101.553	55 356–1 040 060	6–4	1.69+02	1.74−02	3.49−02	−0.981	D+	3
				101.491	55 372.8–1 040 680	4–2	1.23+02	9.51−03	1.27−02	−1.420	D+	3
				101.555	55 372.8–1 040 060	4–4	5.63+01	8.71−03	1.17−02	−1.458	D	3
19		^{2}D°−^{2}F		*100.79*	*55 363–1 047 540*	10–14	8.36+02	1.78−01	5.92−01	0.250	C+	3
				100.703	55 356–1 048 380	6–8	8.44+02	1.71−01	3.40−01	0.011	C+	3
				100.903	55 372.8–1 046 420	4–6	7.70+02	1.76−01	2.34−01	−0.152	C+	3
				100.902	55 356–1 046 420	6–6	5.58+01	8.52−03	1.70−02	−1.291	D+	3
20		^{2}D°−^{2}D		*99.30*	55 363–1 062 392	10–10	8.25+02	1.22−01	3.99−01	0.086	C	3
				99.279	55 356–1 062 620	6–6	7.56+02	1.12−01	2.19−01	−0.173	C+	3
				99.337	55 372.8–1 062 050	4–4	5.95+02	8.80−02	1.15−01	−0.453	C	3
				99.335	55 356–1 062 050	6–4	9.67+01	9.54−03	1.87−02	−1.242	D+	3
				99.280	55 372.8–1 062 620	4–6	1.58+02	3.50−02	4.58−02	−0.854	C	3
21		^{2}P°−^{2}P		*104.57*	*83 992–1 040 267*	6–6	6.43+02	1.05−01	2.18−01	−0.201	C	3
				104.599	84 028.4–1 040 060	4–4	5.30+02	8.70−02	1.20−01	−0.458	C	3
				104.519	83 920.0–1 040 680	2–2	4.06+02	6.65−02	4.57−02	−0.876	C	3
				104.531	84 028.4–1 040 680	4–2	2.12+02	1.73−02	2.39−02	−1.160	D+	3
				104.587	83 920.0–1 040 060	2–4	1.25+02	4.11−02	2.83−02	−1.085	D+	3
22		^{2}P°−^{2}D		*102.21*	*83 992–1 062 392*	6–10	1.13+03	2.94−01	5.94−01	0.246	C+	3
				102.188	84 028.4–1 062 620	4–6	1.07+03	2.51−01	3.38−01	0.002	C+	3
				102.236	83 920.0–1 062 050	2–4	9.48+02	2.97−01	2.00−01	−0.226	C+	3
				102.247	84 028.4–1 062 050	4–4	2.63+02	4.12−02	5.54−02	−0.783	C	3
23	$2p^3-2p^2(^1\mathrm{D})3d$	^{2}D°−^{2}F		*97.27*	*55 363–1 083 469*	10–14	2.85+03	5.66−01	1.81+00	0.753	B	3
				97.278	55 356–1 083 340	6–8	2.76+03	5.23−01	1.00+00	0.497	B	3
				97.251	55 372.8–1 083 640	4–6	2.59+03	5.50−01	7.04−01	0.342	B	3
				97.249	55 356–1 083 640	6–6	3.79+02	5.37−02	1.03−01	−0.492	C	3
24		^{2}D°−^{2}D		*96.95*	*55 363–1 086 780*	10–10	1.44+03	2.03−01	6.48−01	0.307	C+	3
				96.940	55 356–1 086 920	6–6	1.18+03	1.66−01	3.18−01	−0.002	C+	3
				96.975	55 372.8–1 086 570	4–4	1.40+03	1.98−01	2.53−01	−0.101	C+	3
				96.973	55 356–1 086 570	6–4	1.68+02	1.57−02	3.02−02	−1.026	D+	3
				96.942	55 372.8–1 086 920	4–6	1.76+02	3.73−02	4.76−02	−0.826	C	3
25		^{2}D°−^{2}P		*96.27*	*55 363–1 094 087*	10–6	5.82+02	4.85−02	1.54−01	−0.314	C	3
				96.256	55 356–1 094 250	6–4	5.01+02	4.64−02	8.82−02	−0.555	C	3
				96.303	55 372.8–1 093 760	4–2	6.65+02	4.63−02	5.87−02	−0.732	C	3
				96.258	55 372.8–1 094 250	4–4	3.93+01	5.46−03	6.93−03	−1.661	D	3
26		^{2}P°−^{2}D		*99.72*	*83 992–1 086 780*	6–10	9.97+02	2.48−01	4.88−01	0.173	C+	3
				99.712	84 028.4–1 086 920	4–6	1.09+03	2.43−01	3.19−01	−0.012	C+	3
				99.736	83 920.0–1 086 570	2–4	7.67+02	2.29−01	1.50−01	−0.339	C	3
				99.746	84 028.4–1 086 570	4–4	9.65+01	1.44−02	1.89−02	−1.240	D+	3
27		^{2}P°−^{2}P		*99.00*	*83 992–1 094 087*	6–6	1.31+03	1.93−01	3.77−01	0.064	C	3
				98.988	84 028.4–1 094 250	4–4	1.15+03	1.69−01	2.21−01	−0.170	C+	3
				99.026	83 920.0–1 093 760	2–2	8.70+02	1.28−01	8.34−02	−0.592	C	3
				99.036	84 028.4–1 093 760	4–2	3.35+02	2.47−02	3.21−02	−1.005	D+	3
				98.978	83 920.0–1 094 250	2–4	2.12+02	6.22−02	4.05−02	−0.905	D+	3

TABLE 60. Transition probabilities of allowed lines for Mg VI (reference for this table are as follows: 1=Burke and Lennon,[11] 2=Tachiev and Froese Fischer,[99] 3=Tachiev and Froese Fischer,[95] 4=Merkelis *et al.*[65])—Continued

No.	Transition aray	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
28	$2p^3-2p^2(^1D)3d$?	$^2P^\circ-^2S$?		*[98.5]*	*83 992–1 099 180*	6–2	1.47+03	7.11−02	1.38−01	−0.370	C	3
				98.507	84 028.4–1 099 180	4–2	1.01+03	7.37−02	9.56−02	−0.530	C	3
				98.497	83 920.0–1 099 180	2–2	4.52+02	6.58−02	4.27−02	−0.881	C	3
29	$2s^22p^3-2s2p^3(^5S^\circ)3p$	$^4S^\circ-^4P$		*90.90*	*0.0–1 100 150*	4–12	4.41+02	1.64−01	1.96−01	−0.183	C	3
				90.897	0.0–1 100 150	4–6	4.45+02	8.27−02	9.90−02	−0.480	C	3
				90.897	0.0–1 100 150	4–4	4.39+02	5.44−02	6.51−02	−0.662	C	3
				90.897	0.0–1 100 150	4–2	4.34+02	2.69−02	3.22−02	−0.968	D+	3
30	$2p^3-2p^2(^1S)3d$	$^2D^\circ-^2D$		*93.50*	*55 363–1 124 890*	10–10	2.96+01	3.88−03	1.19−02	−1.411	D	3
				93.499	55 356–1 124 890	6–6	2.71+01	3.55−03	6.56−03	−1.672	D	3
				93.500	55 372.8–1 124 890	4–4	2.07+01	2.71−03	3.34−03	−1.965	D	3
				93.499	55 356–1 124 890	6–4	3.03+00	2.65−04	4.89−04	−2.799	E+	3
				93.500	55 372.8–1 124 890	4–6	6.34+00	1.25−03	1.53−03	−2.301	E+	3
31		$^2P^\circ-^2D$		*96.07*	*83 992–1 124 890*	6–10	1.14+03	2.64−01	5.01−01	0.200	C+	3
				96.074	84 028.4–1 124 890	4–6	1.11+03	2.30−01	2.91−01	−0.036	C+	3
				96.064	83 920.0–1 124 890	2–4	9.99+02	2.77−01	1.75−01	−0.256	C	3
				96.074	84 028.4–1 124 890	4–4	1.98+02	2.74−02	3.47−02	−0.960	D+	3
32	$2p^3-2p^2(^3P)4s$	$^4S^\circ-^4P$				4–12						1
				[83.56]	0.0–1 196 740	4–6	7.13+01	1.12−02	1.23−02	−1.349	D	LS
33		$^2P^\circ-^2P$				6–6						1
				89.651	84 028.4–1 199 470	4–4	1.55+02	1.87−02	2.21−02	−1.126	D	LS
				89.642	83 920.0–1 199 470	2–4	3.11+01	7.49−03	4.42−03	−1.824	E+	LS
34	$2s^22p^3-2s2p^3(^3D^\circ)3p$	$^2D^\circ-^2F$		*85.60*	*55 363–1 223 554*	10–14	6.89+02	1.06−01	2.99−01	0.025	C	1
				[85.62]	55 356–1 223 280	6–8	6.89+02	1.01−01	1.71−01	−0.218	C	LS
				[85.58]	55 372.8–1 223 920	4–6	6.44+02	1.06−01	1.19−01	−0.373	C	LS
				[85.58]	55 356–1 223 920	6–6	4.58+01	5.03−03	8.50−03	−1.520	E+	LS
35	$2p^3-2p^2(^1D)4s$	$^2D^\circ-^2D$		*84.72*	*55 363–1 235 690*	10–10	3.69+02	3.98−02	1.11−01	−0.400	D+	1
				84.722	55 356–1 235 690	6–6	3.45+02	3.71−02	6.21−02	−0.652	D+	LS
				84.723	55 372.8–1 235 690	4–4	3.33+02	3.58−02	3.99−02	−0.844	D+	LS
				84.722	55 356–1 235 690	6–4	3.69+01	2.65−03	4.43−03	−1.799	E+	LS
				84.723	55 372.8–1 235 690	4–6	2.46+01	3.97−03	4.43−03	−1.799	E+	LS
36	$2p^3-2p^2(^3P)4d$	$^4S^\circ-^4P$		*79.84*	0.0–*1 252 485*	4–12	7.73+02	2.22−01	2.33−01	−0.052	C	1
				79.857	0.0–1 252 240	4–6	7.74+02	1.11−01	1.17−01	−0.353	C	LS
				79.830	0.0–1 252 660	4–4	7.72+02	7.38−02	7.76−02	−0.530	D+	LS
				79.817	0.0–1 252 870	4–2	7.73+02	3.69−02	3.88−02	−0.831	D+	LS
37		$^2D^\circ-^2F$		*83.45*	*55 363–1 253 643*	10–14	6.91+02	1.01−01	2.77−01	0.004	C	1
				[83.40]	55 356–1 254 350	6–8	6.92+02	9.62−02	1.58−01	−0.239	C	LS
				[83.52]	55 372.8–1 252 700	4–6	6.44+02	1.01−01	1.11−01	−0.394	C	LS
				[83.52]	55 356–1 252 700	6–6	4.59+01	4.80−03	7.92−03	−1.541	E+	LS
38		$^2D^\circ-^2D$				10–10						1
				[83.12]	55 356–1 258 380	6–6	2.23+02	2.31−02	3.79−02	−0.858	D+	LS
				[83.13]	55 372.8–1 258 380	4–6	1.59+01	2.47−03	2.70−03	−2.005	E+	LS
39		$^2P^\circ-^2D$				6–10						1

TABLE 60. Transition probabilities of allowed lines for Mg VI (reference for this table are as follows: 1 = Burke and Lennon,[11] 2 = Tachiev and Froese Fischer,[99] 3 = Tachiev and Froese Fischer,[95] 4 = Merkelis *et al.*[65])—Continued

No.	Transition aray	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				[85.15]	84 028.4–1 258 380	4–6	7.05+01	1.15−02	1.29−02	−1.337	D	LS
40	$2p^3-2p^2(^1D)4d$	$^2D^\circ-^2F$		*81.11*	*55 363–1 288 310*	10–14	8.60+02	1.19−01	3.17−01	0.076	C	1
				[81.11]	55 356–1 288 310	6–8	8.59+02	1.13−01	1.81−01	−0.169	C	LS
				[81.11]	55 372.8–1 288 310	4–6	8.04+02	1.19−01	1.27−01	−0.322	C	LS
				[81.11]	55 356–1 288 310	6–6	5.74+01	5.66−03	9.07−03	−1.469	D	LS
41		$^2D^\circ-^2D$		*80.93*	*55 363–1 290 990*	10–10	5.87+02	5.76−02	1.54−01	−0.240	D+	1
				80.930	55 356–1 290 990	6–6	5.48+02	5.38−02	8.60−02	−0.491	C	LS
				80.931	55 372.8–1 290 990	4–4	5.29+02	5.19−02	5.53−02	−0.683	D+	LS
				80.930	55 356–1 290 990	6–4	5.87+01	3.84−03	6.14−03	−1.638	E+	LS
				80.931	55 372.8–1 290 990	4–6	3.91+01	5.76−03	6.14−03	−1.638	E+	LS
42		$^2D^\circ-^2P$		*80.72*	*55 363–1 294 150*	10–6	2.78+02	1.63−02	4.33−02	−0.788	D	1
				[80.72]	55 356–1 294 150	6–4	2.50+02	1.63−02	2.60−02	−1.010	D	LS
				[80.72]	55 372.8–1 294 150	4–2	2.78+02	1.36−02	1.45−02	−1.264	D	LS
				[80.72]	55 372.8–1 294 150	4–4	2.78+01	2.72−03	2.89−03	−1.963	E+	LS
43		$^2P^\circ-^2D$		*82.85*	*83 992–1 290 990*	6–10	2.18+02	3.73−02	6.11−02	−0.650	D	1
				82.853	84 028.4–1 290 990	4–6	2.18+02	3.36−02	3.67−02	−0.872	D+	LS
				82.845	83 920.0–1 290 990	2–4	1.81+02	3.73−02	2.03−02	−1.127	D	LS
				82.853	84 028.4–1 290 990	4–4	3.62+01	3.73−03	4.07−03	−1.826	E+	LS
44		$^2P^\circ-^2P$		*82.63*	*83 992–1 294 150*	6–6	4.74+02	4.85−02	7.91−02	−0.536	D	1
				[82.64]	84 028.4–1 294 150	4–4	3.95+02	4.04−02	4.40−02	−0.792	D+	LS
				[82.63]	83 920.0–1 294 150	2–2	3.16+02	3.23−02	1.76−02	−1.190	D	LS
				[82.64]	84 028.4–1 294 150	4–2	1.58+02	8.08−03	8.79−03	−1.491	D	LS
				[82.63]	83 920.0–1 294 150	2–4	7.91+01	1.62−02	8.81−03	−1.489	D	LS
45		$^2P^\circ-^2S$		*82.47*	*83 992–1 296 520*	6–2	2.69+02	9.16−03	1.49−02	−1.260	E+	1
				[82.47]	84 028.4–1 296 520	4–2	1.80+02	9.16−03	9.95−03	−1.436	D	LS
				[82.47]	83 920.0–1 296 520	2–2	8.98+01	9.16−03	4.97−03	−1.737	E+	LS
46	$2p^3-2p^2(^3P)5s$	$^4S^\circ-^4P$				4–12						1
				[75.83]	0.0–1 318 670	4–6	1.01+02	1.31−02	1.31−02	−1.281	D	LS
				[75.89]	0.0–1 317 700	4–4	1.01+02	8.74−03	8.73−03	−1.456	D	LS
47	$2p^3-2p^2(^1S)4d$	$^2P^\circ-^2D$		*80.03*	*83 992–1 333 500*	6–10	3.43+02	5.49−02	8.68−02	−0.482	D+	1
				[80.03]	84 028.4–1 333 500	4–6	3.43+02	4.94−02	5.21−02	−0.704	D+	LS
				[80.03]	83 920.0–1 333 500	2–4	2.86+02	5.49−02	2.89−02	−0.959	D	LS
				[80.03]	84 028.4–1 333 500	4–4	5.72+01	5.49−03	5.79−03	−1.658	E+	LS
48	$2p^3-2p^2(^3P)5d$	$^2D^\circ-^2F$		*77.45*	*55 363–1 346 510*	10–14	4.57+02	5.75−02	1.47−01	−0.240	D+	1
				[77.41]	55 356–1 347 260	6–8	4.58+02	5.48−02	8.38−02	−0.483	C	LS
				[77.51]	55 372.8–1 345 510	4–6	4.25+02	5.74−02	5.86−02	−0.639	D+	LS
				[77.51]	55 356–1 345 510	6–6	3.03+01	2.73−03	4.18−03	−1.786	E+	LS
49	$2p^3-2p^2(^1D)5d$	$^2D^\circ-^2F$		*75.33*	*55 363–1 382 780*	10–14	2.73+02	3.26−02	8.08−02	−0.487	D+	1
				[75.33]	55 356–1 382 780	6–8	2.73+02	3.10−02	4.61−02	−0.730	D+	LS
				[75.33]	55 372.8–1 382 780	4–6	2.55+02	3.26−02	3.23−02	−0.885	D+	LS
				[75.33]	55 356–1 382 780	6–6	1.82+01	1.55−03	2.31−03	−2.032	E+	LS
50	$2p^3-2p^2(^1D)5d$?	$^2D^\circ-^2D$?		*[75.3]*	*55 363–1 384 290*	10–10	3.28+02	2.79−02	6.90−02	−0.554	D	1
				75.248	55 356–1 384 290	6–6	3.06+02	2.60−02	3.86−02	−0.807	D+	LS

TABLE 60. Transition probabilities of allowed lines for Mg VI (reference for this table are as follows: 1=Burke and Lennon,[11] 2=Tachiev and Froese Fischer,[99] 3=Tachiev and Froese Fischer,[95] 4=Merkelis *et al.*[65])—Continued

No.	Transition aray	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	$E_i - E_k$ (cm^{-1})	$g_i - g_k$	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				75.249	55 372.8–1 384 290	4–4	2.96+02	2.51−02	2.49−02	−0.998	D	LS
				75.248	55 356–1 384 290	6–4	3.29+01	1.86−03	2.76−03	−1.952	E+	LS
				75.249	55 372.8–1 384 290	4–6	2.19+01	2.79−03	2.76−03	−1.952	E+	LS
51		^{2}P$^\circ$–^{2}D?		*[76.9]*	*83 992–1 384 290*	6–10	9.23+01	1.36−02	2.07−02	−1.088	D	1
				76.908	84 028.4–1 384 290	4–6	9.25+01	1.23−02	1.25−02	−1.308	D	LS
				76.901	83 920.0–1 384 290	2–4	7.67+01	1.36−02	6.89−03	−1.565	E+	LS
				76.908	84 028.4–1 384 290	4–4	1.53+01	1.36−03	1.38−03	−2.264	E	LS
52	$2s2p^4$–$2p^5$	^{4}P–^{2}P$^\circ$										
				248.581	249 584–651 867	4–4	8.66−03	8.02−06	2.63−05	−4.494	E+	4
				247.511	250 450–654 473	2–2	9.69−03	8.90−06	1.45−05	−4.750	E+	4
				247.574	247 948–651 867	6–4	3.46−02	2.12−05	1.04−04	−3.896	D	4
				246.981	249 584–654 473	4–2	2.02−03	9.22−07	3.00−06	−5.433	E+	4
				249.118	250 450–651 867	2–4	2.30−03	4.27−06	7.01−06	−5.069	E+	4
53		^{2}D–^{2}P$^\circ$		*321.58*	*341 768–652 736*	10–6	1.09+02	1.01−01	1.07+00	0.004	B+	4
				322.460	341 751–651 867	6–4	9.70+01	1.01−01	6.42−01	−0.218	B+	4
				319.816	341 793–654 473	4–2	1.08+02	8.30−02	3.50−01	−0.479	B+	4
				322.504	341 793–651 867	4–4	1.18+01	1.84−02	7.81−02	−1.133	B+	4
54		^{2}S–^{2}P$^\circ$		*398.54*	401 822–*652 736*	2–6	5.30+00	3.79−02	9.94−02	−1.120	B+	4
				399.928	401 822–651 867	2–4	6.17+00	2.96−02	7.79−02	−1.228	B+	4
				395.803	401 822–654 473	2–2	3.51+00	8.25−03	2.15−02	−1.783	B+	4
55		^{2}P–^{2}P$^\circ$		*440.73*	*425 838–652 736*	6–6	6.87+01	2.00−01	1.74+00	0.079	B+	4
				441.156	425 190–651 867	4–4	5.67+01	1.65−01	9.61−01	−0.180	B+	4
				439.874	427 135–654 473	2–2	4.74+01	1.37−01	3.98−01	−0.562	B+	4
				436.142	425 190–654 473	4–2	2.45+01	3.50−02	2.01−01	−0.854	B+	4
				444.974	427 135–651 867	2–4	1.04+01	6.20−02	1.82−01	−0.907	B+	4
56	$2s2p^4$–$2s2p^3(^5S^\circ)3s$	^{4}P–^{4}S$^\circ$		*125.36*	*248 910*–1 046 640	12–4	4.84+02	3.80−02	1.88−01	−0.341	C	2
				125.205	247 948–1 046 640	6–4	2.44+02	3.82−02	9.46−02	−0.640	C	2
				125.462	249 584–1 046 640	4–4	1.60+02	3.78−02	6.25−02	−0.820	C	2
				125.598	250 450–1 046 640	2–4	7.97+01	3.77−02	3.12−02	−1.123	D+	2
57	$2s2p^4$–$2s2p^3(^3D^\circ)3s$	^{4}P–^{4}D$^\circ$		*114.53*	*248 910–1 122 020*	12–20	2.89+02	9.48−02	4.29−01	0.056	D+	1
				114.407	247 948–1 122 020	6–8	2.90+02	7.60−02	1.72−01	−0.341	C	LS
				114.622	249 584–1 122 020	4–6	2.02+02	5.97−02	9.01−02	−0.622	C	LS
				114.735	250 450–1 122 020	2–4	1.20+02	4.73−02	3.57−02	−1.024	D+	LS
				114.407	247 948–1 122 020	6–6	8.71+01	1.71−02	3.86−02	−0.989	D+	LS
				114.622	249 584–1 122 020	4–4	1.54+02	3.03−02	4.57−02	−0.916	D+	LS
				114.735	250 450–1 122 020	2–2	2.40+02	4.73−02	3.57−02	−1.024	D+	LS
				114.407	247 948–1 122 020	6–4	1.45+01	1.90−03	4.29−03	−1.943	E+	LS
				114.622	249 584–1 122 020	4–2	4.81+01	4.74−03	7.15−03	−1.722	E+	LS
58		^{2}D–^{2}D$^\circ$		*123.60*	*341 768–1 150 840*	10–10	3.82+02	8.74−02	3.56−01	−0.058	C	1
				123.596	341 751–1 150 840	6–6	3.56+02	8.16−02	1.99−01	−0.310	C	LS
				123.602	341 793–1 150 840	4–4	3.43+02	7.86−02	1.28−01	−0.503	C	LS
				123.596	341 751–1 150 840	6–4	3.82+01	5.83−03	1.42−02	−1.456	D	LS
				123.602	341 793–1 150 840	4–6	2.54+01	8.74−03	1.42−02	−1.456	D	LS
59		^{2}P–^{2}D$^\circ$		*137.93*	*425 838–1 150 840*	6–10	1.89+01	8.98−03	2.45−02	−1.269	D	1
				137.807	425 190–1 150 840	4–6	1.89+01	8.09−03	1.47−02	−1.490	D	LS

TABLE 60. Transition probabilities of allowed lines for Mg VI (reference for this table are as follows: 1=Burke and Lennon,[11] 2=Tachiev and Froese Fischer,[99] 3=Tachiev and Froese Fischer,[95] 4=Merkelis *et al.*[65])—Continued

No.	Transition aray	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				138.178	427 135–1 150 840	2–4	1.57+01	8.97−03	8.16−03	−1.746	E+	LS
				137.807	425 190–1 150 840	4–4	3.16+00	8.99−04	1.63−03	−2.444	E	LS
60	$2s2p^4-2s2p^3(^3P^\circ)3s$	$^4P-^4P^\circ$		*108.26*	*248 910–1 172 610*	12–12	3.11+02	5.46−02	2.34−01	−0.184	D+	1
				108.148	247 948–1 172 610	6–6	2.18+02	3.83−02	8.18−02	−0.639	D+	LS
				108.339	249 584–1 172 610	4–4	4.14+01	7.28−03	1.04−02	−1.536	D	LS
				108.441	250 450–1 172 610	2–2	5.16+01	9.09−03	6.49−03	−1.740	E+	LS
				108.148	247 948–1 172 610	6–4	1.40+02	1.64−02	3.50−02	−1.007	D+	LS
				108.339	249 584–1 172 610	4–2	2.58+02	2.27−02	3.24−02	−1.042	D+	LS
				108.339	249 584–1 172 610	4–6	9.32+01	2.46−02	3.51−02	−1.007	D+	LS
				108.441	250 450–1 172 610	2–4	1.29+02	4.54−02	3.24−02	−1.042	D+	LS
61		$^2D-^2P^\circ$		*117.55*	*341 768–1 192 497*	10–6	2.29+02	2.84−02	1.10−01	−0.547	D+	1
				117.532	341 751–1 192 580	6–4	2.06+02	2.84−02	6.59−02	−0.769	D+	LS
				117.573	341 793–1 192 330	4–2	2.29+02	2.37−02	3.67−02	−1.023	D+	LS
				117.538	341 793–1 192 580	4–4	2.29+01	4.74−03	7.34−03	−1.722	E+	LS
62		$^2S-^2P^\circ$		*126.47*	401 822–*1 192 497*	2–6	1.66+02	1.20−01	9.97−02	−0.620	D+	1
				126.461	401 822–1 192 580	2–4	1.66+02	7.98−02	6.64−02	−0.797	D+	LS
				126.501	401 822–1 192 330	2–2	1.66+02	3.99−02	3.32−02	−1.098	D+	LS
63		$^2P-^2P^\circ$		*130.44*	*425 838–1 192 497*	6–6	3.56+01	9.09−03	2.34−02	−1.263	E+	1
				130.312	425 190–1 192 580	4–4	2.98+01	7.58−03	1.30−02	−1.518	D	LS
				130.686	427 135–1 192 330	2–2	2.36+01	6.05−03	5.21−03	−1.917	E+	LS
				130.354	425 190–1 192 330	4–2	1.19+01	1.52−03	2.61−03	−2.216	E+	LS
				130.643	427 135–1 192 580	2–4	5.92+00	3.03−03	2.61−03	−2.218	E+	LS
64	$2s2p^4-2s2p^3(^5S^\circ)3d$	$^4P-^4D^\circ$		*107.93*	*248 910–1 175 400*	12–20	1.11+03	3.24−01	1.38+00	0.590	C	1
				107.822	247 948–1 175 400	6–8	1.11+03	2.59−01	5.52−01	0.191	C+	LS
				108.013	249 584–1 175 400	4–6	7.78+02	2.04−01	2.90−01	−0.088	C	LS
				108.114	250 450–1 175 400	2–4	4.62+02	1.62−01	1.15−01	−0.489	C	LS
				107.822	247 948–1 175 400	6–6	3.34+02	5.83−02	1.24−01	−0.456	C	LS
				108.013	249 584–1 175 400	4–4	5.89+02	1.03−01	1.47−01	−0.385	C	LS
				108.114	250 450–1 175 400	2–2	9.24+02	1.62−01	1.15−01	−0.489	C	LS
				107.822	247 948–1 175 400	6–4	5.58+01	6.48−03	1.38−02	−1.410	D	LS
				108.013	249 584–1 175 400	4–2	1.85+02	1.62−02	2.30−02	−1.188	D	LS
65	$2s2p^4-2s2p^3(^3D^\circ)3d$	$^4P-^4P^\circ$		*96.77*	*248 910–1 282 260*	12–12	2.53+03	3.55−01	1.36+00	0.629	C	1
				96.704	247 948–1 282 030	6–6	1.78+03	2.49−01	4.76−01	0.174	C+	LS
				96.823	249 584–1 282 400	4–4	3.37+02	4.73−02	6.03−02	−0.723	D+	LS
				96.879	250 450–1 282 670	2–2	4.20+02	5.91−02	3.77−02	−0.927	D+	LS
				96.670	247 948–1 282 400	6–4	1.15+03	1.07−01	2.04−01	−0.192	C	LS
				96.797	249 584–1 282 670	4–2	2.11+03	1.48−01	1.89−01	−0.228	C	LS
				96.857	249 584–1 282 030	4–6	7.58+02	1.60−01	2.04−01	−0.194	C	LS
				96.904	250 450–1 282 400	2–4	1.05+03	2.95−01	1.88−01	−0.229	C	LS
66		$^4P-^4D^\circ$		*96.33*	*248 910–1 287 040*	12–20	1.19+03	2.76−01	1.05+00	0.520	C	1
				96.238	247 948–1 287 040	6–8	1.19+03	2.21−01	4.20−01	0.123	C+	LS
				96.390	249 584–1 287 040	4–6	8.33+02	1.74−01	2.21−01	−0.157	C	LS
				96.470	250 450–1 287 040	2–4	4.95+02	1.38−01	8.77−02	−0.559	C	LS
				96.238	247 948–1 287 040	6–6	3.59+02	4.98−02	9.47−02	−0.525	C	LS
				96.390	249 584–1 287 040	4–4	6.35+02	8.85−02	1.12−01	−0.451	C	LS
				96.470	250 450–1 287 040	2–2	9.89+02	1.38−01	8.77−02	−0.559	C	LS
				96.238	247 948–1 287 040	6–4	5.98+01	5.54−03	1.05−02	−1.478	D	LS

TABLE 60. Transition probabilities of allowed lines for Mg VI (reference for this table are as follows: 1=Burke and Lennon,[11] 2=Tachiev and Froese Fischer,[99] 3=Tachiev and Froese Fischer,[95] 4=Merkelis *et al.*[65])—Continued

No.	Transition aray	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})$^{\mathrm{a}}$	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				96.390	249 584–1 287 040	4–2	1.98+02	1.38−02	1.75−02	−1.258	D	LS
67		^{4}P$-^4$S$^{\circ}$		*96.25*	*248 910–1 287 890*	12–4	2.65+03	1.22−01	4.66−01	0.166	C	1
				[96.16]	247 948–1 287 890	6–4	1.33+03	1.23−01	2.34−01	−0.132	C	LS
				[96.31]	249 584–1 287 890	4–4	8.77+02	1.22−01	1.55−01	−0.312	C	LS
				[96.39]	250 450–1 287 890	2–4	4.38+02	1.22−01	7.74−02	−0.613	D+	LS
68		^{2}D$-^2$F$^{\circ}$		*105.46*	*341 768–1 289 973*	10–14	1.60+03	3.73−01	1.29+00	0.572	C+	1
				[105.50]	341 751–1 289 600	6–8	1.60+03	3.55−01	7.40−01	0.328	C+	LS
				[105.41]	341 793–1 290 470	4–6	1.49+03	3.73−01	5.18−01	0.174	C+	LS
				[105.41]	341 751–1 290 470	6–6	1.07+02	1.78−02	3.71−02	−0.971	D+	LS
69	$2s2p^4$–$2s2p^3$(^{5}S$^{\circ}$)$4d$	^{4}P$-^4$D$^{\circ}$		*88.90*	*248 910–1 373 760*	12–20	8.86+02	1.75−01	6.14−01	0.322	C	1
				88.825	247 948–1 373 760	6–8	8.88+02	1.40−01	2.46−01	−0.076	C	LS
				88.954	249 584–1 373 760	4–6	6.18+02	1.10−01	1.29−01	−0.357	C	LS
				89.023	250 450–1 373 760	2–4	3.68+02	8.74−02	5.12−02	−0.757	D+	LS
				88.825	247 948–1 373 760	6–6	2.66+02	3.15−02	5.53−02	−0.724	D+	LS
				88.954	249 584–1 373 760	4–4	4.72+02	5.60−02	6.56−02	−0.650	D+	LS
				89.023	250 450–1 373 760	2–2	7.36+02	8.74−02	5.12−02	−0.757	D+	LS
				88.825	247 948–1 373 760	6–4	4.44+01	3.50−03	6.14−03	−1.678	E+	LS
				88.954	249 584–1 373 760	4–2	1.47+02	8.74−03	1.02−02	−1.456	D	LS
70	$2s^22p^2$(^{3}P)$3s$–$2s2p^3$(^{5}S$^{\circ}$)$3s$	^{4}P$-^4$S$^{\circ}$		*661.7*	*895 507–1 046 640*	12–4	5.64+00	1.23−02	3.22−01	−0.831	C	2
				665.78	896 440–1 046 640	6–4	2.76+00	1.22−02	1.61−01	−1.135	C	2
				658.98	894 890–1 046 640	4–4	1.90+00	1.24−02	1.07−01	−1.305	C	2
				654.88	893 940–1 046 640	2–4	9.75−01	1.25−02	5.40−02	−1.602	C	2
71	$2s^22p^2$(^{3}P)$3s$– $2s2p^3$(^{3}D$^{\circ}$)$3s$	^{4}P$-^4$D$^{\circ}$		*441.48*	*895 507–1 122 020*	12–20	2.41+01	1.17−01	2.05+00	0.147	C+	1
				443.302	896 440–1 122 020	6–8	2.38+01	9.35−02	8.19−01	−0.251	C+	LS
				440.276	894 890–1 122 020	4–6	1.70+01	7.41−02	4.30−01	−0.528	C+	LS
				438.443	893 940–1 122 020	2–4	1.03+01	5.91−02	1.71−01	−0.927	C	LS
				443.302	896 440–1 122 020	6–6	7.13+00	2.10−02	1.84−01	−0.900	C	LS
				440.276	894 890–1 122 020	4–4	1.30+01	3.77−02	2.19−01	−0.822	C	LS
				438.443	893 940–1 122 020	2–2	2.05+01	5.91−02	1.71−01	−0.927	C	LS
				443.302	896 440–1 122 020	6–4	1.19+00	2.34−03	2.05−02	−1.853	D	LS
				440.276	894 890–1 122 020	4–2	4.05+00	5.88−03	3.41−02	−1.629	D+	LS
72		^{2}P$-^2$D$^{\circ}$		*414.65*	*909 670–1 150 840*	6–10	1.15+01	4.95−02	4.05−01	−0.527	C	1
				415.731	910 300–1 150 840	4–6	1.14+01	4.44−02	2.43−01	−0.751	C	LS
				412.490	908 410–1 150 840	2–4	9.74+00	4.97−02	1.35−01	−1.003	C	LS
				415.731	910 300–1 150 840	4–4	1.91+00	4.94−03	2.70−02	−1.704	D	LS
73	$2s^22p^2$(^{3}P)$3s$–$2s2p^3$(^{3}P$^{\circ}$)$3s$	^{4}P$-^4$P$^{\circ}$		*360.88*	*895 507–1 172 610*	12–12	6.93+01	1.35−01	1.93+00	0.210	C+	1
				362.096	896 440–1 172 610	6–6	4.81+01	9.45−02	6.76−01	−0.246	C+	LS
				360.075	894 890–1 172 610	4–4	9.31+00	1.81−02	8.58−02	−1.140	C	LS
				358.847	893 940–1 172 610	2–2	1.18+01	2.27−02	5.36−02	−1.343	D+	LS
				362.096	896 440–1 172 610	6–4	3.09+01	4.05−02	2.90−01	−0.614	C	LS
				360.075	894 890–1 172 610	4–2	5.81+01	5.65−02	2.68−01	−0.646	C	LS
				360.075	894 890–1 172 610	4–6	2.10+01	6.11−02	2.90−01	−0.612	C	LS
				358.847	893 940–1 172 610	2–4	2.93+01	1.13−01	2.67−01	−0.646	C	LS
74		^{2}P$-^2$P$^{\circ}$		*353.57*	*909 670–1 192 497*	6–6	3.73+01	6.99−02	4.88−01	−0.377	C	1
				354.258	910 300–1 192 580	4–4	3.09+01	5.82−02	2.72−01	−0.633	C	LS

TABLE 60. Transition probabilities of allowed lines for Mg VI (reference for this table are as follows: 1 = Burke and Lennon,[11] 2 = Tachiev and Froese Fischer,[99] 3 = Tachiev and Froese Fischer,[95] 4 = Merkelis *et al.*[65])—Continued

No.	Transition aray	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				352.212	908 410–1 192 330	2–2	2.52+01	4.68−02	1.09−01	−1.029	C	LS
				354.572	910 300–1 192 330	4–2	1.23+01	1.16−02	5.42−02	−1.333	D+	LS
				351.902	908 410–1 192 580	2–4	6.30+00	2.34−02	5.42−02	−1.330	D+	LS
75	$2s^22p^2(^3P)3s$– $2s2p^3(^3D^\circ)3d$	$^4P-^4S^\circ$		*254.85*	*895 507*–1 287 890	12–4	1.02+01	3.30−03	3.32−02	−1.402	D	1
				[255.46]	896 440–1 287 890	6–4	5.04+00	3.29−03	1.66−02	−1.705	D	LS
				[254.45]	894 890–1 287 890	4–4	3.41+00	3.31−03	1.11−02	−1.878	D	LS
				[253.84]	893 940–1 287 890	2–4	1.72+00	3.32−03	5.55−03	−2.178	E+	LS
76	$2s^22p^2(^1D)3s$– $2s2p^3(^3D^\circ)3s$	$^2D-^2D^\circ$		*471.68*	*938 830–1 150 840*	10–10	3.20+00	1.07−02	1.66−01	−0.971	D+	1
				471.676	938 830–1 150 840	6–6	2.99+00	9.96−03	9.28−02	−1.224	C	LS
				471.676	938 830–1 150 840	4–4	2.88+00	9.61−03	5.97−02	−1.415	D+	LS
				471.676	938 830–1 150 840	6–4	3.20−01	7.12−04	6.63−03	−2.369	E+	LS
				471.676	938 830–1 150 840	4–6	2.14−01	1.07−03	6.65−03	−2.369	E+	LS
77	$2s^22p^2(^1D)3s$– $2s2p^3(^3P^\circ)3s$	$^2D-^2P^\circ$		*394.22*	*938 830–1 192 497*	10–6	2.23+00	3.12−03	4.05−02	−1.506	D	1
				394.089	938 830–1 192 580	6–4	2.01+00	3.12−03	2.43−02	−1.728	D	LS
				394.477	938 830–1 192 330	4–2	2.23+00	2.60−03	1.35−02	−1.983	D	LS
				394.089	938 830–1 192 580	4–4	2.23−01	5.20−04	2.70−03	−2.682	E+	LS
78	$2s^22p^2(^1S)3s$–$2s2p^3(^3P^\circ)3s$	$^2S-^2P^\circ$		*478.29*	983 420–*1 192 497*	2–6	1.25+00	1.28−02	4.04−02	−1.592	D	1
				[478.10]	983 420–1 192 580	2–4	1.25+00	8.56−03	2.69−02	−1.766	D	LS
				[478.68]	983 420–1 192 330	2–2	1.25+00	4.28−03	1.35−02	−2.068	D	LS
79	$2s^22p^2(^3P)3d$– $2s2p^3(^3D^\circ)3s$	$^2F-^2D^\circ$		*968.1*	*1 047 540–1 150 840*	14–10	8.85−02	8.88−04	3.96−02	−1.905	D	1
				975.99	1 048 380–1 150 840	8–6	8.23−02	8.81−04	2.26−02	−2.152	D	LS
				957.67	1 046 420–1 150 840	6–4	9.14−02	8.38−04	1.59−02	−2.299	D	LS
				957.67	1 046 420–1 150 840	6–6	4.36−03	5.99−05	1.13−03	−3.444	E	LS
80		$^2D-^2D^\circ$		*1 130.6*	*1 062 392–1 150 840*	10–10	6.23−02	1.19−03	4.44−02	−1.924	D	1
				1 133.53	1 062 620–1 150 840	6–6	5.76−02	1.11−03	2.49−02	−2.177	D	LS
				1 126.25	1 062 050–1 150 840	4–4	5.68−02	1.08−03	1.60−02	−2.365	D	LS
				1 133.53	1 062 620–1 150 840	6–4	6.18−03	7.93−05	1.78−03	−3.323	E	LS
				1 126.25	1 062 050–1 150 840	4–6	4.21−03	1.20−04	1.78−03	−3.319	E	LS
81	$2s^22p^2(^3P)3d$–$2s2p^3(^3P^\circ)3s$	$^2P-^2P^\circ$		*656.9*	*1 040 267–1 192 497*	6–6	2.26−01	1.46−03	1.90−02	−2.057	E+	1
				655.65	1 040 060–1 192 580	4–4	1.89−01	1.22−03	1.05−02	−2.312	D	LS
				659.41	1 040 680–1 192 330	2–2	1.49−01	9.74−04	4.23−03	−2.710	E+	LS
				656.73	1 040 060–1 192 330	4–2	7.55−02	2.44−04	2.11−03	−3.011	E+	LS
				658.33	1 040 680–1 192 580	2–4	3.76−02	4.88−04	2.12−03	−3.011	E+	LS
82		$^4D-^4P^\circ$				20–12						1
				[784.9]	1 045 210–1 172 610	6–4	1.61−01	9.93−04	1.54−02	−2.225	D	LS
				[784.9]	1 045 210–1 172 610	4–2	1.28−01	5.91−04	6.11−03	−2.626	E+	LS
				[784.9]	1 045 210–1 172 610	6–6	4.61−02	4.26−04	6.60−03	−2.592	E+	LS
				[784.9]	1 045 210–1 172 610	4–4	8.20−02	7.57−04	7.82−03	−2.519	E+	LS
				[787.5]	1 045 620–1 172 610	2–2	1.27−01	1.18−03	6.12−03	−2.627	E+	LS
				[784.9]	1 045 210–1 172 610	4–6	5.12−03	7.09−05	7.33−04	−3.547	E	LS
				[787.5]	1 045 620–1 172 610	2–4	1.27−02	2.36−04	1.22−03	−3.326	E	LS
83		$^4P-^4P^\circ$		*800.7*	*1 047 715–1 172 610*	12–12	1.24−01	1.19−03	3.77−02	−1.845	E+	1

TABLE 60. Transition probabilities of allowed lines for Mg VI (reference for this table are as follows: 1=Burke and Lennon,[11] 2=Tachiev and Froese Fischer,[99] 3=Tachiev and Froese Fischer,[95] 4=Merkelis *et al.*[65])—Continued

No.	Transition aray	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				798.08	1 047 310–1 172 610	6–6	8.75−02	8.36−04	1.32−02	−2.300	D	LS
				802.44	1 047 990–1 172 610	4–4	1.64−02	1.58−04	1.67−03	−3.199	E	LS
				804.96	1 048 380–1 172 610	2–2	2.03−02	1.97−04	1.04−03	−3.405	E	LS
				798.08	1 047 310–1 172 610	6–4	5.62−02	3.58−04	5.64−03	−2.668	E+	LS
				802.44	1 047 990–1 172 610	4–2	1.03−01	4.95−04	5.23−03	−2.703	E+	LS
				802.44	1 047 990–1 172 610	4–6	3.69−02	5.35−04	5.65−03	−2.670	E+	LS
				804.96	1 048 380–1 172 610	2–4	5.08−02	9.87−04	5.23−03	−2.705	E+	LS
84		^{2}D−^{2}P$^\circ$		*768.6*	*1 062 392–1 192 497*	10–6	2.50−01	1.33−03	3.37−02	−1.876	D	1
				769.47	1 062 620–1 192 580	6–4	2.25−01	1.33−03	2.02−02	−2.098	D	LS
				767.58	1 062 050–1 192 330	4–2	2.51−01	1.11−03	1.12−02	−2.353	D	LS
				766.11	1 062 050–1 192 580	4–4	2.53−02	2.23−04	2.25−03	−3.050	E+	LS
85	$2s^22p^2(^3P)3d$– $2s2p^3(^3D^\circ)3d$	^{4}D−^{4}P$^\circ$				20–12						1
				[421.60]	1 045 210–1 282 400	6–4	9.12−01	1.62−03	1.35−02	−2.012	D	LS
				[421.12]	1 045 210–1 282 670	4–2	7.27−01	9.67−04	5.36−03	−2.413	E+	LS
				[422.26]	1 045 210–1 282 030	6–6	2.60−01	6.94−04	5.79−03	−2.380	E+	LS
				[421.60]	1 045 210–1 282 400	4–4	4.65−01	1.24−03	6.88−03	−2.305	E+	LS
				[421.85]	1 045 620–1 282 670	2–2	7.23−01	1.93−03	5.36−03	−2.413	E+	LS
				[422.26]	1 045 210–1 282 030	4–6	2.89−02	1.16−04	6.45−04	−3.333	E	LS
				[422.33]	1 045 620–1 282 400	2–4	7.22−02	3.86−04	1.07−03	−3.112	E	LS
86		^{4}D−^{4}D$^\circ$				20–20						1
				[413.51]	1 045 210–1 287 040	6–6	4.68+00	1.20−02	9.80−02	−1.143	C	LS
				[413.51]	1 045 210–1 287 040	4–4	3.26+00	8.35−03	4.55−02	−1.476	D+	LS
				[414.22]	1 045 620–1 287 040	2–2	4.04+00	1.04−02	2.84−02	−1.682	D	LS
				[413.51]	1 045 210–1 287 040	6–4	2.85+00	4.87−03	3.98−02	−1.534	D+	LS
				[413.51]	1 045 210–1 287 040	4–2	4.07+00	5.22−03	2.84−02	−1.680	D	LS
				[413.51]	1 045 210–1 287 040	6–8	1.16+00	3.97−03	3.24−02	−1.623	D+	LS
				[413.51]	1 045 210–1 287 040	4–6	1.90+00	7.31−03	3.98−02	−1.534	D+	LS
				[414.22]	1 045 620–1 287 040	2–4	2.02+00	1.04−02	2.84−02	−1.682	D	LS
87		^{2}F−^{2}F$^\circ$		*412.49*	*1 047 540–1 289 973*	14–14	1.31+01	3.35−02	6.36−01	−0.329	C	1
				[414.56]	1 048 380–1 289 600	8–8	1.14+01	2.94−02	3.21−01	−0.629	C+	LS
				[409.75]	1 046 420–1 290 470	6–6	1.43+01	3.60−02	2.91−01	−0.666	C	LS
				[413.07]	1 048 380–1 290 470	8–6	5.68−01	1.09−03	1.19−02	−2.059	D	LS
				[411.22]	1 046 420–1 289 600	6–8	4.32−01	1.46−03	1.19−02	−2.057	D	LS
88		^{4}P−^{4}P$^\circ$		*426.36*	*1 047 715–1 282 260*	12–12	1.50+01	4.08−02	6.87−01	−0.310	C	1
				426.040	1 047 310–1 282 030	6–6	1.05+01	2.86−02	2.41−01	−0.765	C	LS
				426.603	1 047 990–1 282 400	4–4	1.99+00	5.43−03	3.05−02	−1.663	D+	LS
				426.821	1 048 380–1 282 670	2–2	2.49+00	6.79−03	1.91−02	−1.867	D	LS
				425.369	1 047 310–1 282 400	6–4	6.80+00	1.23−02	1.03−01	−1.132	C	LS
				426.112	1 047 990–1 282 670	4–2	1.25+01	1.70−02	9.54−02	−1.167	C	LS
				427.277	1 047 990–1 282 030	4–6	4.46+00	1.83−02	1.03−01	−1.135	C	LS
				427.314	1 048 380–1 282 400	2–4	6.19+00	3.39−02	9.54−02	−1.169	C	LS
89		^{4}P−^{4}D$^\circ$		*417.84*	*1 047 715–1 287 040*	12–20	1.93+01	8.41−02	1.39+00	0.004	C	1
				417.136	1 047 310–1 287 040	6–8	1.94+01	6.74−02	5.55−01	−0.393	C+	LS
				418.323	1 047 990–1 287 040	4–6	1.34+01	5.29−02	2.91−01	−0.674	C	LS
				419.006	1 048 380–1 287 040	2–4	7.96+00	4.19−02	1.16−01	−1.077	C	LS
				417.136	1 047 310–1 287 040	6–6	5.83+00	1.52−02	1.25−01	−1.040	C	LS
				418.323	1 047 990–1 287 040	4–4	1.03+01	2.69−02	1.48−01	−0.968	C	LS
				419.006	1 048 380–1 287 040	2–2	1.59+01	4.19−02	1.16−01	−1.077	C	LS

TABLE 60. Transition probabilities of allowed lines for Mg VI (reference for this table are as follows: 1=Burke and Lennon,[11] 2=Tachiev and Froese Fischer,[99] 3=Tachiev and Froese Fischer,[95] 4=Merkelis *et al.*[65])—Continued

No.	Transition aray	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				417.136	1 047 310–1 287 040	6–4	9.66−01	1.68−03	1.38−02	−1.997	D	LS
				418.323	1 047 990–1 287 040	4–2	3.20+00	4.20−03	2.31−02	−1.775	D	LS
90		^{4}P–^{4}S$^\circ$		*416.36*	*1 047 715*–1 287 890	12–4	2.05+01	1.78−02	2.93−01	−0.670	C	1
				[415.66]	1 047 310–1 287 890	6–4	1.03+01	1.78−02	1.46−01	−0.971	C	LS
				[416.84]	1 047 990–1 287 890	4–4	6.83+00	1.78−02	9.77−02	−1.148	C	LS
				[417.52]	1 048 380–1 287 890	2–4	3.39+00	1.77−02	4.87−02	−1.451	D+	LS
91		^{2}D–^{2}F$^\circ$		*439.40*	*1 062 392–1 289 973*	10–14	1.59+01	6.43−02	9.31−01	−0.192	C+	1
				[440.57]	1 062 620–1 289 600	6–8	1.57+01	6.11−02	5.32−01	−0.436	C+	LS
				[437.79]	1 062 050–1 290 470	4–6	1.50+01	6.46−02	3.72−01	−0.588	C+	LS
				[438.88]	1 062 620–1 290 470	6–6	1.06+00	3.07−03	2.66−02	−1.735	D	LS
92	$2s^22p^2(^3$P$)3d$– $2s2p^3(^5$S$^\circ)4d$	^{4}P–^{4}D$^\circ$		*306.71*	*1 047 715–1 373 760*	12–20	8.07−01	1.90−03	2.30−02	−1.642	E+	1
				306.326	1 047 310–1 373 760	6–8	8.10−01	1.52−03	9.20−03	−2.040	D	LS
				306.965	1 047 990–1 373 760	4–6	5.62−01	1.19−03	4.81−03	−2.322	E+	LS
				307.333	1 048 380–1 373 760	2–4	3.34−01	9.47−04	1.92−03	−2.723	E	LS
				306.326	1 047 310–1 373 760	6–6	2.43−01	3.42−04	2.07−03	−2.688	E+	LS
				306.965	1 047 990–1 373 760	4–4	4.30−01	6.07−04	2.45−03	−2.615	E+	LS
				307.333	1 048 380–1 373 760	2–2	6.69−01	9.47−04	1.92−03	−2.723	E	LS
				306.326	1 047 310–1 373 760	6–4	4.05−02	3.80−05	2.30−04	−3.642	E	LS
				306.965	1 047 990–1 373 760	4–2	1.34−01	9.48−05	3.83−04	−3.421	E	LS
93	$2s2p^3(^5$S$^\circ)3s$–$2s^22p^2(^3$P$)3d$	^{4}S$^\circ$–^{4}P		*1 075 cm*$^{-1}$	1 046 640–*1 047 715*	4–12	1.55−06	6.07−04	7.47−01	−2.615	C+	2
				670 cm^{-1}	1 046 640–1 047 310	4–6	3.32−07	1.67−04	3.27−01	−3.175	C+	2
				1 350 cm^{-1}	1 046 640–1 047 990	4–4	3.39−06	2.79−04	2.72−01	−2.952	C+	2
				1 740 cm^{-1}	1 046 640–1 048 380	4–2	7.90−06	1.96−04	1.48−01	−3.106	C	2
94	$2s2p^3(^5$S$^\circ)3s$–$2s2p^3(^5$S$^\circ)3p$	^{4}S$^\circ$–^{4}P		*1 869*	1 046 640–*1 100 150*	4–12	2.41+00	3.79−01	9.33+00	0.181	B+	2
				1 868.8	1 046 640–1 100 150	4–6	2.42+00	1.90−01	4.67+00	−0.119	B+	2
				1 868.8	1 046 640–1 100 150	4–4	2.41+00	1.26−01	3.11+00	−0.298	B+	2
				1 868.8	1 046 640–1 100 150	4–2	2.41+00	6.31−02	1.55+00	−0.598	B	2
95	$2s2p^3(^5$S$^\circ)3s$–$2s^22p^2(^3$P$)4s$	^{4}S$^\circ$–^{4}P				4–12						1
				[666.2]	1 046 640–1 196 740	4–6	2.40+00	2.40−02	2.11−01	−1.018	C	LS
96	$2s2p^3(^5$S$^\circ)3s$–$2s^22p^2(^3$P$)4d$	^{4}S$^\circ$–^{4}P		*485.80*	1 046 640–*1 252 485*	4–12	1.20+01	1.27−01	8.15−01	−0.294	C	1
				486.381	1 046 640–1 252 240	4–6	1.20+01	6.36−02	4.07−01	−0.594	C+	LS
				485.390	1 046 640–1 252 660	4–4	1.20+01	4.25−02	2.72−01	−0.770	C	LS
				484.896	1 046 640–1 252 870	4–2	1.21+01	2.13−02	1.36−01	−1.070	C	LS
97	$2s2p^3(^5$S$^\circ)3s$–$2s^22p^2(^3$P$)5s$	^{4}S$^\circ$–^{4}P				4–12						1
				[367.61]	1 046 640–1 318 670	4–6	1.39+00	4.21−03	2.04−02	−1.774	D	LS
				[368.92]	1 046 640–1 317 700	4–4	1.37+00	2.80−03	1.36−02	−1.951	D	LS
98	$2s2p^3(^5$S$^\circ)3s$–$2s2p^3(^5$S$^\circ)4p$	^{4}S$^\circ$–^{4}P		*339.78*	1 046 640–*1 340 950*	4–12	1.45+01	7.52−02	3.36−01	−0.522	C	1
				[339.78]	1 046 640–1 340 950	4–6	1.45+01	3.76−02	1.68−01	−0.823	C	LS
				[339.78]	1 046 640–1 340 950	4–4	1.45+01	2.51−02	1.12−01	−0.998	C	LS
				[339.78]	1 046 640–1 340 950	4–2	1.44+01	1.25−02	5.59−02	−1.301	D+	LS
99	$2s^22p^2(^1$D$)3d$– $2s2p^3(^3$D$^\circ)3s$	^{2}F–^{2}D$^\circ$		*1 484.3*	*1 083 469–1 150 840*	14–10	2.22−01	5.24−03	3.59−01	−1.135	C	1
				1 481.48	1 083 340–1 150 840	8–6	2.13−01	5.25−03	2.05−01	−1.377	C	LS

TABLE 60. Transition probabilities of allowed lines for Mg VI (reference for this table are as follows: 1=Burke and Lennon,[11] 2=Tachiev and Froese Fischer,[99] 3=Tachiev and Froese Fischer,[95] 4=Merkelis *et al.*[65])—Continued

No.	Transition aray	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				1 488.10	1 083 640–1 150 840	6–4	2.20−01	4.88−03	1.43−01	−1.533	C	LS
				1 488.10	1 083 640–1 150 840	6–6	1.05−02	3.48−04	1.02−02	−2.680	D	LS
100		^{2}D$-^2$D$^\circ$		*1 561.0*	*1 086 780–1 150 840*	10–10	8.09−02	2.95−03	1.52−01	−1.530	D+	1
				1 564.46	1 086 920–1 150 840	6–6	7.49−02	2.75−03	8.50−02	−1.783	C	LS
				1 555.94	1 086 570–1 150 840	4–4	7.36−02	2.67−03	5.47−02	−1.971	D+	LS
				1 564.46	1 086 920–1 150 840	6–4	8.05−03	1.97−04	6.09−03	−2.927	E+	LS
				1 555.94	1 086 570–1 150 840	4–6	5.46−03	2.97−04	6.09−03	−2.925	E+	LS
101		^{2}P$-^2$D$^\circ$		*1 762.0*	*1 094 087–1 150 840*	6–10	1.01−02	7.85−04	2.73−02	−2.327	D	1
				1 767.10	1 094 250–1 150 840	4–6	1.00−02	7.04−04	1.64−02	−2.550	D	LS
				1 751.93	1 093 760–1 150 840	2–4	8.57−03	7.89−04	9.10−03	−2.802	D	LS
				1 767.10	1 094 250–1 150 840	4–4	1.67−03	7.82−05	1.82−03	−3.505	E	LS
102	$2s^22p^2(^1D)3d$– $2s2p^3(^3P^\circ)3s$	^{2}D$-^2$P$^\circ$		*945.9*	*1 086 780–1 192 497*	10–6	3.23−01	2.60−03	8.10−02	−1.585	D+	1
				946.43	1 086 920–1 192 580	6–4	2.90−01	2.60−03	4.86−02	−1.807	D+	LS
				945.54	1 086 570–1 192 330	4–2	3.24−01	2.17−03	2.70−02	−2.061	D	LS
				943.31	1 086 570–1 192 580	4–4	3.26−02	4.35−04	5.40−03	−2.759	E+	LS
103		^{2}P$-^2$P$^\circ$		*1 016.2*	*1 094 087–1 192 497*	6–6	1.76−01	2.73−03	5.47−02	−1.786	D	1
				1 016.98	1 094 250–1 192 580	4–4	1.46−01	2.27−03	3.04−02	−2.042	D+	LS
				1 014.51	1 093 760–1 192 330	2–2	1.18−01	1.82−03	1.22−02	−2.439	D	LS
				1 019.58	1 094 250–1 192 330	4–2	5.81−02	4.53−04	6.08−03	−2.742	E+	LS
				1 011.94	1 093 760–1 192 580	2–4	2.97−02	9.12−04	6.08−03	−2.739	E+	LS
104	$2s^22p^2(^1D)3d$– $2s2p^3(^3D^\circ)3d$	^{2}D$-^2$F$^\circ$		*492.14*	*1 086 780–1 289 973*	10–14	4.63−01	2.36−03	3.82−02	−1.627	D	1
				[493.39]	1 086 920–1 289 600	6–8	4.60−01	2.24−03	2.18−02	−1.872	D	LS
				[490.44]	1 086 570–1 290 470	4–6	4.36−01	2.36−03	1.52−02	−2.025	D	LS
				[491.28]	1 086 920–1 290 470	6–6	3.10−02	1.12−04	1.09−03	−3.173	E	LS
105	$2s^22p^2(^1D)3d$?– $2s2p^3(^3P^\circ)3s$	^{2}S?$-^2$P$^\circ$		*[1 072]*	*1 099 180–1 192 497*	2–6	5.02−02	2.59−03	1.83−02	−2.286	D	1
				1 070.66	1 099 180–1 192 580	2–4	5.03−02	1.73−03	1.22−02	−2.461	D	LS
				1 073.54	1 099 180–1 192 330	2–2	4.99−02	8.63−04	6.10−03	−2.763	E+	LS
106	$2s2p^3(^5S^\circ)3p$– $2s2p^3(^3D^\circ)3s$	^{4}P$-^4$D$^\circ$	*4 571*	*4 572*	*1 100 150–1 122 020*	12–20	1.24−03	6.46−04	1.17−01	−2.111	D	1
			4 571.2	4 572.5	1 100 150–1 122 020	6–8	1.24−03	5.17−04	4.67−02	−2.508	D+	LS
			4 571.2	4 572.5	1 100 150–1 122 020	4–6	8.66−04	4.07−04	2.45−02	−2.788	D	LS
			4 571.2	4 572.5	1 100 150–1 122 020	2–4	5.15−04	3.23−04	9.72−03	−3.190	D	LS
			4 571.2	4 572.5	1 100 150–1 122 020	6–6	3.70−04	1.16−04	1.05−02	−3.157	D	LS
			4 571.2	4 572.5	1 100 150–1 122 020	4–4	6.60−04	2.07−04	1.25−02	−3.082	D	LS
			4 571.2	4 572.5	1 100 150–1 122 020	2–2	1.03−03	3.23−04	9.72−03	−3.190	D	LS
			4 571.2	4 572.5	1 100 150–1 122 020	6–4	6.17−05	1.29−05	1.17−03	−4.111	E	LS
			4 571.2	4 572.5	1 100 150–1 122 020	4–2	2.06−04	3.23−05	1.94−03	−3.889	E	LS
107	$2s2p^3(^5S^\circ)3p$–$2s2p^3(^3P^\circ)3s$	^{4}P$-^4$P$^\circ$		*1 380.1*	*1 100 150–1 172 610*	12–12	5.57−02	1.59−03	8.67−02	−1.719	D	1
				1 380.07	1 100 150–1 172 610	6–6	3.89−02	1.11−03	3.03−02	−2.177	D+	LS
				1 380.07	1 100 150–1 172 610	4–4	7.42−03	2.12−04	3.85−03	−3.072	E+	LS
				1 380.07	1 100 150–1 172 610	2–2	9.28−03	2.65−04	2.41−03	−3.276	E+	LS
				1 380.07	1 100 150–1 172 610	6–4	2.51−02	4.78−04	1.30−02	−2.542	D	LS
				1 380.07	1 100 150–1 172 610	4–2	4.64−02	6.63−04	1.20−02	−2.576	D	LS

TABLE 60. Transition probabilities of allowed lines for Mg VI (reference for this table are as follows: 1 = Burke and Lennon,[11] 2 = Tachiev and Froese Fischer,[99] 3 = Tachiev and Froese Fischer,[95] 4 = Merkelis *et al.*[65])—Continued

No.	Transition aray	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				1 380.07	1 100 150–1 172 610	4–6	1.67−02	7.17−04	1.30−02	−2.542	D	LS
				1 380.07	1 100 150–1 172 610	2–4	2.33−02	1.33−03	1.21−02	−2.575	D	LS
108	$2s2p^3(^5S^\circ)3p$– $2s2p^3(^5S^\circ)3d$	$^4P-^4D^\circ$		*1 328.9*	*1 100 150–1 175 400*	12–20	9.12+00	4.03−01	2.11+01	0.684	B+	1
				1 328.90	1 100 150–1 175 400	6–8	9.12+00	3.22−01	8.45+00	0.286	B+	LS
				1 328.90	1 100 150–1 175 400	4–6	6.40+00	2.54−01	4.44+00	0.007	B+	LS
				1 328.90	1 100 150–1 175 400	2–4	3.80+00	2.01−01	1.76+00	−0.396	B	LS
				1 328.90	1 100 150–1 175 400	6–6	2.73+00	7.24−02	1.90+00	−0.362	B	LS
				1 328.90	1 100 150–1 175 400	4–4	4.87+00	1.29−01	2.26+00	−0.287	B	LS
				1 328.90	1 100 150–1 175 400	2–2	7.59+00	2.01−01	1.76+00	−0.396	B	LS
				1 328.90	1 100 150–1 175 400	6–4	4.56−01	8.05−03	2.11−01	−1.316	C	LS
				1 328.90	1 100 150–1 175 400	4–2	1.52+00	2.01−02	3.52−01	−1.095	C+	LS
109	$2s2p^3(^5S^\circ)3p$– $2s2p^3(^3D^\circ)3d$	$^4P-^4P^\circ$		*549.12*	*1 100 150–1 282 260*	12–12	2.22+00	1.01−02	2.18−01	−0.916	D+	1
				549.813	1 100 150–1 282 030	6–6	1.55+00	7.03−03	7.63−02	−1.375	D+	LS
				548.697	1 100 150–1 282 400	4–4	2.97−01	1.34−03	9.68−03	−2.271	D	LS
				547.885	1 100 150–1 282 670	2–2	3.73−01	1.68−03	6.06−03	−2.474	E+	LS
				548.697	1 100 150–1 282 400	6–4	1.00+00	3.02−03	3.27−02	−1.742	D+	LS
				547.885	1 100 150–1 282 670	4–2	1.87+00	4.20−03	3.03−02	−1.775	D+	LS
				549.813	1 100 150–1 282 030	4–6	6.65−01	4.52−03	3.27−02	−1.743	D+	LS
				548.697	1 100 150–1 282 400	2–4	9.29−01	8.39−03	3.03−02	−1.775	D+	LS
110		$^4P-^4D^\circ$		*535.07*	*1 100 150–1 287 040*	12–20	2.43−01	1.74−03	3.68−02	−1.680	E+	1
				535.074	1 100 150–1 287 040	6–8	2.43−01	1.39−03	1.47−02	−2.079	D	LS
				535.074	1 100 150–1 287 040	4–6	1.71−01	1.10−03	7.75−03	−2.357	E+	LS
				535.074	1 100 150–1 287 040	2–4	1.01−01	8.70−04	3.07−03	−2.759	E+	LS
				535.074	1 100 150–1 287 040	6–6	7.29−02	3.13−04	3.31−03	−2.726	E+	LS
				535.074	1 100 150–1 287 040	4–4	1.30−01	5.57−04	3.92−03	−2.652	E+	LS
				535.074	1 100 150–1 287 040	2–2	2.03−01	8.70−04	3.07−03	−2.759	E+	LS
				535.074	1 100 150–1 287 040	6–4	1.22−02	3.48−05	3.68−04	−3.680	E	LS
				535.074	1 100 150–1 287 040	4–2	4.05−02	8.70−05	6.13−04	−3.458	E	LS
111		$^4P-^4S^\circ$		*532.65*	*1 100 150–1 287 890*	12–4	8.75+00	1.24−02	2.61−01	−0.827	C	1
				[532.65]	1 100 150–1 287 890	6–4	4.37+00	1.24−02	1.30−01	−1.128	C	LS
				[532.65]	1 100 150–1 287 890	4–4	2.92+00	1.24−02	8.70−02	−1.305	C	LS
				[532.65]	1 100 150–1 287 890	2–4	1.46+00	1.24−02	4.35−02	−1.606	D+	LS
112	$2s2p^3(^5S^\circ)3p$–$2s2p^3(^5S^\circ)4s$	$^4P-^4S^\circ$		*447.51*	*1 100 150–1 323 610*	12–4	7.01+01	7.02−02	1.24+00	−0.074	C+	1
				[447.51]	1 100 150–1 323 610	6–4	3.51+01	7.02−02	6.21−01	−0.376	C+	LS
				[447.51]	1 100 150–1 323 610	4–4	2.34+01	7.02−02	4.14−01	−0.552	C+	LS
				[447.51]	1 100 150–1 323 610	2–4	1.17+01	7.02−02	2.07−01	−0.853	C	LS
113	$2s2p^3(^5S^\circ)3p$– $2s2p^3(^5S^\circ)4d$	$^4P-^4D^\circ$		*365.48*	*1 100 150–1 373 760*	12–20	5.81+01	1.94−01	2.80+00	0.367	C+	1
				365.484	1 100 150–1 373 760	6–8	5.80+01	1.55−01	1.12+00	−0.032	B	LS
				365.484	1 100 150–1 373 760	4–6	4.06+01	1.22−01	5.87−01	−0.312	C+	LS
				365.484	1 100 150–1 373 760	2–4	2.42+01	9.71−02	2.34−01	−0.712	C	LS
				365.484	1 100 150–1 373 760	6–6	1.75+01	3.50−02	2.53−01	−0.678	C	LS
				365.484	1 100 150–1 373 760	4–4	3.11+01	6.22−02	2.99−01	−0.604	C	LS
				365.484	1 100 150–1 373 760	2–2	4.85+01	9.71−02	2.34−01	−0.712	C	LS
				365.484	1 100 150–1 373 760	6–4	2.91+00	3.88−03	2.80−02	−1.633	D	LS
				365.484	1 100 150–1 373 760	4–2	9.70+00	9.71−03	4.67−02	−1.411	D+	LS

TABLE 60. Transition probabilities of allowed lines for Mg VI (reference for this table are as follows: 1 = Burke and Lennon,[11] 2 = Tachiev and Froese Fischer,[99] 3 = Tachiev and Froese Fischer,[95] 4 = Merkelis *et al.*[65])—Continued

No.	Transition aray	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
114	$2s2p^3(^3D^\circ)3s$– $2s^22p^2(^3P)4s$	$^4D^\circ-^4P$				20–12						1
				[1 338.3]	1 122 020–1 196 740	8–6	1.42+00	2.86−02	1.01+00	−0.641	B	LS
				[1 338.3]	1 122 020–1 196 740	6–6	3.19−01	8.57−03	2.27−01	−1.289	C	LS
				[1 338.3]	1 122 020–1 196 740	4–6	3.55−02	1.43−03	2.52−02	−2.243	D	LS
115		$^2D^\circ-^2P$				10–6						1
			2 055.7	2 056.3	1 150 840–1 199 470	6–4	6.46−01	2.73−02	1.11+00	−0.786	B	LS
			2 055.7	2 056.3	1 150 840–1 199 470	4–4	7.18−02	4.55−03	1.23−01	−1.740	C	LS
116	$2s2p^3(^3D^\circ)3s$– $2s2p^3(^3D^\circ)3p$	$^2D^\circ-^2F$		*1 375.2*	*1 150 840–1 223 554*	10–14	6.64+00	2.64−01	1.19+01	0.422	B+	1
				[1 380.5]	1 150 840–1 223 280	6–8	6.56+00	2.50−01	6.82+00	0.176	B+	LS
				[1 368.4]	1 150 840–1 223 920	4–6	6.29+00	2.65−01	4.78+00	0.025	B+	LS
				[1 368.4]	1 150 840–1 223 920	6–6	4.49−01	1.26−02	3.41−01	−1.121	C+	LS
117	$2s2p^3(^3D^\circ)3s$– $2s^22p^2(^1D)4s$	$^2D^\circ-^2D$		*1 178.6*	*1 150 840–1 235 690*	10–10	1.16−01	2.41−03	9.36−02	−1.618	D+	1
				1 178.55	1 150 840–1 235 690	6–6	1.08−01	2.25−03	5.24−02	−1.870	D+	LS
				1 178.55	1 150 840–1 235 690	4–4	1.04−01	2.17−03	3.37−02	−2.061	D+	LS
				1 178.55	1 150 840–1 235 690	6–4	1.16−02	1.61−04	3.75−03	−3.015	E+	LS
				1 178.55	1 150 840–1 235 690	4–6	7.75−03	2.42−04	3.76−03	−3.014	E+	LS
118	$2s2p^3(^3D^\circ)3s$– $2s^22p^2(^3P)4d$	$^2D^\circ-^2F$		*972.7*	*1 150 840–1 253 643*	10–14	3.46−01	6.87−03	2.20−01	−1.163	C	1
				[966.1]	1 150 840–1 254 350	6–8	3.53−01	6.59−03	1.26−01	−1.403	C	LS
				[981.7]	1 150 840–1 252 700	4–6	3.14−01	6.80−03	8.79−02	−1.565	C	LS
				[981.7]	1 150 840–1 252 700	6–6	2.24−02	3.24−04	6.28−03	−2.711	E+	LS
119	$2s2p^3(^3D^\circ)3s$– $2s^22p^2(^1D)4d$	$^2D^\circ-^2F$		*727.4*	*1 150 840–1 288 310*	10–14	1.97+00	2.18−02	5.23−01	−0.662	C	1
				[727.4]	1 150 840–1 288 310	6–8	1.97+00	2.08−02	2.99−01	−0.904	C	LS
				[727.4]	1 150 840–1 288 310	4–6	1.83+00	2.18−02	2.09−01	−1.059	C	LS
				[727.4]	1 150 840–1 288 310	6–6	1.31−01	1.04−03	1.49−02	−2.205	D	LS
120		$^2D^\circ-^2D$		*713.5*	*1 150 840–1 290 990*	10–10	2.30+00	1.76−02	4.13−01	−0.754	C	1
				713.52	1 150 840–1 290 990	6–6	2.15+00	1.64−02	2.31−01	−1.007	C	LS
				713.52	1 150 840–1 290 990	4–4	2.07+00	1.58−02	1.48−01	−1.199	C	LS
				713.52	1 150 840–1 290 990	6–4	2.30−01	1.17−03	1.65−02	−2.154	D	LS
				713.52	1 150 840–1 290 990	4–6	1.54−01	1.76−03	1.65−02	−2.152	D	LS
121		$^2D^\circ-^2P$		*697.8*	*1 150 840–1 294 150*	10–6	5.26−01	2.30−03	5.29−02	−1.638	D	1
				[697.8]	1 150 840–1 294 150	6–4	4.73−01	2.30−03	3.17−02	−1.860	D+	LS
				[697.8]	1 150 840–1 294 150	4–2	5.26−01	1.92−03	1.76−02	−2.115	D	LS
				[697.8]	1 150 840–1 294 150	4–4	5.26−02	3.84−04	3.53−03	−2.814	E+	LS
122	$2s2p^3(^3D^\circ)3s$– $2s2p^3(^5S^\circ)4p$	$^4D^\circ-^4P$		*456.77*	*1 122 020–1 340 950*	20–12	2.73+00	5.12−03	1.54−01	−0.990	D	1
				[456.77]	1 122 020–1 340 950	8–6	2.18+00	5.12−03	6.16−02	−1.388	D+	LS
				[456.77]	1 122 020–1 340 950	6–4	1.72+00	3.59−03	3.24−02	−1.667	D+	LS
				[456.77]	1 122 020–1 340 950	4–2	1.36+00	2.13−03	1.28−02	−2.070	D	LS
				[456.77]	1 122 020–1 340 950	6–6	4.92−01	1.54−03	1.39−02	−2.034	D	LS
				[456.77]	1 122 020–1 340 950	4–4	8.73−01	2.73−03	1.64−02	−1.962	D	LS
				[456.77]	1 122 020–1 340 950	2–2	1.37+00	4.27−03	1.28−02	−2.069	D	LS

TABLE 60. Transition probabilities of allowed lines for Mg VI (reference for this table are as follows: 1=Burke and Lennon,[11] 2=Tachiev and Froese Fischer,[99] 3=Tachiev and Froese Fischer,[95] 4=Merkelis *et al.*[65])—Continued

No.	Transition aray	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				[456.77]	1 122 020–1 340 950	4–6	5.46−02	2.56−04	1.54−03	−2.990	E	LS
				[456.77]	1 122 020–1 340 950	2–4	1.37−01	8.54−04	2.57−03	−2.768	E+	LS
123	$2s2p^3(^3D^\circ)3s$–$2s^22p^2(^1D)5d$	$^2D^\circ-^2F$		*431.15*	*1 150 840–1 382 780*	10–14	4.45−01	1.74−03	2.46−02	−1.759	D	1
				[431.15]	1 150 840–1 382 780	6–8	4.44−01	1.65−03	1.41−02	−2.004	D	LS
				[431.15]	1 150 840–1 382 780	4–6	4.16−01	1.74−03	9.88−03	−2.157	D	LS
				[431.15]	1 150 840–1 382 780	6–6	2.97−02	8.27−05	7.04−04	−3.304	E	LS
124	$2s2p^3(^3D^\circ)3s$–$2s^22p^2(^1D)5d$?	$^2D^\circ-^2D$?		*[428.4]*	*1 150 840–1 384 290*	10–10	4.98−01	1.37−03	1.93−02	−1.863	E+	1
				428.357	1 150 840–1 384 290	6–6	4.65−01	1.28−03	1.08−02	−2.115	D	LS
				428.357	1 150 840–1 384 290	4–4	4.47−01	1.23−03	6.94−03	−2.308	E+	LS
				428.357	1 150 840–1 384 290	6–4	4.98−02	9.14−05	7.73−04	−3.261	E	LS
				428.357	1 150 840–1 384 290	4–6	3.32−02	1.37−04	7.73−04	−3.261	E	LS
125	$2s^22p^2(^1S)3d$–$2s2p^3(^3P^\circ)3s$	$^2D-^2P^\circ$		*1 479.1*	*1 124 890–1 192 497*	10–6	1.08−01	2.13−03	1.04−01	−1.672	D+	1
				1 477.32	1 124 890–1 192 580	6–4	9.76−02	2.13−03	6.22−02	−1.893	D+	LS
				1 482.80	1 124 890–1 192 330	4–2	1.07−01	1.77−03	3.46−02	−2.150	D+	LS
				1 477.32	1 124 890–1 192 580	4–4	1.08−02	3.55−04	6.91−03	−2.848	E+	LS
126	$2s^22p^2(^1S)3d$–$2s2p^3(^3D^\circ)3d$	$^2D-^2F^\circ$		*605.8*	*1 124 890–1 289 973*	10–14	1.93−01	1.48−03	2.96−02	−1.830	D	1
				[607.1]	1 124 890–1 289 600	6–8	1.91−01	1.41−03	1.69−02	−2.073	D	LS
				[603.9]	1 124 890–1 290 470	4–6	1.82−01	1.49−03	1.18−02	−2.225	D	LS
				[603.9]	1 124 890–1 290 470	6–6	1.30−02	7.11−05	8.48−04	−3.370	E	LS
127	$2s2p^3(^3P^\circ)3s$–$2s^22p^2(^3P)4s$	$^4P^\circ-^4P$				12–12						1
			[4 143]	[4 144]	1 172 610–1 196 740	6–6	2.56−02	6.59−03	5.39−01	−1.403	C+	LS
			[4 143]	[4 144]	1 172 610–1 196 740	4–6	1.10−02	4.24−03	2.31−01	−1.771	C	LS
128		$^2P^\circ-^2P$				6–6						1
			14 510	14 514	1 192 580–1 199 470	4–4	8.07−05	2.55−04	4.87−02	−2.991	D+	LS
			14 002	14 006	1 192 330–1 199 470	2–4	1.80−05	1.06−04	9.77−03	−3.674	D	LS
129	$2s2p^3(^3P^\circ)3s$–$2s^22p^2(^1D)4s$	$^2P^\circ-^2D$	*2 314*	*2 315*	*1 192 497–1 235 690*	6–10	4.62−02	6.18−03	2.83−01	−1.431	C	1
			2 318.9	2 319.6	1 192 580–1 235 690	4–6	4.59−02	5.55−03	1.70−01	−1.654	C	LS
			2 305.6	2 306.3	1 192 330–1 235 690	2–4	3.89−02	6.20−03	9.41−02	−1.907	C	LS
			2 318.9	2 319.6	1 192 580–1 235 690	4–4	7.65−03	6.17−04	1.88−02	−2.608	D	LS
130	$2s2p^3(^3P^\circ)3s$–$2s^22p^2(^3P)4d$	$^4P^\circ-^4D$				12–20						1
				[1 311.0]	1 172 610–1 248 830	4–6	2.89−02	1.12−03	1.94−02	−2.349	D	LS
				[1 311.0]	1 172 610–1 248 830	2–4	1.72−02	8.89−04	7.68−03	−2.750	E+	LS
				[1 311.0]	1 172 610–1 248 830	6–6	1.24−02	3.20−04	8.29−03	−2.717	E+	LS
				[1 311.0]	1 172 610–1 248 830	4–4	2.20−02	5.69−04	9.83−03	−2.643	D	LS
				[1 300.6]	1 172 610–1 249 500	2–2	3.54−02	8.97−04	7.68−03	−2.746	E+	LS
				[1 311.0]	1 172 610–1 248 830	6–4	2.07−03	3.56−05	9.23−04	−3.670	E	LS
				[1 300.6]	1 172 610–1 249 500	4–2	7.07−03	8.97−05	1.54−03	−3.445	E	LS
131		$^4P^\circ-^4P$		*1 252.0*	*1 172 610–1 252 485*	12–12	4.92+00	1.16−01	5.72+00	0.144	B	1
				1 255.81	1 172 610–1 252 240	6–6	3.41+00	8.07−02	2.00+00	−0.315	B	LS
				1 249.22	1 172 610–1 252 660	4–4	6.63−01	1.55−02	2.55−01	−1.208	C	LS
				1 245.95	1 172 610–1 252 870	2–2	8.34−01	1.94−02	1.59−01	−1.411	C	LS

TABLE 60. Transition probabilities of allowed lines for Mg VI (reference for this table are as follows: 1=Burke and Lennon,[11] 2=Tachiev and Froese Fischer,[99] 3=Tachiev and Froese Fischer,[95] 4=Merkelis *et al.*[65])—Continued

No.	Transition aray	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				1 249.22	1 172 610–1 252 660	6–4	2.23+00	3.48−02	8.59−01	−0.680	C+	LS
				1 245.95	1 172 610–1 252 870	4–2	4.16+00	4.84−02	7.94−01	−0.713	C+	LS
				1 255.81	1 172 610–1 252 240	4–6	1.46+00	5.19−02	8.58−01	−0.683	C+	LS
				1 249.22	1 172 610–1 252 660	2–4	2.06+00	9.66−02	7.95−01	−0.714	C+	LS
132		$^2P^\circ-^2D$				6–10						1
				[1 519.8]	1 192 580–1 258 380	4–6	1.84+00	9.56−02	1.91+00	−0.417	B	LS
133	$2s2p^3(^3P^\circ)3s-$ $2s^22p^2(^1D)4d$	$^2P^\circ-^2D$		*1 015.3*	*1 192 497–1 290 990*	6–10	6.38−01	1.64−02	3.29−01	−1.007	C	1
				1 016.16	1 192 580–1 290 990	4–6	6.37−01	1.48−02	1.98−01	−1.228	C	LS
				1 013.58	1 192 330–1 290 990	2–4	5.32−01	1.64−02	1.09−01	−1.484	C	LS
				1 016.16	1 192 580–1 290 990	4–4	1.06−01	1.64−03	2.19−02	−2.183	D	LS
134		$^2P^\circ-^2P$		*983.7*	*1 192 497–1 294 150*	6–6	6.79−01	9.85−03	1.91−01	−1.228	D+	1
				[984.5]	1 192 580–1 294 150	4–4	5.64−01	8.20−03	1.06−01	−1.484	C	LS
				[982.1]	1 192 330–1 294 150	2–2	4.55−01	6.58−03	4.25−02	−1.881	D+	LS
				[984.5]	1 192 580–1 294 150	4–2	2.26−01	1.64−03	2.13−02	−2.183	D	LS
				[982.1]	1 192 330–1 294 150	2–4	1.14−01	3.29−03	2.13−02	−2.182	D	LS
135		$^2P^\circ-^2S$		*961.3*	*1 192 497*–1 296 520	6–2	2.05+00	9.47−03	1.80−01	−1.245	C	1
				[962.1]	1 192 580–1 296 520	4–2	1.36+00	9.46−03	1.20−01	−1.422	C	LS
				[959.8]	1 192 330–1 296 520	2–2	6.86−01	9.48−03	5.99−02	−1.722	D+	LS
136	$2s2p^3(^3P^\circ)3s-2s^22p^2(^3P)5s$	$^4P^\circ-^4P$				12–12						1
				[684.6]	1 172 610–1 318 670	6–6	4.04−01	2.84−03	3.84−02	−1.769	D+	LS
				[689.2]	1 172 610–1 317 700	4–4	7.54−02	5.37−04	4.87−03	−2.668	E+	LS
				[689.2]	1 172 610–1 317 700	6–4	2.55−01	1.21−03	1.65−02	−2.139	D	LS
				[684.6]	1 172 610–1 318 670	4–6	1.73−01	1.82−03	1.64−02	−2.138	D	LS
				[689.2]	1 172 610–1 317 700	2–4	2.35−01	3.35−03	1.52−02	−2.174	D	LS
137	$2s2p^3(^3P^\circ)3s-2s^22p^2(^1S)4d$	$^2P^\circ-^2D$		*709.2*	*1 192 497–1 333 500*	6–10	1.40+00	1.76−02	2.47−01	−0.976	C	1
				[709.6]	1 192 580–1 333 500	4–6	1.40+00	1.59−02	1.49−01	−1.197	C	LS
				[708.4]	1 192 330–1 333 500	2–4	1.17+00	1.76−02	8.21−02	−1.453	D+	LS
				[709.6]	1 192 580–1 333 500	4–4	2.33−01	1.76−03	1.64−02	−2.152	D	LS
138	$2s2p^3(^3P^\circ)3s-2s2p^3(^5S^\circ)4p$	$^4P^\circ-^4P$		*594.0*	*1 172 610–1 340 950*	12–12	6.55−01	3.47−03	8.14−02	−1.380	D	1
				[594.0]	1 172 610–1 340 950	6–6	4.59−01	2.43−03	2.85−02	−1.836	D	LS
				[594.0]	1 172 610–1 340 950	4–4	8.73−02	4.62−04	3.61−03	−2.733	E+	LS
				[594.0]	1 172 610–1 340 950	2–2	1.09−01	5.78−04	2.26−03	−2.937	E+	LS
				[594.0]	1 172 610–1 340 950	6–4	2.95−01	1.04−03	1.22−02	−2.205	D	LS
				[594.0]	1 172 610–1 340 950	4–2	5.44−01	1.44−03	1.13−02	−2.240	D	LS
				[594.0]	1 172 610–1 340 950	4–6	1.97−01	1.56−03	1.22−02	−2.205	D	LS
				[594.0]	1 172 610–1 340 950	2–4	2.73−01	2.89−03	1.13−02	−2.238	D	LS
139	$2s2p^3(^5S^\circ)3d-$ $2s^22p^2(^3P)4d$	$^4D^\circ-^4P$		*1 297.3*	*1 175 400–1 252 485*	20–12	2.83−02	4.28−04	3.66−02	−2.068	E+	1
				1 301.41	1 175 400–1 252 240	8–6	2.24−02	4.27−04	1.46−02	−2.466	D	LS
				1 294.33	1 175 400–1 252 660	6–4	1.79−02	3.00−04	7.67−03	−2.745	E+	LS
				1 290.82	1 175 400–1 252 870	4–2	1.43−02	1.79−04	3.04−03	−3.145	E+	LS
				1 301.41	1 175 400–1 252 240	6–6	5.04−03	1.28−04	3.29−03	−3.115	E+	LS
				1 294.33	1 175 400–1 252 660	4–4	9.12−03	2.29−04	3.90−03	−3.038	E+	LS
				1 290.82	1 175 400–1 252 870	2–2	1.43−02	3.58−04	3.04−03	−3.145	E+	LS
				1 301.41	1 175 400–1 252 240	4–6	5.59−04	2.13−05	3.65−04	−4.070	E	LS
				1 294.33	1 175 400–1 252 660	2–4	1.42−03	7.15−05	6.09−04	−3.845	E	LS

TABLE 60. Transition probabilities of allowed lines for Mg VI (reference for this table are as follows: 1 = Burke and Lennon,[11] 2 = Tachiev and Froese Fischer,[99] 3 = Tachiev and Froese Fischer,[95] 4 = Merkelis *et al.*[65])—Continued

No.	Transition aray	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
140	$2s2p^3(^5S^\circ)3d$– $2s2p^3(^5S^\circ)4p$	$^4D^\circ-^4P$		*604.0*	*1 175 400–1 340 950*	20–12	1.51+01	4.97−02	1.98+00	−0.003	C+	1
				[604.0]	1 175 400–1 340 950	8–6	1.21+00	4.97−02	7.91−01	−0.401	C+	LS
				[604.0]	1 175 400–1 340 950	6–4	9.54+00	3.48−02	4.15−01	−0.680	C+	LS
				[604.0]	1 175 400–1 340 950	4–2	7.57+00	2.07−02	1.65−01	−1.082	C	LS
				[604.0]	1 175 400–1 340 950	6–6	2.72+00	1.49−02	1.78−01	−1.049	C	LS
				[604.0]	1 175 400–1 340 950	4–4	4.84+00	2.65−02	2.11−01	−0.975	C	LS
				[604.0]	1 175 400–1 340 950	2–2	7.57+00	4.14−02	1.65−01	−1.082	C	LS
				[604.0]	1 175 400–1 340 950	4–6	3.03−01	2.49−03	1.98−02	−2.002	D	LS
				[604.0]	1 175 400–1 340 950	2–4	7.58−01	8.29−03	3.30−02	−1.780	D+	LS
141	$2s^22p^2(^3P)4s$– $2s2p^3(^3D^\circ)3d$	$^4P-^4P^\circ$				12–12						1
				[1 172.5]	1 196 740–1 282 030	6–6	1.35−01	2.78−03	6.44−02	−1.778	D+	LS
				[1 167.4]	1 196 740–1 282 400	6–4	8.81−02	1.20−03	2.77−02	−2.143	D	LS
142		$^4P-^4D^\circ$				12–20						1
				[1 107.4]	1 196 740–1 287 040	6–8	8.24−02	2.02−03	4.42−02	−1.916	D+	LS
				[1 107.4]	1 196 740–1 287 040	6–6	2.47−02	4.55−04	9.95−03	−2.564	D	LS
				[1 107.4]	1 196 740–1 287 040	6–4	4.12−03	5.05−05	1.10−03	−3.519	E	LS
143		$^4P-^4S^\circ$				12–4						1
				[1 097.1]	1 196 740–1 287 890	6–4	1.34−01	1.61−03	3.49−02	−2.015	D+	LS
144	$2s^22p^2(^3P)4s$–$2s2p^3(^5S^\circ)4s$	$^4P-^4S^\circ$				12–4						1
				[788.2]	1 196 740–1 323 610	6–4	1.38+00	8.56−03	1.33−01	−1.289	C	LS
145	$2s2p^3(^3D^\circ)3p$– $2s2p^3(^3D^\circ)3d$	$^2F-^2F^\circ$		*1 505.6*	*1 223 554–1 289 973*	14–14	3.21+00	1.09−01	7.58+00	0.184	B	1
				[1 507.8]	1 223 280–1 289 600	8–8	2.82+00	9.62−02	3.82+00	−0.114	B+	LS
				[1 502.6]	1 223 920–1 290 470	6–6	3.46+00	1.17−01	3.47+00	−0.154	B+	LS
				[1 488.3]	1 223 280–1 290 470	8–6	1.45−01	3.61−03	1.42−01	−1.539	C	LS
				[1 522.5]	1 223 920–1 289 600	6–8	1.01−01	4.70−03	1.41−01	−1.550	C	LS
146	$2s^22p^2(^1D)4s$– $2s2p^3(^3D^\circ)3d$	$^2D-^2F^\circ$		*1 842*	*1 235 690–1 289 973*	10–14	2.92−01	2.08−02	1.26+00	−0.682	C+	1
				[1 855]	1 235 690–1 289 600	6–8	2.86−01	1.97−02	7.22−01	−0.927	C+	LS
				[1 826]	1 235 690–1 290 470	4–6	2.80−01	2.10−02	5.05−01	−1.076	C+	LS
				[1 826]	1 235 690–1 290 470	6–6	2.00−02	1.00−03	3.61−02	−2.222	D+	LS
147	$2s^22p^2(^3P)4d$– $2s2p^3(^3D^\circ)3d$	$^4D-^4P^\circ$				20–12						1
			[2 978]	[2 979]	1 248 830–1 282 400	6–4	2.63−02	2.33−03	1.37−01	−1.854	C	LS
			[2 954]	[2 955]	1 248 830–1 282 670	4–2	2.14−02	1.40−03	5.45−02	−2.252	D+	LS
			[3 011]	[3 012]	1 248 830–1 282 030	6–6	7.26−03	9.87−04	5.87−02	−2.228	D+	LS
			[2 978]	[2 979]	1 248 830–1 282 400	4–4	1.33−02	1.77−03	6.94−02	−2.150	D+	LS
			[3 014]	[3 015]	1 249 500–1 282 670	2–2	2.01−02	2.74−03	5.44−02	−2.261	D+	LS
			[3 011]	[3 012]	1 248 830–1 282 030	4–6	8.04−04	1.64−04	6.50−03	−3.183	E+	LS
			[3 039]	[3 040]	1 249 500–1 282 400	2–4	1.96−03	5.43−04	1.09−02	−2.964	D	LS
148		$^4D-^4D^\circ$				20–20						1
			[2 616]	[2 617]	1 248 830–1 287 040	6–6	9.74−03	1.00−03	5.17−02	−2.222	D+	LS
			[2 616]	[2 617]	1 248 830–1 287 040	4–4	6.82−03	7.00−04	2.41−02	−2.553	D	LS
			[2 663]	[2 664]	1 249 500–1 287 040	2–2	8.07−03	8.59−04	1.51−02	−2.765	D	LS
			[2 616]	[2 617]	1 248 830–1 287 040	6–4	5.96−03	4.08−04	2.11−02	−2.611	D	LS

TABLE 60. Transition probabilities of allowed lines for Mg VI (reference for this table are as follows: 1 = Burke and Lennon,[11] 2 = Tachiev and Froese Fischer,[99] 3 = Tachiev and Froese Fischer,[95] 4 = Merkelis *et al.*[65])—Continued

No.	Transition aray	Mult.	$\lambda_{\rm air}$ (Å)	$\lambda_{\rm vac}$ (Å) or σ (cm^{-1})$^{\rm a}$	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
			[2 616]	[2 617]	1 248 830–1 287 040	4–2	8.51−03	4.37−04	1.51−02	−2.757	D	LS
			[2 616]	[2 617]	1 248 830–1 287 040	6–8	2.42−03	3.32−04	1.72−02	−2.701	D	LS
			[2 616]	[2 617]	1 248 830–1 287 040	4–6	3.97−03	6.12−04	2.11−02	−2.611	D	LS
			[2 663]	[2 664]	1 249 500–1 287 040	2–4	4.04−03	8.59−04	1.51−02	−2.765	D	LS
149		^{4}P$-^4$P$^\circ$	*3 358*	*3 359*	*1 252 485–1 282 260*	12–12	3.07−03	5.19−04	6.88−02	−2.206	D	1
			3 355.9	3 356.8	1 252 240–1 282 030	6–6	2.15−03	3.63−04	2.41−02	−2.662	D	LS
			3 361.5	3 362.5	1 252 660–1 282 400	4–4	4.08−04	6.91−05	3.06−03	−3.558	E+	LS
			3 354.7	3 355.7	1 252 870–1 282 670	2–2	5.12−04	8.65−05	1.91−03	−3.762	E	LS
			3 314.7	3 315.6	1 252 240–1 282 400	6–4	1.44−03	1.58−04	1.03−02	−3.023	D	LS
			3 331.3	3 332.2	1 252 660–1 282 670	4–2	2.62−03	2.18−04	9.57−03	−3.059	D	LS
			3 403.9	3 404.8	1 252 660–1 282 030	4–6	8.82−04	2.30−04	1.03−02	−3.036	D	LS
			3 385.4	3 386.4	1 252 870–1 282 400	2–4	1.25−03	4.29−04	9.57−03	−3.067	D	LS
150		^{4}P$-^4$D$^\circ$	*2 893*	*2 894*	*1 252 485–1 287 040*	12–20	3.98−02	8.32−03	9.51−01	−1.001	C	1
			2 872.7	2 873.6	1 252 240–1 287 040	6–8	4.06−02	6.70−03	3.80−01	−1.396	C+	LS
			2 907.8	2 908.7	1 252 660–1 287 040	4–6	2.74−02	5.21−03	2.00−01	−1.681	C	LS
			2 925.7	2 926.5	1 252 870–1 287 040	2–4	1.60−02	4.11−03	7.92−02	−2.085	D+	LS
			2 872.7	2 873.6	1 252 240–1 287 040	6–6	1.22−02	1.51−03	8.57−02	−2.043	C	LS
			2 907.8	2 908.7	1 252 660–1 287 040	4–4	2.09−02	2.65−03	1.02−01	−1.975	C	LS
			2 925.7	2 926.5	1 252 870–1 287 040	2–2	3.20−02	4.11−03	7.92−02	−2.085	D+	LS
			2 872.7	2 873.6	1 252 240–1 287 040	6–4	2.02−03	1.67−04	9.48−03	−2.999	D	LS
			2 907.8	2 908.7	1 252 660–1 287 040	4–2	6.53−03	4.14−04	1.59−02	−2.781	D	LS
151		^{4}P$-^4$S$^\circ$	*2 824*	*2 824*	1 252 485–1 287 890	12–4	3.21−02	1.28−03	1.43−01	−1.814	D+	1
			[2 804]	[2 805]	1 252 240–1 287 890	6–4	1.64−02	1.29−03	7.15−02	−2.111	D+	LS
			[2 838]	[2 838]	1 252 660–1 287 890	4–4	1.05−02	1.27−03	4.75−02	−2.294	D+	LS
			[2 855]	[2 856]	1 252 870–1 287 890	2–4	5.15−03	1.26−03	2.37−02	−2.599	D	LS
152		^{2}D$-^2$F$^\circ$				10–14						1
			[3 202]	[3 203]	1 258 380–1 289 600	6–8	2.66−02	5.45−03	3.45−01	−1.485	C+	LS
			[3 115]	[3 116]	1 258 380–1 290 470	6–6	1.92−03	2.80−04	1.72−02	−2.775	D	LS
153	$2s^22p^2(^3$P$)4d-2s2p^3(^5$S$^\circ)4s$	^{4}P$-^4$S$^\circ$		*1 406.0*	*1 252 485–1 323 610*	12–4	2.28+00	2.25−02	1.25+00	−0.569	C+	1
				[1 401.2]	1 252 240–1 323 610	6–4	1.15+00	2.26−02	6.25−01	−0.868	C+	LS
				[1 409.4]	1 252 660–1 323 610	4–4	7.55−01	2.25−02	4.18−01	−1.046	C+	LS
				[1 413.6]	1 252 870–1 323 610	2–4	3.74−01	2.24−02	2.08−01	−1.349	C	LS
154	$2s^22p^2(^3$P$)4d-$ $2s2p^3(^5$S$^\circ)4d$	^{4}P$-^4$D$^\circ$		*824.6*	*1 252 485–1 373 760*	12–20	6.85−02	1.16−03	3.79−02	−1.856	E+	1
				822.91	1 252 240–1 373 760	6–8	6.89−02	9.33−04	1.52−02	−2.252	D	LS
				825.76	1 252 660–1 373 760	4–6	4.77−02	7.32−04	7.96−03	−2.533	E+	LS
				827.20	1 252 870–1 373 760	2–4	2.83−02	5.80−04	3.16−03	−2.936	E+	LS
				822.91	1 252 240–1 373 760	6–6	2.07−02	2.10−04	3.41−03	−2.900	E+	LS
				825.76	1 252 660–1 373 760	4–4	3.64−02	3.72−04	4.05−03	−2.827	E+	LS
				827.20	1 252 870–1 373 760	2–2	5.65−02	5.80−04	3.16−03	−2.936	E+	LS
				822.91	1 252 240–1 373 760	6–4	3.44−03	2.33−05	3.79−04	−3.854	E	LS
				825.76	1 252 660–1 373 760	4–2	1.14−02	5.81−05	6.32−04	−3.634	E	LS
155	$2s2p^3(^3$D$^\circ)3d-$ $2s^22p^2(^1$D$)4d$	^{2}F$^\circ-^2$D		*1 017 cm*$^{-1}$	*1 289 973–1 290 990*	14–10	3.96−07	4.07−05	1.84−01	−3.244	D+	1
				[1 390]	1 289 600–1 290 990	8–6	9.54−07	5.55−05	1.05−01	−3.353	C	LS
				[520]	1 290 470–1 290 990	6–4	5.25−08	1.94−05	7.37−02	−3.934	D+	LS
				[520]	1 290 470–1 290 990	6–6	2.51−09	1.39−06	5.28−03	−5.079	E+	LS
156	$2s2p^3(^3$D$^\circ)3d-$ $2s^22p^2(^3$P$)5s$	^{4}P$^\circ-^4$P				12–12						1

TABLE 60. Transition probabilities of allowed lines for Mg VI (reference for this table are as follows: 1=Burke and Lennon,[11] 2=Tachiev and Froese Fischer,[99] 3=Tachiev and Froese Fischer,[95] 4=Merkelis *et al.*[65])—Continued

No.	Transition aray	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
			[2 728]	[2 729]	1 282 030–1 318 670	6–6	1.54−02	1.72−03	9.27−02	−1.986	C	LS
			[2 832]	[2 833]	1 282 400–1 317 700	4–4	2.63−03	3.16−04	1.18−02	−2.898	D	LS
			[2 803]	[2 803]	1 282 030–1 317 700	6–4	9.15−03	7.19−04	3.98−02	−2.365	D+	LS
			[2 756]	[2 757]	1 282 400–1 318 670	4–6	6.43−03	1.10−03	3.99−02	−2.357	D+	LS
			[2 854]	[2 855]	1 282 670–1 317 700	2–4	8.02−03	1.96−03	3.68−02	−2.407	D+	LS
157		$^4\mathrm{D}^\circ-^4\mathrm{P}$				20–12						1
			[3 161]	[3 162]	1 287 040–1 318 670	8–6	4.98−03	5.60−04	4.66−02	−2.349	D+	LS
			[3 261]	[3 262]	1 287 040–1 317 700	6–4	3.57−03	3.80−04	2.45−02	−2.642	D	LS
			[3 161]	[3 162]	1 287 040–1 318 670	6–6	1.12−03	1.68−04	1.05−02	−2.997	D	LS
			[3 261]	[3 262]	1 287 040–1 317 700	4–4	1.82−03	2.90−04	1.25−02	−2.936	D	LS
			[3 161]	[3 162]	1 287 040–1 318 670	4–6	1.25−04	2.80−05	1.17−03	−3.951	E	LS
			[3 261]	[3 262]	1 287 040–1 317 700	2–4	2.84−04	9.05−05	1.94−03	−3.742	E	LS
158		$^4\mathrm{S}^\circ-^4\mathrm{P}$				4–12						1
			[3 248]	[3 249]	1 287 890–1 318 670	4–6	3.49−03	8.29−04	3.55−02	−2.479	D+	LS
			[3 354]	[3 355]	1 287 890–1 317 700	4–4	3.17−03	5.35−04	2.36−02	−2.670	D	LS
159	$2s2p^3(^3\mathrm{D}^\circ)3d$–$2s^22p^2(^1\mathrm{S})4d$	$^2\mathrm{F}^\circ-^2\mathrm{D}$	*2297*	*2297*	*1 289 973–1 333 500*	14–10	5.25−03	2.97−04	3.14−02	−2.381	D	1
			[2 277]	[2 278]	1 289 600–1 333 500	8–6	5.12−03	2.99−04	1.79−02	−2.621	D	LS
			[2 323]	[2 324]	1 290 470–1 333 500	6–4	5.08−03	2.74−04	1.26−02	−2.784	D	LS
			[2 323]	[2 324]	1 290 470–1 333 500	6–6	2.42−04	1.96−05	9.00−04	−3.930	E	LS
160	$2s2p^3(^3\mathrm{D}^\circ)3d$–$2s2p^3(^5\mathrm{S}^\circ)4p$	$^4\mathrm{D}^\circ-^4\mathrm{P}$		*1 855*	*1 287 040–1 340 950*	20–12	7.33−02	2.27−03	2.77−01	−1.343	D+	1
				[1 855]	1 287 040–1 340 950	8–6	5.87−02	2.27−03	1.11−01	−1.741	C	LS
				[1 855]	1 287 040–1 340 950	6–4	4.62−02	1.59−03	5.83−02	−2.020	D+	LS
				[1 855]	1 287 040–1 340 950	4–2	3.66−02	9.44−04	2.31−02	−2.423	D	LS
				[1 855]	1 287 040–1 340 950	6–6	1.32−02	6.80−04	2.49−02	−2.389	D	LS
				[1 855]	1 287 040–1 340 950	4–4	2.35−02	1.21−03	2.96−02	−2.315	D	LS
				[1 855]	1 287 040–1 340 950	2–2	3.66−02	1.89−03	2.31−02	−2.423	D	LS
				[1 855]	1 287 040–1 340 950	4–6	1.46−03	1.13−04	2.76−03	−3.345	E+	LS
				[1 855]	1 287 040–1 340 950	2–4	3.66−03	3.78−04	4.62−03	−3.121	E+	LS
161		$^4\mathrm{S}^\circ-^4\mathrm{P}$		*1 885*	1 287 890–1 340 950	4–12	1.23−01	1.96−02	4.86−01	−1.106	C	1
				[1 885]	1 287 890–1 340 950	4–6	1.23−01	9.79−03	2.43−01	−1.407	C	LS
				[1 885]	1 287 890–1 340 950	4–4	1.23−01	6.53−03	1.62−01	−1.583	C	LS
				[1 885]	1 287 890–1 340 950	4–2	1.22−01	3.26−03	8.09−02	−1.885	D+	LS
162	$2s2p^3(^3\mathrm{D}^\circ)3d$–$2s^22p^2(^3\mathrm{P})5d$	$^2\mathrm{F}^\circ-^2\mathrm{F}$		*1 768.7*	*1 289 973–1 346 510*	14–14	1.05−02	4.91−04	4.00−02	−2.163	D	1
				[1 734.3]	1 289 600–1 347 260	8–8	9.80−03	4.42−04	2.02−02	−2.451	D	LS
				[1 817]	1 290 470–1 345 510	6–6	1.03−02	5.10−04	1.83−02	−2.514	D	LS
				[1 789]	1 289 600–1 345 510	8–6	4.42−04	1.59−05	7.49−04	−3.896	E	LS
				[1 760.9]	1 290 470–1 347 260	6–8	3.47−04	2.15−05	7.48−04	−3.889	E	LS
163	$2s2p^3(^3\mathrm{D}^\circ)3d$–$2s^22p^2(^1\mathrm{D})5d$	$^2\mathrm{F}^\circ-^2\mathrm{F}$		*1 077.5*	*1 289 973–1 382 780*	14–14	2.02−02	3.52−04	1.75−02	−2.307	E+	1
				[1 073.2]	1 289 600–1 382 780	8–8	1.81−02	3.12−04	8.82−03	−2.603	D	LS
				[1 083.3]	1 290 470–1 382 780	6–6	2.13−02	3.74−04	8.00−03	−2.649	E+	LS
				[1 073.2]	1 289 600–1 382 780	8–6	8.88−04	1.15−05	3.25−04	−4.036	E	LS
				[1 083.3]	1 290 470–1 382 780	6–8	6.52−04	1.53−05	3.27−04	−4.037	E	LS
164	$2s^22p^2(^1\mathrm{D})4d$–$2s2p^3(^3\mathrm{D}^\circ)3d$	$^2\mathrm{F}-^2\mathrm{F}^\circ$		*1 663 cm^{-1}*	*1 288 310–1 289 973*	14–14	2.49−06	1.35−04	3.76−01	−2.724	C	1

TABLE 60. Transition probabilities of allowed lines for Mg VI (reference for this table are as follows: 1=Burke and Lennon,[11] 2=Tachiev and Froese Fischer,[99] 3=Tachiev and Froese Fischer,[95] 4=Merkelis *et al.*[65])—Continued

No.	Transition aray	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				[1 290]	1 288 310–1 289 600	8–8	1.03−06	9.29−05	1.90−01	−3.129	C	LS
				[2 160]	1 288 310–1 290 470	6–6	5.85−06	1.88−04	1.72−01	−2.948	C	LS
				[2 160]	1 288 310–1 290 470	8–6	2.39−07	5.76−06	7.02−03	−4.336	E+	LS
				[1 290]	1 288 310–1 289 600	6–8	3.82−08	4.59−06	7.03−03	−4.560	E+	LS
165	$2s^22p^2(^3P)5s-2s2p^3(^5S^\circ)4s$	$^4P-^4S^\circ$				12–4						1
				[4 940]	1 318 670–1 323 610	6–4	1.52−03	6.23−03	2.49+00	−1.427	B	LS
			[16 916]	[16 920]	1 317 700–1 323 610	4–4	1.74−03	7.46−03	1.66+00	−1.525	B	LS
166	$2s2p^3(^5S^\circ)4s-2s2p^3(^5S^\circ)4p$	$^4S^\circ-^4P$	*5 770*	*5 767*	*1 323 610–1 340 950*	4–12	3.67−01	5.48−01	4.17+01	0.341	B+	1
			[5 765]	[5 767]	1 323 610–1 340 950	4–6	3.66−01	2.74−01	2.08+01	0.040	B+	LS
			[5 765]	[5 767]	1 323 610–1 340 950	4–4	3.67−01	1.83−01	1.39+01	−0.135	B+	LS
			[5 765]	[5 767]	1 323 610–1 340 950	4–2	3.67−01	9.15−02	6.95+00	−0.437	B+	LS
167	$2s2p^3(^5S^\circ)4p-$ $2s2p^3(^5S^\circ)4d$	$^4P-^4D^\circ$	*3 047*	*3 048*	*1 340 950–1 373 760*	12–20	3.03+00	7.04−01	8.47+01	0.927	B+	1
			[3 047]	[3 048]	1 340 950–1 373 760	6–8	3.03+00	5.63−01	3.39+01	0.529	B+	LS
			[3 047]	[3 048]	1 340 950–1373 760	4–6	2.12+00	4.43−01	1.78+01	0.248	B+	LS
			[3 047]	[3 048]	1 340 950–1 373 760	2–4	1.26+00	3.52−01	7.06+00	−0.152	B+	LS
			[3 047]	[3 048]	1 340 950–1 373 760	6–6	9.12−01	1.27−01	7.65+00	−0.118	B+	LS
			[3 047]	[3 048]	1 340 950–1 373 760	4–4	1.62+00	2.25−01	9.03+00	−0.046	B+	LS
			[3 047]	[3 048]	1 340 950–1 373 760	2–2	2.53+00	3.52−01	7.06+00	−0.152	B+	LS
			[3 047]	[3 048]	1 340 950–1 373 760	6–4	1.52−01	1.41−02	8.49−01	−1.073	C+	LS
			[3 047]	[3 048]	1 340 950–1 373 760	4–2	5.06−01	3.52−02	1.41+00	−0.851	B	LS

[a] Wavelengths (Å) are always given unless cm^{-1} is indicated.

11.6.3. Forbidden Transitions for Mg VI

The results of Tachiev and Froese Fischer[95,99] are the product of extensive MCHF calculations with Breit-Pauli corrections to order α^2, with energy corrections. The second-order MBPT results of Merkelis *et al.*[63] are also cited.

The transitions were divided into two groups having upper-level energies below and above 700 000 cm^{-1}. To estimate accuracies, we pooled the relative standard deviation of the mean (RSDM) of each of the lines for which a transition rate is quoted by two or more references,[63,95,99] as discussed in the general introduction. Merkelis *et al.*[63] only include results for transitions from lower-lying levels.

To estimate the accuracy of the forbidden lines from allowed lines, we isoelectronically averaged the logarithmic quality factors (see Sec. 4.1 of the Introduction) observed for lines from the lower-lying levels of N-like Na, Mg, Al, and Si and applied the result to forbidden lines of Mg VI, as described in the introduction. The listed accuracies for these higher-lying transitions are thus less well established than for those from lower levels. In this spectrum, the forbidden transitions between different configurations generally are stronger for E2 than for M1 lines. We note that this type of transitions has only been computed by a single source,[96,99] and that their estimated accuracies are therefore relatively uncertain. The same also holds for the M2 transitions.

11.6.4. References for Forbidden Transitions for Mg VI

[63] G. Merkelis, I. Martinson, R. Kisielius, and M. J. Vilkas, Phys. Scr. **59**, 122 (1999).

[89] G. Tachiev and C. Froese Fischer, Astron. Astrophys. **385**, 716 (2002).

[95] G. Tachiev and C. Froese Fischer, http://www.vuse.vanderbilt.edu/~cff/mchf_collection/ (MCHF, *ab initio*, downloaded on Sept 3, 2003).

[99] G. Tachiev and C. Froese Fischer, http://www.vuse.vanderbilt.edu/~cff/mchf_collection/ (MCHF, energy adjusted, downloaded on Dec. 10, 2003). See Tachiev and Froese Fischer (Ref. 89).

TABLE 61. Wavelength finding list for forbidden lines for Mg VI

Wavelength (vac) (Å)	Mult. No.
109.854	22
110.082	22
111.186	28
111.552	21
111.746	21
111.864	21
113.190	26
113.192	26
116.967	24
116.969	24
116.971	27
116.986	27
117.226	24
117.228	24

TABLE 61. Wavelength finding list for forbidden lines for Mg VI—Continued

Wavelength (vac) (Å)	Mult. No.
118.894	23
118.897	23
119.114	23
119.116	23
119.249	23
119.251	23
123.074	25
123.090	25
123.309	25
123.326	25
123.470	25
152.795	18
153.406	18
166.912	19
166.917	19
167.482	38
167.494	38
167.642	19
167.646	19
175.269	20
175.302	20
176.073	20
176.106	20
234.118	9
235.189	9
248.866	8
268.977	13
268.989	13
270.392	13
270.404	13
288.629	12
288.643	12
291.455	17
292.575	7
292.611	7
293.023	17
293.116	17
314.670	16
349.117	11
349.137	11
349.168	11
349.189	11
387.788	15
387.851	15
387.951	15
388.014	15
399.281	6
400.667	6
403.310	6
512.573	10
512.618	10
514.859	10
514.903	10
519.232	10
519.278	10
563.22	32
564.20	32
565.98	32
569.46	32
572.28	32
600.88	14
603.63	14
604.03	14
609.65	14
610.06	14
656.87	31
660.62	31
1 065.59	30
1 066.06	30
1 084.49	30
1 084.99	30
1 094.77	30
1 171.76	35
1 190.074	2
1 191.611	2
1 198.48	35
1 199.08	35
1 665.86	34
1 805.94	1
1 806.5	1
Wavelength (air) (Å)	**Mult. No.**
3 486.7	4
3 488.72	4
3 499.9	4
3 501.97	4
3 949.4	36
4 278.2	36
Wavenumber (cm^{-1})	**Mult. No**
1 945	37
1 890	40
1 636	29
1 550	39
950	39
866	29
108.4	5
42	33
17	3

TABLE 62. Transition probabilities of forbidden lines for Mg VI (references for this table are as follows: 1=Tachiev and Froese Fischer,[99] 2=Tachiev and Froese Fischer,[96] and 3=Merkelis *et al.*[63])

No.	Transition array	Mult. No.	$\lambda_{\rm air}$ (Å)	$\lambda_{\rm vac}$ (Å) or σ (cm^{-1})$^{\rm a}$	E_i-E_k (cm^{-1})	g_i-g_k	Type	A_{ki} (s^{-1})	S (a.u.)	Acc.	Source
1	$2p^3-2p^3$	^{4}S°−^{2}D°									
				1 806.5	0.0–55 356	4–6	M1	2.91−03	3.82−06	D+	1,3
				1 806.5	0.0–55 356	4–6	E2	2.28−03	2.35−04	C	1,3
				1 805.94	0.0–55 372.8	4–4	M1	1.10−01	9.57−05	C	1,3
				1 805.94	0.0–55 372.8	4–4	E2	1.47−03	1.01−04	C	1,3
2		^{4}S°−^{2}P°									
				1 190.074	0.0–84 028.4	4–4	M1	1.21+01	3.02−03	B	1,3
				1 190.074	0.0–84 028.4	4–4	E2	2.59−05	2.21−07	E+	1,3
				1 191.611	0.0–83 920.0	4–2	M1	4.91+00	6.16−04	C+	1,3
				1 191.611	0.0–83 920.0	4–2	E2	1.99−04	8.55−07	D+	1,3
3		^{2}D°−^{2}D°									
				17 cm^{-1}	55 356–55 372.8	6–4	M1	8.68−08	2.72+00	C+	1,3
				17 cm^{-1}	55 356–55 372.8	6–4	E2	1.09−19	2.91−03	D+	1,3
4		^{2}D°−^{2}P°									
			3 499.9	3 500.9	55 356–83 920.0	6–2	E2	1.58−01	1.48−01	B+	1,3
			3 486.7	3 487.7	55 356–84 028.4	6–4	M1	1.89+00	1.19−02	B	1,3
			3 486.7	3 487.7	55 356–84 028.4	6–4	E2	2.79−01	5.15−01	B+	1,3
			3 501.97	3 502.97	55 372.8–83 920.0	4–2	M1	2.08+00	6.62−03	B	1,3
			3 501.97	3 502.97	55 372.8–83 920.0	4–2	E2	2.36−01	2.22−01	B+	1,3
			3 488.72	3 489.72	55 372.8–84 028.4	4–4	M1	3.21+00	2.02−02	B	1,3
			3 488.72	3 489.72	55 372.8–84 028.4	4–4	E2	1.17−01	2.16−01	B+	1,3
5		^{2}P°−^{2}P°									
				108.4 cm^{-1}	83 920.0–84 028.4	2–4	M1	1.04−05	1.21+00	B	1,3
				108.4 cm^{-1}	83 920.0–84 028.4	2–4	E2	5.57−17	1.33−04	E+	1,3
6	$2s^22p^3-2s2p^4$	^{4}S°−^{4}P									
				403.310	0.0–247 948	4–6	M2	1.58+00	6.77+00	B+	2
				400.667	0.0–249 584	4–4	M2	1.16+00	3.21+00	B	2
				399.281	0.0–250 450	4–2	M2	3.58−01	4.88−01	B	2
7		^{4}S°−^{2}D									
				292.611	0.0–341 751	4–6	M2	1.79−04	1.54−04	D	2
				292.575	0.0–341 793	4–4	M2	5.55−03	3.19−03	D+	2
8		^{4}S°−^{2}S									
				248.866	0.0–401 822	4–2	M2	1.49−01	1.91−02	C	2
9		^{4}S°−^{2}P									
				235.189	0.0–425 190	4–4	M2	1.84+01	3.55+00	B	2
				234.118	0.0–427 135	4–2	M2	3.60+01	3.39+00	B	2
10		^{2}D°−^{4}P									
				512.573	55 356–250 450	6–2	M2	1.05−01	4.97−01	B	2
				514.859	55 356–249 584	6–4	M2	2.82−01	2.74+00	B	2
				512.618	55 372.8–250 450	4–2	M2	7.99−01	3.79+00	B	2
				519.232	55 356–247 948	6–6	M2	2.63−01	3.99+00	B	2
				514.903	55 372.8–249 584	4–4	M2	4.27−01	4.15+00	B	2
				519.278	55 372.8–247 948	4–6	M2	1.01−01	1.54+00	B	2
11		^{2}D°−^{2}D									
				349.168	55 356–341 751	6–6	M2	4.88+00	1.02+01	B+	2
				349.137	55 372.8–341 793	4–4	M2	5.85−01	8.15−01	B	2
				349.117	55 356–341 793	6–4	M2	3.38+00	4.71+00	B+	2
				349.189	55 372.8–341 751	4–6	M2	2.52+00	5.26+00	B+	2
12		^{2}D°−^{2}S									

TABLE 62. Transition probabilities of forbidden lines for Mg VI (references for this table are as follows: 1=Tachiev and Froese Fischer,[99] 2=Tachiev and Froese Fischer,[96] and 3=Merkelis *et al.*[63])—Continued

No.	Transition array	Mult. No.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i–E_k (cm^{-1})	g_i–g_k	Type	A_{ki} (s^{-1})	S (a.u.)	Acc.	Source
				288.629	55 356–401 822	6–2	M2	6.50−02	1.75−02	C	2
				288.643	55 372.8–401 822	4–2	M2	2.01−02	5.40−03	D+	2
13		$^2D^\circ-{}^2P$									
				268.977	55 356–427 135	6–2	M2	4.64+00	8.77−01	B	2
				270.392	55 356–425 190	6–4	M2	1.35+00	5.23−01	B	2
				268.989	55 372.8–427 135	4–2	M2	2.29−01	4.32−02	C	2
				270.404	55 372.8–425 190	4–4	M2	4.02−01	1.56−01	C+	2
14		$^2P^\circ-{}^4P$									
				604.03	84 028.4–249 584	4–4	M2	7.67−03	1.66−01	C+	2
				600.88	84 028.4–250 450	4–2	M2	8.15−02	8.57−01	B	2
				610.06	84 028.4–247 948	4–6	M2	2.18−01	7.40+00	B+	2
				603.63	83 920.0–249 584	2–4	M2	1.88−01	4.04+00	B	2
				609.65	83 920.0–247 948	2–6	M2	6.48−02	2.20+00	B	2
15		$^2P^\circ-{}^2D$									
				387.851	83 920.0–341 751	2–6	M2	1.42+00	5.03+00	B+	2
				388.014	84 028.4–341 751	4–6	M2	9.72−01	3.44+00	B	2
				387.788	83 920.0–341 793	2–4	M2	1.00−01	2.36−01	C+	2
				387.951	84 028.4–341 793	4–4	M2	3.17−01	7.47−01	B	2
16		$^2P^\circ-{}^2S$									
				314.670	84 028.4–401 822	4–2	M2	9.49+00	3.93+00	B	2
17		$^2P^\circ-{}^2P$									
				293.116	84 028.4–425 190	4–4	M2	1.53+00	8.86−01	B	2
				291.455	84 028.4–427 135	4–2	M2	2.37+00	6.70−01	B	2
				293.023	83 920.0–425 190	2–4	M2	7.25−01	4.20−01	C+	2
18	$2s^22p^3-2p^5$	$^4S^\circ-{}^2P^\circ$									
				153.406	0.0–651 867	4–4	M1	2.02+00	1.08−06	D	3
				153.406	0.0–651 867	4–4	E2	1.16+01	3.52−06	D	3
				152.795	0.0–654 473	4–2	M1	7.68−01	2.03−07	E+	3
				152.795	0.0–654 473	4–2	E2	1.69+01	2.51−06	D	3
19		$^2D^\circ-{}^2P^\circ$									
				166.912	55 356–654 473	6–2	E2	3.97+04	9.18−03	C+	3
				167.642	55 356–651 867	6–4	M1	8.37−01	5.85−07	D	3
				167.642	55 356–651 867	6–4	E2	6.83+04	3.23−02	B	3
				166.917	55 372.8–654 473	4–2	M1	7.68−01	2.65−07	E+	3
				166.917	55 372.8–654 473	4–2	E2	5.34+04	1.24−02	C+	3
				167.646	55 372.8–651 867	4–4	M1	1.49+00	1.04−06	D	3
				167.646	55 372.8–651 867	4–4	E2	3.22+04	1.52−02	C+	3
20		$^2P^\circ-{}^2P^\circ$									
				176.106	84 028.4–651 867	4–4	M1	3.06−03	2.48−09	E	3
				176.106	84 028.4–651 867	4–4	E2	1.00+04	6.05−03	C+	3
				175.269	83 920.0–654 473	2–2	M1	2.91−01	1.16−07	E+	3
				175.269	83 920.0–654 473	2–2	E2	7.31−07	2.16−13	E	3
				175.302	84 028.4–654 473	4–2	M1	1.57+00	6.27−07	D	3
				175.302	84 028.4–654 473	4–2	E2	3.03+04	8.96−03	C+	3
				176.073	83 920.0–651 867	2–4	M1	6.84−01	5.54−07	D	3
				176.073	83 920.0–651 867	2–4	E2	1.24+04	7.49−03	C+	3
21	$2p^3-2p^2(^3P)3s$	$^4S^\circ-{}^4P$									
				111.552	0.0–896 440	4–6	M2	1.08+02	7.48−01	C	2
				111.746	0.0–894 890	4–4	M2	9.03+01	4.22−01	D+	2
				111.864	0.0–893 940	4–2	M2	3.13+01	7.37−02	E+	2

TABLE 62. Transition probabilities of forbidden lines for Mg VI (references for this table are as follows: 1=Tachiev and Froese Fischer,[99] 2=Tachiev and Froese Fischer,[96] and 3=Merkelis *et al.*[63])—Continued

No.	Transition array	Mult. No.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i–E_k (cm^{-1})	g_i–g_k	Type	A_{ki} (s^{-1})	S (a.u.)	Acc.	Source
22		^{4}S°–^{2}P									
				109.854	0.0–910 300	4–4	M2	7.03+01	3.02−01	D+	2
				110.082	0.0–908 410	4–2	M2	1.51+02	3.28−01	D+	2
23		^{2}D°–^{4}P									
				119.249	55 356–893 940	6–2	M2	1.78+01	5.75−02	E+	2
				119.114	55 356–894 890	6–4	M2	5.52+01	3.55−01	D+	2
				119.251	55 372.8–893 940	4–2	M2	1.68+02	5.44−01	C	2
				118.894	55 356–896 440	6–6	M2	6.14+01	5.87−01	C	2
				119.116	55 372.8–894 890	4–4	M2	7.90+01	5.08−01	D+	2
				118.897	55 372.8–896 440	4–6	M2	8.78+00	8.39−02	E+	2
24		^{2}D°–^{2}P									
				117.226	55 356–908 410	6–2	M2	3.59+01	1.07−01	D	2
				116.967	55 356–910 300	6–4	M2	1.24+01	7.29−02	E+	2
				117.228	55 372.8–908 410	4–2	M2	1.79+00	5.31−03	E	2
				116.969	55 372.8–910 300	4–4	M2	4.01+00	2.35−02	E	2
25		^{2}P°–^{4}P									
				123.326	84 028.4–894 890	4–4	M2	3.11+00	2.38−02	E	2
				123.470	84 028.4–893 940	4–2	M2	7.42+00	2.86−02	E	2
				123.090	84 028.4–896 440	4–6	M2	4.91+01	5.58−01	C	2
				123.309	83 920.0–894 890	2–4	M2	3.54+01	2.70−01	D+	2
				123.074	83 920.0–896 440	2–6	M2	1.43+01	1.62−01	D	2
26	$2p^3$–$2p^2(^1\mathrm{D})3s$	^{2}D°–^{2}D									
				113.190	55 356–938 830	6–6	M2	1.54+02	1.15+00	C	2
				113.192	55 372.8–938 830	4–4	M2	1.36+01	6.80−02	E+	2
				113.190	55 356–938 830	6–4	M2	9.95+01	4.96−01	D+	2
				113.192	55 372.8–938 830	4–6	M2	6.42+01	4.80−01	D+	2
27		^{2}P°–^{2}D									
				116.971	83 920.0–938 830	2–6	M2	2.26+01	1.99−01	D	2
				116.986	84 028.4–938 830	4–6	M2	4.13+01	3.64−01	D+	2
				116.971	83 920.0–938 830	2–4	M2	4.88−01	2.87−03	E	2
				116.986	84 028.4–938 830	4–4	M2	6.17+00	3.63−02	E+	2
28	$2p^3$–$2p^2(^1\mathrm{S})3s$	^{2}P°–^{2}S									
				[111.19]	84 028.4–983 420	4–2	M2	3.20+02	7.29−01	C	2
29	$2s2p^4$–$2s2p^4$	^{4}P–^{4}P									
				1 636 cm^{-1}	247 948–249 584	6–4	M1	1.06−01	3.60+00	B+	2
				866 cm^{-1}	249 584–250 450	4–2	M1	2.92−02	3.33+00	B+	2
30		^{4}P–^{2}D									
				1 084.99	249 584–341 751	4–6	M1	8.87−01	2.52−04	C	2
				1 094.77	250 450–341 793	2–4	M1	5.79−01	1.13−04	C	2
				1 066.06	247 948–341 751	6–6	M1	5.34+00	1.44−03	C	2
				1 084.49	249 584–341 793	4–4	M1	2.33+00	4.40−04	C	2
				1 065.59	247 948–341 793	6–4	M1	4.72−01	8.46−05	D+	2
31		^{4}P–^{2}S									
				656.87	249 584–401 822	4–2	M1	2.93+01	6.16−04	C	2
				660.62	250 450–401 822	2–2	M1	5.44+00	1.16−04	C	2
32		^{4}P–^{2}P									
				569.46	249 584–425 190	4–4	M1	1.21+00	3.32−05	D+	2
				565.98	250 450–427 135	2–2	M1	2.72+00	3.65−05	D+	2
				564.20	247 948–425 190	6–4	M1	2.13+00	5.66−05	D+	2
				563.22	249 584–427 135	4–2	M1	6.64−02	8.79−07	D	2

TABLE 62. Transition probabilities of forbidden lines for Mg VI (references for this table are as follows: 1=Tachiev and Froese Fischer,[99] 2=Tachiev and Froese Fischer,[96] and 3=Merkelis *et al.*[63])—Continued

No.	Transition array	Mult. No.	$\lambda_{\rm air}$ (Å)	$\lambda_{\rm vac}$ (Å) or σ (cm^{-1})$^{\rm a}$	E_i–E_k (cm^{-1})	g_i–g_k	Type	A_{ki} (s^{-1})	S (a.u.)	Acc.	Source
				572.28	250 450–425 190	2–4	M1	7.02−01	1.95−05	D+	2
33		^{2}D−^{2}D									
				42 cm^{-1}	341 751–341 793	6–4	M1	1.20−06	2.40+00	B+	2
34		^{2}D−^{2}S									
				1 665.86	341 793–401 822	4–2	M1	1.55−03	5.33−07	D	2
35		^{2}D−^{2}P									
				1 198.48	341 751–425 190	6–4	M1	1.70+00	4.33−04	C	2
				1 171.76	341 793–427 135	4–2	M1	2.03+00	2.42−04	C	2
				1 199.08	341 793–425 190	4–4	M1	3.05+00	7.79−04	C	2
36		^{2}S−^{2}P									
			4 278.2	4 279.4	401 822–425 190	2–4	M1	3.60−01	4.19−03	C+	2
			3 949.4	3 950.5	401 822–427 135	2–2	M1	1.83+00	8.38−03	C+	2
37		^{2}P−^{2}P									
				1 945 cm^{-1}	425 190–427 135	4–2	M1	1.32−01	1.33+00	B+	2
38	$2s2p^4$–$2s^22p^2(^1{\rm D})3s$	^{2}D−^{2}D									
				167.482	341 751–938 830	6–6	M1	2.96+00	3.09−06	E	2
				167.482	341 751–938 830	6–6	E2	1.81+04	1.28−02	D	2
				167.494	341 793–938 830	4–4	M1	5.89−01	4.10−07	E	2
				167.494	341 793–938 830	4–4	E2	1.59+04	7.47−03	E+	2
				167.482	341 751–938 830	6–4	M1	1.28−01	8.93−08	E	2
				167.482	341 751–938 830	6–4	E2	6.75+03	3.18−03	E+	2
				167.494	341 793–938 830	4–6	M1	9.96−02	1.04−07	E	2
				167.494	341 793–938 830	4–6	E2	4.49+03	3.17−03	E+	2
39	$2p^2(^3{\rm P})3s$−$2p^2(^3{\rm P})3s$	^{4}P−^{4}P									
				1 550 cm^{-1}	894 890–896 440	4–6	M1	6.01−02	3.59+00	B+	2
				950 cm^{-1}	893 940–894 890	2–4	M1	1.92−02	3.33+00	B+	2
40		^{2}P−^{2}P									
				1 890 cm^{-1}	908 410–910 300	2–4	M1	6.06−02	1.33+00	B	2

[a] Wavelengths (Å) are always given unless cm^{-1} is indicated.

11.7. Mg VII

Carbon isoelectronic sequence
Ground state: $1s^22s^22p^2\,{}^3P_0$
Ionization energy: 225.02 eV=1 814 900 cm^{-1}

11.7.1. Allowed Transitions for Mg VII

Only OP (Ref. 55) results were available for energy levels above the $2p3d$. Wherever available we have used the data of Tachiev and Froese Fischer,[91] which are the product of extensive MCHF calculations with Breit-Pauli corrections to order α^2. Their calculations only extend to transitions from energy levels up to $2p3d$. Aggarwal[3] used the CIV3 code. Fawcett[21] applied the Hartree-Fock relativistic version of the COWAN code with Slater parameter optimization. As part of the Iron Project, Mendoza *et al.*[62] used the SUPERSTRUCTURE code with CI, relativistic effects, and semiempirical energy corrections.

To estimate accuracies, we pooled the relative standard deviation of the mean (RSDM) for each of the lines with transition rates published in two or more references,[3,21,55,62,95] as described in the general introduction. For this purpose the spin-allowed (non-OP) and intercombination data were treated separately and each of these was in turn divided into two upper-level energy groups below and above 1 000 000 cm^{-1}. Estimated accuracies were substantially better for the lower energy groups. OP lines constituted a fifth group and have been used only when more accurate sources were not available, because spin-orbit effects are often significant for this spectrum.

A NIST compilation of far-UV lines of Mg VII was published recently.[78] The estimated accuracies are different in some cases because a different method of evaluation was used.

11.7.2. References for Allowed Transitions for Mg VII

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TABLE 63. Wavelength finding list for allowed lines for Mg VII

Wavelength (vac) (Å)	Mult. No.
62.166	70
64.122	33
66.788	71
67.453	68
67.470	68
67.497	68
68.100	31
68.144	31
68.184	31
68.352	69
69.615	32
75.975	30
76.392	29
78.339	28
78.407	28
78.519	28
79.133	27
79.168	27
79.246	27
80.951	26
81.024	26
81.143	26
82.940	56
82.969	56
83.015	56
83.511	20
83.560	20
83.588	20
83.637	20
83.715	20
83.764	20
83.910	19
83.959	19
83.988	19
84.025	19
84.051	64
84.059	64
84.087	19
84.092	64
84.100	64
84.105	64
84.117	19
84.643	63
84.650	63
84.655	63
85.335	24
85.407	23
86.032	66
86.035	66
87.131	65
87.175	65
87.722	22
87.889	21
88.680	25

TABLE 63. Wavelength finding list for allowed lines for Mg VII—Continued

Wavelength (vac) (Å)	Mult. No.
89.406	59
89.415	59
89.439	59
89.448	59
89.453	59
89.471	59
89.476	59
90.706	58
90.806	58
90.815	58
90.883	58
90.891	58
90.897	58
91.447	57
91.486	57
91.492	57
91.566	57
91.575	57
91.580	57
92.256	67
92.899	61
92.934	61
92.935	61
92.959	61
92.960	61
92.963	61
94.043	50
94.174	50
95.027	53
95.036	53
95.088	60
95.136	60
95.137	60
95.141	60
95.232	60
95.233	60
95.258	16
95.383	16
95.423	16
95.484	16
95.556	16
95.650	16
98.031	17
98.982	54
101.956	51
101.967	51
101.974	51
102.137	51
102.144	51
102.235	51
102.472	18
103.688	62
103.745	62
103.859	62
105.164	55
106.522	52
106.523	52
106.708	52
106.709	52
106.714	52
106.808	52
111.984	47
111.997	47
112.005	47
112.110	47
112.118	47
112.269	47
117.517	48
117.518	48
117.641	48
117.642	48
117.648	48
117.807	48
130.938	49
131.092	49
131.299	49
196.628	72
197.435	72
197.596	72
198.393	100
198.410	72
198.721	72
198.753	72
206.292	73
215.485	110
232.661	109
234.580	34
235.729	34
241.733	94
241.879	94
242.078	94
242.324	94
242.395	94
242.842	94
251.792	6
252.496	6
253.660	6
260.727	39
272.747	99
276.154	5
277.001	5
278.402	5
280.737	11
283.050	4
284.514	4
288.027	84
288.775	84
290.192	83
290.217	83
290.951	83

Table 63. Wavelength finding list for allowed lines for Mg VII—Continued

Wavelength (vac) (Å)	Mult. No.
291.183	36
291.271	36
291.328	36
293.436	108
293.539	108
294.092	108
294.516	108
295.177	108
311.363	10
319.027	9
320.266	35
320.513	15
321.093	35
321.162	35
323.140	35
323.249	35
323.319	35
331.804	38
331.811	38
337.470	43
361.058	14
363.773	3
365.177	3
365.234	3
365.243	3
367.674	3
367.684	3
369.868	37
371.063	37
371.073	37
371.132	37
373.945	37
373.955	37
382.721	46
388.334	98
389.499	98
390.823	98
404.629	116
406.157	116
408.180	116
409.383	77
415.783	92
416.997	92
417.693	92
424.556	88
426.803	76
427.431	8
427.444	8
429.140	2
431.189	2
431.313	2
433.971	90
434.273	90
434.594	2
434.720	2
434.917	2
435.066	90
435.635	90
435.958	117
436.738	117
437.618	123
441.443	93
442.772	91
443.538	125
443.912	91
445.295	91
449.357	89
450.207	89
450.696	41
451.998	89
520.627	7
520.809	7
521.091	7
526.338	40
527.026	13
532.155	40
546.009	42
548.619	42
554.942	42
558.263	45
580.99	113
605.07	75
608.20	75
611.13	75
614.33	75
614.40	75
620.58	75
622.43	122
633.75	107
636.09	107
638.81	107
641.19	107
654.62	82
659.80	82
663.75	82
667.47	128
675.17	44
676.27	12
679.16	44
688.88	44
713.17	81
714.95	81
719.58	81
733.57	124
734.97	124
739.10	124
739.70	124
743.88	124
854.75	1
865.35	127

TABLE 63. Wavelength finding list for allowed lines for Mg VII—Continued

Wavelength (vac) (Å)	Mult. No.
868.24	1
885.90	129
891.90	129
896.30	80
900.98	129
906.04	80
913.49	80
1 069.63	87
1 096.01	102
1 102.41	102
1 115.45	102
1 131.86	114
1 155.67	104
1 161.17	104
1 165.09	104
1 172.61	104
1 178.27	104
1 231.98	115
1 291.32	74
1 293.16	74
1 306.51	74
1 327.32	74
1 334.22	74
1 336.18	106
1 343.54	106
1 348.80	106
1 350.44	74
1 356.67	79
1 371.55	79
1 379.12	79
1 392.56	79
1 396.45	79
1 410.24	79
1 443.21	103
1 443.83	103
1 462.84	103
1 469.72	103
1 470.37	78
1 487.43	78
1 487.87	78
1 490.09	103
1 496.78	78
1 507.61	78
1 517.22	78
1 530.46	97
1 551.11	97
1 591.60	97
1 781.9	118
1 810.0	118
1 894.7	96
1 908.8	96
1 927.9	112
1 955.4	96
1 998.0	105

Wavelength (air) (Å)	Mult. No.
2 018.7	105
2 062.9	105
2 065.9	119
2 090.9	119
2 103.7	119
2 129.7	119
2 236.9	111
2 867.0	120
3 668.7	121
3 783.9	126
3 953.0	126
4 075.5	126
4 139.6	95
4 294.3	95
4 560.8	85
4 575.4	130
4 619.8	95
4 649.9	85
4 848.3	85
4 905.4	101
4 929.6	85
5 033.8	85
5 150.5	85
5 225.9	101
5 909	86
6 164	86
6 543	86
6 857	86
7 050	86
7 292	86
8 056	131

TABLE 64. Transition probabilities of allowed lines for Mg VII (references for this table are as follows: 1=Luo and Pradhan,[55] 2=Tachiev and Froese Fischer,[91] 3=Aggarwal,[3] 4=Fawcett,[21] and 5=Mendoza *et al.*[62])

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc	Source
1	$2s^22p^2-2s2p^3$	$^3P-^5S^\circ$										
				[868.2]	2 924–118 100	5–5	3.38−04	3.82−06	5.46−05	−4.719	C+	2,3,5
				[854.8]	1 107–118 100	3–5	1.38−04	2.52−06	2.13−05	−5.121	C	2,3,5

TABLE 64. Transition probabilities of allowed lines for Mg VII (references for this table are as follows: 1=Luo and Pradhan,[55] 2=Tachiev and Froese Fischer,[91] 3=Aggarwal,[3] 4=Fawcett,[21] and 5=Mendoza *et al.*[62])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i−E_k (cm^{-1})	g_i−g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc	Source
2		^{3}P−^{3}D°		*433.03*	*1 993–232 922*	9–15	1.69+01	7.93−02	1.02+00	−0.146	A	2,3
				434.917	2 924–232 853	5–7	1.67+01	6.61−02	4.73−01	−0.481	A	2,3
				431.313	1 107–232 957	3–5	1.36+01	6.32−02	2.69−01	−0.722	A	2,3
				429.140	0–233 024	1–3	1.03+01	8.50−02	1.20−01	−1.071	A	2,3
				434.720	2 924–232 957	5–5	3.47+00	9.84−03	7.04−02	−1.308	A	2,3
				431.189	1 107–233 024	3–3	6.73+00	1.88−02	7.98−02	−1.249	A	2,3
				434.594	2 924–233 024	5–3	3.46+01	5.88−04	4.21−03	−2.532	B+	2,3
3		^{3}P−^{3}P°		*366.42*	*1 993–274 906*	9–9	4.53+01	9.11−02	9.89−01	−0.086	A	2,3
				367.674	2 924–274 904	5–5	3.48+01	7.06−02	4.27−01	−0.452	A	2,3
				365.243	1 107–274 897	3–3	1.27+01	2.54−02	9.18−02	−1.118	A	2,3
				367.684	2 924–274 897	5–3	1.80+01	2.19−02	1.32−01	−0.961	A	2,3
				365.177	1 107–274 947	3–1	4.54+01	3.03−02	1.09−01	−1.041	B+	2
				365.234	1 107–274 904	3–5	1.02+01	3.40−02	1.23−01	−0.991	A	2,3
				363.773	0–274 897	1–3	1.48+01	8.83−02	1.06−01	−1.054	A	2,3
4		^{3}P−^{1}D°										
				283.050	1 107–354 401	3–5	7.07−03	1.42−05	3.96−05	−4.371	D	2,3
				284.514	2 924–354 401	5–5	1.34−01	1.62−04	7.60−04	−3.092	C	2,3
5		^{3}P−^{3}S°		*277.68*	*1 993*–362 117	9–3	2.91+02	1.12−01	9.24−01	0.003	A	2,3
				278.402	2 924–362 117	5–3	1.63+02	1.13−01	5.20−01	−0.248	A	2,3
				277.001	1 107–362 117	3–3	9.66+01	1.11−01	3.04−01	−0.478	A	2,3
				276.154	0–362 117	1–3	3.21+01	1.10−01	1.00−01	−0.959	A	2,3
6		^{3}P−^{1}P°										
				252.496	1 107–397 153	3–3	1.89−01	1.81−04	4.51−04	−3.265	C	2,3
				253.660	2 924–397 153	5–3	1.02−02	5.88−06	2.45−05	−4.532	D	2,3
				251.792	0–397 153	1–3	1.46−03	4.17−06	3.46−06	−5.380	E+	2,3
7		^{1}D−^{3}D°										
				520.809	40 948–232 957	5–5	2.40−03	9.75−06	8.35−05	−4.312	D+	2,3
				520.627	40 948–233 024	5–3	1.54−03	3.76−06	3.22−05	−4.726	D	2,3
				521.091	40 948–232 853	5–7	1.20−02	6.81−05	5.84−04	−3.468	C	2,3
8		^{1}D−^{3}P°										
				427.444	40 948–274 897	5–3	1.44−02	2.37−05	1.67−04	−3.926	+	2,3
				427.431	40 948–274 904	5–5	1.89−03	5.16−06	3.63−05	−4.588	D	2,3
9		^{1}D−^{1}D°		319.027	40 948–354 401	5–5	1.36+02	2.07−01	1.09+00	0.015	A	2,3
10		^{1}D−^{3}S°										
				311.363	40 948–362 117	5–3	1.53−02	1.33−05	6.83−05	−4.177	D+	2,3
11		^{1}D−^{1}P°		280.737	40 948–397 153	5–3	1.82+02	1.29−01	5.97−01	−0.190	A	2,3
12		^{1}S−^{3}D°										
				676.27	85 153–233 024	1–3	8.70−04	1.79−05	3.98−05	−4.747	D	2,3
13		^{1}S−^{3}P°										
				527.026	85 153–274 897	1–3	4.75−03	5.94−05	1.03−04	−4.226	D+	2,3
14		^{1}S−^{3}S°										
				361.058	85 153–362 117	1–3	1.40−02	8.22−05	9.77−05	−4.085	D+	2,3
15		^{1}S−^{1}P°		320.513	85 153–397 153	1–3	4.39+01	2.03−01	2.14−01	−0.693	A	2,3
16	$2p^2$−$2p3s$	^{3}P−^{3}P°		*95.45*	*1 993–1 049 696*	9–9	5.15+02	7.04−02	1.99−01	−0.198	B+	2,3
				95.423	2 924–1 050 890	5–5	3.88+02	5.29−02	8.32−02	−0.578	B+	2,3

TABLE 64. Transition probabilities of allowed lines for Mg VII (references for this table are as follows: 1=Luo and Pradhan,[55] 2=Tachiev and Froese Fischer,[91] 3=Aggarwal,[3] 4=Fawcett,[21] and 5=Mendoza *et al.*[62])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})$^{\mathrm{a}}$	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc	Source
				95.484	1 107–1 048 400	3–3	1.27+02	1.73−02	1.63−02	−1.285	B+	2,3
				95.650	2 924–1 048 400	5–3	2.14+02	1.77−02	2.78−02	−1.053	B+	2,3
				95.556	1 107–1 047 610	3–1	5.13+02	2.34−02	2.21−02	−1.154	B+	2,3
				95.258	1 107–1 050 890	3–5	1.30+02	2.94−02	2.77−02	−1.055	B+	2,3
				95.383	0–1 048 400	1–3	1.71+02	6.98−02	2.19−02	−1.156	B+	2,3
17		$^{1}\mathrm{D}-{}^{1}\mathrm{P}^{\circ}$		98.031	40 948–1 061 030	5–3	6.13+02	5.30−02	8.55−02	−0.577	B+	2,3
18		$^{1}\mathrm{S}-{}^{1}\mathrm{P}^{\circ}$		102.472	85 153–1 061 030	1–3	1.84+02	8.69−02	2.93−02	−1.061	B+	2,3
19	$2p^2-2p3d$	$^{3}\mathrm{P}-{}^{3}\mathrm{D}^{\circ}$		*84.00*	*1 993–1 192 497*	9–15	4.40+03	7.76−01	1.93+00	0.844	B	2,3
				84.025	2 924–1 193 050	5–7	4.46+03	6.61−01	9.14−01	0.519	B+	2,3
				83.959	1 107–1 192 170	3–5	3.91+03	6.89−01	5.72−01	0.315	B	2,3
				83.910	0–1 191 750	1–3	2.96+03	9.36−01	2.59−01	−0.029	B	2,3
				84.087	2 924–1 192 170	5–5	3.92+02	4.15−02	5.75−02	−0.683	C	2,3
				83.988	1 107–1 191 750	3–3	1.44+03	1.53−01	1.27−01	−0.338	C+	2,3
				84.117	2 924–1 191 750	5–3	2.64+01	1.68−03	2.33−03	−2.076	D	2,3
20		$^{3}\mathrm{P}-{}^{3}\mathrm{P}^{\circ}$		*83.67*	*1 993–1 197 106*	9–9	2.65+03	2.78−01	6.89−01	0.398	C+	2,3
				83.764	2 924–1 196 750	5–5	2.62+03	2.76−01	3.81−01	0.140	B	2,3
				83.588	1 107–1 197 450	3–3	1.07+03	1.12−01	9.27−02	−0.474	C+	2,3
				83.715	2 924–1 197 450	5–3	1.16+03	7.30−02	1.01−01	−0.438	C+	2,3
				83.560	1 107–1 197 850	3–1	2.56+03	8.92−02	7.36−02	−0.573	C+	2,3
				83.637	1 107–1 196 750	3–5	5.56+01	9.73−03	8.03−03	−1.535	D+	2,3
				83.511	0–1 197 450	1–3	3.85+02	1.21−01	3.32−02	−0.917	C	2,3
21		$^{1}\mathrm{D}-{}^{3}\mathrm{F}^{\circ}$										
				87.889	40 948–1 178 750	5–5	5.88+02	6.81−02	9.85−02	−0.468	D+	2
22		$^{1}\mathrm{D}-{}^{1}\mathrm{D}^{\circ}$		87.722	40 948–1 180 910	5–5	1.07+03	1.23−01	1.78−01	−0.211	C+	2
23		$^{1}\mathrm{D}-{}^{1}\mathrm{F}^{\circ}$		85.407	40 948–1 211 810	5–7	5.26+03	8.05−01	1.13+00	0.605	B+	2,3
24		$^{1}\mathrm{D}-{}^{1}\mathrm{P}^{\circ}$		85.335	40 948–1 212 800	5–3	1.55+02	1.01−02	1.42−02	−1.297	D+	2,3
25		$^{1}\mathrm{S}-{}^{1}\mathrm{P}^{\circ}$		88.680	85 153–1 212 800	1–3	3.16+03	1.12+00	3.26−01	0.049	B	2,3
26	$2s^22p^2-$ $2s2p^2(^4\mathrm{P})3p$	$^{3}\mathrm{P}-{}^{3}\mathrm{S}^{\circ}$?		*[81.1]*	*1 993–1 235 310*	9–3	1.37+3	4.51−02	1.08−01	−0.392	D+	4
				81.143	2 924–1 235 310	5–3	7.33+02	4.34−02	5.80−02	−0.664	C	4
				81.024	1 107–1 235 310	3–3	4.74+02	4.67−02	3.73−02	−0.854	D+	4
				80.951	0–1 235 310	1–3	1.66+02	4.90−02	1.31−02	−1.310	D	4
27		$^{3}\mathrm{P}-{}^{3}\mathrm{D}^{\circ}$?				9–15						
				[79.17]	2 924–1 266 060	5–7	9.73+02	1.28−01	1.67−01	−0.194	C+	4
				79.133	1 107–1 264 810	3–5	7.75+02	1.21−01	9.48−02	−0.440	C	4
				79.246	2 924–1 264 810	5–5	1.98+02	1.86−02	2.43−02	−1.032	D+	4
28		$^{3}\mathrm{P}-{}^{3}\mathrm{P}^{\circ}$?				9–9						
				78.519	2 924–1 276 500	5–5	8.01+02	7.40−02	9.56−02	−0.432	C	4
				78.407	1 107–1 276 500	3–3	2.53+02	2.33−02	1.81−02	−1.156	D+	4
				78.519	2 924–1 276 500	5–3	4.62+02	2.56−02	3.31−02	−0.893	D+	4
				78.407	1 107–1 276 500	3–5	2.13+02	3.27−02	2.53−02	−1.008	D+	4
				78.339	0–1 276 500	1–3	2.90+02	8.00−02	2.06−02	−1.097	D+	4
29	$2s^22p^2-$ $2s2p^2(^2\mathrm{D})3p$	$^{1}\mathrm{D}-{}^{1}\mathrm{F}^{\circ}$		76.392	40 948–1 349 990	5–7	1.26+03	1.54−01	1.93−01	−0.114	C+	4
30		$^{1}\mathrm{D}-{}^{1}\mathrm{D}^{\circ}$		75.975	40 948–1 357 170	5–5	1.21+03	1.04−01	1.31−01	−0.284	C	4

TABLE 64. Transition probabilities of allowed lines for Mg VII (references for this table are as follows: 1=Luo and Pradhan,[55] 2=Tachiev and Froese Fischer,[91] 3=Aggarwal,[3] 4=Fawcett,[21] and 5=Mendoza *et al.*[62])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc	Source
31	$2p^2-2p4d$	$^3\mathrm{P}-^3\mathrm{D}^\circ$				9–15						
				[68.14]	2 924–1 470 410	5–7	1.51+03	1.47−01	1.65−01	−0.134	D	LS
				[68.10]	1 107–1 469 540	3–5	1.13+03	1.31−01	8.81−02	−0.406	D	LS
				[68.18]	2 924–1 469 540	5–5	3.76+02	2.62−02	2.94−02	−0.883	E+	LS
32		$^1\mathrm{D}-^1\mathrm{F}^\circ$		[69.61]	40 948–1 477 420	5–7	1.91+03	1.94−01	2.22−01	−0.013	D+	1
33	$2p^2-2p5d$	$^1\mathrm{D}-^1\mathrm{F}^\circ$		[64.12]	40 948–1 600 470	5–7	1.00+03	8.66−02	9.14−02	−0.364	D	1
34	$2s2p^3-2p^4$	$^5\mathrm{S}^\circ-^3\mathrm{P}$										
				[235.73]	118 100–542 316	5–5	1.43−02	1.19−05	4.61−05	−4.225	D	2
				[234.58]	118 100–544 393	5–3	6.23−03	3.08−06	1.19−05	−4.812	E+	2
35		$^3\mathrm{D}^\circ-^3\mathrm{P}$		*322.15*	*232 922–543 336*	15–9	1.15+02	1.07−01	1.70+00	0.205	A	2,3
				323.140	232 853–542 316	7–5	9.53+01	1.07−01	7.93−01	−0.126	A	2,3
				321.093	232 957–544 393	5–3	8.36+01	7.75−02	4.10−01	−0.412	A	2,3
				320.266	233 024–545 264	3–1	1.12+02	5.77−02	1.82−01	−0.762	A	2,3
				323.249	232 957–542 316	5–5	1.89+01	2.96−02	1.57−01	−0.830	A	2,3
				321.162	233 024–544 393	3–3	2.99+01	4.62−02	1.47−01	−0.858	A	2,3
				323.319	233 024–542 316	3–5	1.36+00	3.56−03	1.14−02	−1.971	B+	2,3
36		$^3\mathrm{D}^\circ-^1\mathrm{D}$										
				291.271	232 957–576 280	5–5	3.80−02	4.83−05	2.32−04	−3.617	D	2
				291.183	232 853–576 280	7–5	1.95−01	1.77−04	1.19−03	−2.907	D+	2
				291.328	233 024–576 280	3–5	8.89−04	1.88−06	5.42−06	−5.249	E+	2
37		$^3\mathrm{P}^\circ-^3\mathrm{P}$		*372.54*	*274 906–543 336*	9–9	2.69+01	5.61−02	6.19−01	−0.297	A	2,3
				373.955	274 904–542 316	5–5	1.88+01	3.94−02	2.43−01	−0.706	A	2,3
				371.063	274 897–544 393	3–3	5.69+00	1.17−02	4.30−02	−1.455	B+	2,3
				371.073	274 904–544 393	5–3	1.34+01	1.66−02	1.01−01	−1.081	A	2,3
				369.868	274 897–545 264	3–1	2.92+01	2.00−02	7.29−02	−1.222	A	2,3
				373.945	274 897–542 316	3–5	7.01+00	2.45−02	9.04−02	−1.134	A	2,3
				371.132	274 947–544 393	1–3	9.05+00	5.60−02	6.85−02	−1.252	B+	2
38		$^3\mathrm{P}^\circ-^1\mathrm{D}$										
				331.804	274 897–576 280	3–5	1.58−02	4.35−05	1.42−04	−3.884	D	2
				331.811	274 904–576 280	5–5	1.08−03	1.78−06	9.70−06	−5.051	E+	2
39		$^3\mathrm{P}^\circ-^1\mathrm{S}$										
				260.727	274 897–658 440	3–1	5.00−02	1.70−05	4.37−05	−4.292	D	2
40		$^1\mathrm{D}^\circ-^3\mathrm{P}$										
				526.338	354 401–544 393	5–3	1.43−03	3.56−06	3.08−05	−4.750	E+	2
				532.155	354 401–542 316	5–5	4.34−02	1.84−04	1.61−03	−3.036	C	2
41		$^1\mathrm{D}^\circ-^1\mathrm{D}$		450.696	354 401–576 280	5–5	6.98+01	2.12−01	1.58+00	0.025	A	2,3
42		$^3\mathrm{S}^\circ-^3\mathrm{P}$		*551.82*	362 117–*543 336*	3–9	1.66+01	2.27−01	1.24+00	−0.167	A	2,3
				554.942	362 117–542 316	3–5	1.61+01	1.24−01	6.81−01	−0.429	A	2,3
				548.619	362 117–544 393	3–3	1.70+01	7.68−02	4.16−01	−0.638	A	2,3
				546.009	362 117–545 264	3–1	1.74+01	2.60−02	1.40−01	−1.108	A	2,3
43		$^3\mathrm{S}^\circ-^1\mathrm{S}$										
				337.470	362 117–658 440	3–1	2.95−01	1.68−04	5.60−04	−3.298	D+	2
44		$^1\mathrm{P}^\circ-^3\mathrm{P}$										
				679.16	397 153–544 393	3–3	1.43−02	9.89−05	6.63−04	−3.528	D+	2
				675.17	397 153–545 264	3–1	1.62−03	3.69−06	2.46−05	−4.956	E+	2

TABLE 64. Transition probabilities of allowed lines for Mg VII (references for this table are as follows: 1=Luo and Pradhan,[55] 2=Tachiev and Froese Fischer,[91] 3=Aggarwal,[3] 4=Fawcett,[21] and 5=Mendoza *et al.*[62])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	$E_i - E_k$ (cm^{-1})	$g_i - g_k$	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc	Source
				688.88	397 153–542 316	3–5	3.84−03	4.56−05	3.10−04	−3.864	D+	2
45		$^1P^\circ - ^1D$		558.263	397 153–576 280	3–5	7.49+00	5.83−02	3.21−01	−0.757	A	2,3
46		$^1P^\circ - ^1S$		382.721	397 153–658 440	3–1	1.81+02	1.33−01	5.02−01	−0.399	A	2,3
47	$2s2p^3 - 2s^22p3p$	$^3D^\circ - ^3P$		*112.06*	*232 922–1 125 307*	15–9	6.65+01	7.51−03	4.16−02	−0.948	B	2,3
				111.984	232 853–1 125 840	7–5	6.05+01	8.13−03	2.10−02	−1.245	C+	2,3
				112.110	232 957–1 124 940	5–3	4.56+01	5.15−03	9.51−03	−1.589	B+	2,3
				[112.27]	233 024–1 123 740	3–1	6.35+01	4.00−03	4.44−03	−1.921	B+	2,3
				111.997	232 957–1 125 840	5–5	9.36+00	1.76−03	3.24−03	−2.056	B+	2,3
				112.118	233 024–1 124 940	3–3	1.53+01	2.89−03	3.20−03	−2.062	B+	2,3
				112.005	233 024–1 125 840	3–5	6.19−01	1.94−04	2.15−04	−3.235	C+	2,3
48		$^3P^\circ - ^3P$		*117.59*	*274 906–1 125 307*	9–9	6.05+00	1.25−03	4.37−03	−1.949	C+	2,3
				117.518	274 904–1 125 840	5–5	4.20+00	8.70−04	1.68−03	−2.362	B	2,3
				117.641	274 897–1 124 940	3–3	3.31+00	6.87−04	7.98−04	−2.686	B	2,3
				117.642	274 904–1 124 940	5–3	1.90−01	2.37−05	4.58−05	−3.926	D	2,3
				[117.81]	274 897–1 123 740	3–1	4.52+00	3.14−04	3.65−04	−3.026	B	2,3
				117.517	274 897–1 125 840	3–5	1.72+00	5.94−04	6.89−04	−2.749	B	2,3
				117.648	274 947–1 124 940	1–3	3.28+00	2.04−03	7.90−04	−2.690	C+	2
49		$^3S^\circ - ^3P$		*131.03*	362 117–*1 125 307*	3–9	5.82−01	4.50−04	5.82−04	−2.870	D+	2,3
				130.938	362 117–1 125 840	3–5	6.10−01	2.61−04	3.38−04	−3.106	D+	2,3
				131.092	362 117–1 124 940	3–3	5.46−01	1.41−04	1.82−04	−3.374	D+	2,3
				[131.30]	362 117–1 123 740	3–1	5.54−01	4.77−05	6.19−05	−3.844	D+	2,3
50	$2s2p^3 - 2s2p^2(^4P)3s$	$^5S^\circ - ^5P$				5–15						
				94.043	118 100–1 181 440	5–7	3.59+02	6.66−02	1.03−01	−0.478	C	4
				94.174	118 100–1 179 960	5–5	3.55+02	4.72−02	7.32−02	−0.627	C	4
51		$^3D^\circ - ^3P$		*102.05*	*232 922–1 212 844*	15–9	3.40+02	3.19−02	1.61−01	−0.320	D+	4
				101.956	232 853–1 213 670	7–5	2.90+02	3.23−02	7.59−02	−0.646	C	4
				102.137	232 957–1 212 030	5–3	2.71+02	2.54−02	4.27−02	−0.896	D+	4
				[102.24]	233 024–1 211 160	3–1	3.57+02	1.87−02	1.88−02	−1.251	D+	4
				101.967	232 957–1 213 670	5–5	3.98+01	6.20−03	1.04−02	−1.509	D	4
				102.144	233 024–1 212 030	3–3	7.67+01	1.20−02	1.21−02	−1.444	D	4
				101.974	233 024–1 213 670	3–5	2.57+00	6.67−04	6.71−04	−2.699	E	4
52		$^3P^\circ - ^3P$		*106.62*	*274 906–1 212 844*	9–9	2.74+02	4.67−02	1.47−01	−0.376	D+	4
				106.523	274 904–1 213 670	5–5	2.12+02	3.60−02	6.31−02	−0.745	C	4
				106.708	274 897–1 212 030	3–3	7.03+01	1.20−02	1.26−02	−1.444	D	4
				106.709	274 904–1 212 030	5–3	1.03+02	1.06−02	1.86−02	−1.276	D+	4
				[106.81]	274 897–1 211 160	3–1	2.57+02	1.47−02	1.55−02	−1.356	D	4
				106.522	274 897–1 213 670	3–5	7.05+01	2.00−02	2.10−02	−1.222	D+	4
				106.714	274 947–1 212 030	1–3	9.18+01	4.70−02	1.65−02	−1.328	D+	4
53	$2s2p^3 - 2s2p^2(^2D)3s$	$^3D^\circ - ^3D$				15–15						
				[95.03]	232 853–1 285 190	7–7	4.74+02	6.41−02	1.40−01	−0.348	C	4
				[95.04]	232 957–1 285 190	5–7	7.07+01	1.34−02	2.10−02	−1.174	D+	4
54		$^3P^\circ - ^3D$				9–15						
				[98.98]	274 904–1 285 190	5–7	2.08+02	4.27−02	6.96−02	−0.671	D	LS
55		$^1D^\circ - ^1D$		[105.16]	354 401–1 305 300	5–5	3.58+02	5.94−02	1.03−01	−0.527	C	4

TABLE 64. Transition probabilities of allowed lines for Mg VII (references for this table are as follows: 1=Luo and Pradhan,[55] 2=Tachiev and Froese Fischer,[91] 3=Aggarwal,[3] 4=Fawcett,[21] and 5=Mendoza *et al.*[62])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	$E_i - E_k$ (cm^{-1})	$g_i - g_k$	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc	Source
56	$2s2p^3 - 2s2p^2(^4P)3d$	$^5S^\circ - ^5P$		*82.98*	118 100–*1 323 141*	5–15	4.92+03	1.52+00	2.08+00	0.881	B	4
				83.015	118 100–*1 322 700*	5–7	4.89+03	7.08−01	9.67−01	0.549	B	4
				82.969	118 100–1 323 370	5–5	4.92+03	5.08−01	6.94−01	0.405	B	4
				82.940	118 100–1 323 790	5–3	4.98+03	3.08−01	4.20−01	0.188	B	4
57		$^3D^\circ - ^3P$		*91.53*	*232 922–1 325 490*	15–9	2.41+02	1.81−02	8.20−02	−0.566	D+	4
				91.566	232 853–1 324 960	7–5	1.86+02	1.67−02	3.53−02	−0.932	D+	4
				91.486	232 957–1 326 020	5–3	1.35+02	1.02−02	1.54−02	−1.292	D	4
				[91.45]	233 024–1 326 550	3–1	1.99+02	8.33−03	7.53−03	−1.602	D	4
				91.575	232 957–1 324 960	5–5	6.84+01	8.60−03	1.30−02	−1.367	D	4
				91.492	233 024–1 326 020	3–3	8.23+01	1.03−02	9.34−03	−1.510	D	4
				91.580	233 024–1 324 960	3–5	7.95+00	1.67−03	1.51−03	−2.300	E+	4
58		$^3D^\circ - ^3F$		*90.79*	*232 922–1 334 401*	15–21	2.14+03	3.71−01	1.66+00	0.745	B	4
				90.706	232 853–1 335 320	7–9	2.15+03	3.41−01	7.14−01	0.378	B	4
				90.815	232 957–1 334 100	5–7	1.93+03	3.34−01	4.99−01	0.223	B	4
				[90.90]	233 024–1 333 170	3–5	1.81+03	3.73−01	3.35−01	0.049	C+	4
				90.806	232 853–1 334 100	7–7	2.13+02	2.63−02	5.50−02	−0.735	C	4
				[90.89]	232 957–1 333 170	5–5	3.12+02	3.86−02	5.78−02	−0.714	C	4
				[90.88]	232 853–1 333 170	7–5	6.46+00	5.71−04	1.20−03	−2.398	E+	4
59		$^3D^\circ - ^3D$		*89.43*	*232 922–1 351 063*	15–15	9.24+02	1.11−01	4.89−01	0.221	C	4
				89.406	232 853–1 351 340	7–7	8.55+02	1.02−01	2.11−01	−0.146	C+	4
				89.448	232 957–1 350 930	5–5	5.85+02	7.02−02	1.03−01	−0.455	C	4
				89.476	233 024–1 350 640	3–3	6.14+02	7.37−02	6.51−02	−0.655	C	4
				89.439	232 853–1 350 930	7–5	1.62+02	1.39−02	2.86−02	−1.012	D+	4
				89.471	232 957–1 350 640	5–3	2.31+02	1.66−02	2.44−02	−1.081	D+	4
				89.415	232 957–1 351 340	5–7	1.25+02	2.10−02	3.09−02	−0.979	D+	4
				89.453	233 024–1 350 930	3–5	1.47+02	2.93−02	2.59−02	−1.056	D+	4
60		$^3P^\circ - ^3P$		*95.19*	*274 906–1 325 490*	9–9	1.32+03	1.80−01	5.06−01	0.210	C	4
				95.233	274 904–1 324 960	5–5	9.24+02	1.26−01	1.97−01	−0.201	C+	4
				95.136	274 897–1 326 020	3–3	2.95+02	4.00−02	3.76−02	−0.921	D+	4
				95.137	274 904–1 326 020	5–3	5.65+02	4.60−02	7.20−02	−0.638	C	4
				[95.09]	274 897–1 326 550	3–1	1.36+03	6.13−02	5.76−02	−0.735	C	4
				95.232	274 897–1 324 960	3–5	3.80+02	8.60−02	8.09−02	−0.588	C	4
				95.141	274 947–1 326 020	1–3	4.81+02	1.96−01	6.14−02	−0.708	C	4
61		$^3P^\circ - ^3D$		*92.92*	*274 906–1 351 063*	9–15	1.92+03	4.15−01	1.14+00	0.572	C+	4
				92.899	274 904–1 351 340	5–7	1.89+03	3.42−01	5.23−01	0.233	B	4
				92.934	274 897–1 350 930	3–5	1.36+03	2.94−01	2.70−01	−0.055	C+	4
				92.963	274 947–1 350 640	1–3	1.02+03	3.98−01	1.22−01	−0.400	C	4
				92.935	274 904–1 350 930	5–5	5.76+02	7.46−02	1.14−01	−0.428	C	4
				92.959	274 897–1 350 640	3–3	8.72+02	1.13−01	1.04−01	−0.470	C	4
				92.960	274 904–1 350 640	5–3	7.46+01	5.80−03	8.87−03	−1.538	D	4
62		$^3S^\circ - ^3P$		*103.80*	362 117–*1 325 490*	3–9	3.34+02	1.62−01	1.66−01	−0.313	C	4
				103.859	362 117–1 324 960	3–5	3.25+02	8.77−02	8.99−02	−0.580	C	4
				103.745	362 117–1 326 020	3–3	3.43+02	5.53−02	5.67−02	−0.780	C	4
				[103.69]	362 117–1 326 550	3–1	3.54+02	1.90−02	1.95−02	−1.244	D+	4
63	$2s2p^3 - 2s2p^2(^2D)3d$	$^3D^\circ - ^3F$?		*[84.65]*	*232 922–1 414 290*	15–21	4.37+03	6.57−01	2.75+00	0.994	B	4
				84.643	232 853–1 414 290	7–9	4.38+03	6.04−01	1.18+00	0.626	B	4
				84.650	232 957–1 414 290	5–7	3.82+03	5.74−01	8.00−01	0.458	B	4

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No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc	Source
				84.655	233 024–1 414 290	3–5	3.61+03	6.47−01	5.41−01	0.288	B	4
				84.643	232 853–1 414 290	7–7	5.43+02	5.83−02	1.14−01	−0.389	C	4
				84.650	232 957–1 414 290	5–5	7.26+02	7.80−02	1.09−01	−0.409	C	4
				84.643	232 853–1 414 290	7–5	2.42+01	1.86−03	3.62−03	−1.885	E+	4
64		$^3D^\circ-^3D$				15–15						
				[84.05]	232 853–1 422 600	7–7	1.98+03	2.10−01	4.07−01	0.167	C+	4
				[84.10]	232 957–1 422 020	5–5	1.61+03	1.71−01	2.36−01	−0.068	C+	4
				[84.09]	232 853–1 422 020	7–5	3.60+02	2.73−02	5.29−02	−0.719	C	4
				[84.06]	232 957–1 422 600	5–7	2.47+02	3.66−02	5.06−02	−0.738	C	4
				[84.11]	233 024–1 422 020	3–5	3.47+02	6.13−02	5.09−02	−0.735	C	4
65		$^3P^\circ-^3D$				9–15						
				[87.13]	274 904–1 422 600	5–7	1.52+03	2.42−01	3.47−01	0.083	C+	4
				[87.17]	274 897–1 422 020	3–5	1.13+03	2.14−01	1.84−01	−0.192	C+	4
				[87.17]	274 904–1 422 020	5–5	3.02+02	3.44−02	4.94−02	−0.764	C	4
66		$^3P^\circ-^3S$		*86.03*	*274 906*–1 437 260	9–3	2.18+03	8.06−02	2.05−01	−0.139	C	4
				[86.03]	274 904–1 437 260	5–3	1.29+03	8.60−02	1.22−01	−0.367	C	4
				[86.03]	274 897–1 437 260	3–3	6.76+02	7.50−02	6.37−02	−0.648	C	4
				[86.03]	274 947–1 437 260	1–3	2.10+02	7.00−02	1.98−02	−1.155	D+	4
67		$^1D^\circ-^1F$?		*[92.26]*	354 401–*1 438 340*	5–7	1.48+03	2.64−01	4.01−01	0.121	C+	4
68	$2s2p^3-2s2p^2(^4P)4d$	$^5S^\circ-^5P$		*67.48*	118 100–*1 600 039*	5–15	1.76+03	3.60−01	4.00−01	0.255	D	1
				67.497	118 100–1 599 650	5–7	1.76+03	1.68−01	1.87−01	−0.076	D	LS
				67.470	118 100–1 600 240	5–5	1.76+03	1.20−01	1.33−01	−0.222	D	LS
				67.453	118 100–1 600 610	5–3	1.76+03	7.21−02	8.01−02	−0.443	D	LS
69	$2s2p^3-2s2p^2(^2D)4d$	$^3D^\circ-^3F$				15–21						1
				[68.35]	232 853–1 695 870	7–9	8.57+02	7.72−02	1.22−01	−0.267	D	LS
70	$2s2p^3-2s2p^2(^4P)5d$	$^5S^\circ-^5P$				5–15						1
				62.166	118 100–1 726 700	5–7	8.99+02	7.29−02	7.46−02	−0.438	D	LS
71		$^3D^\circ-^3F$				15–21						1
				[66.79]	232 853–1 730 130	7–9	8.07+02	6.94−02	1.07−01	−0.314	D	LS
72	$2p^4-2s^22p3s$	$^3P-^3P^\circ$		*197.49*	*543 336–1 049 696*	9–9	6.38−03	3.73−06	2.18−05	−4.474	C	2,3
				196.628	542 316–1 050 890	5–5	5.05−03	2.93−06	9.47−06	−4.834	C	2,3
				198.410	544 393–1 048 400	3–3	1.52−03	8.95−07	1.75−06	−5.571	C	2,3
				197.596	542 316–1 048 400	5–3	2.63−03	9.24−07	3.00−06	−5.335	C	2,3
				198.721	544 393–1 047 610	3–1	6.03−03	1.19−06	2.33−06	−5.447	C	2,3
				197.435	544 393–1 050 890	3–5	1.66−03	1.62−06	3.15−06	−5.313	C	2,3
				198.753	545 264–1 048 400	1–3	1.82−03	3.22−06	2.11−06	−5.492	D+	2
73		$^1D-^1P^\circ$		206.292	576 280–1 061 030	5–3	2.34−03	8.96−07	3.04−06	−5.349	C	2,3
74	$2p3s-2p3p$	$^3P^\circ-^3P$		*1 322.6*	*1 049 696–1 125 307*	9–9	5.82+00	1.53−01	5.98+00	0.139	B+	2,3
				1 334.22	1 050 890–1 125 840	5–5	4.48+00	1.20−01	2.62+00	−0.222	A	2,3
				1 306.51	1 048 400–1 124 940	3–3	1.09+00	2.78−02	3.59−01	−1.079	B+	2,3
				1 350.44	1 050 890–1 124 940	5–3	3.11+00	5.09−02	1.13+00	−0.594	B+	2,3
				[1 327.3]	1 048 400–1 123 740	3–1	5.75+00	5.06−02	6.63−01	−0.819	B+	2,3
				1 291.32	1 048 400–1 125 840	3–5	1.33+00	5.55−02	7.08−01	−0.779	B+	2,3

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No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc	Source
				1 293.16	1 047 610–1 124 940	1–3	1.53+00	1.15−01	4.90−01	−0.939	B+	2,3
75	$2s^22p3s-2s2p^2(^4P)3s$	$^3P^\circ-^3P$		*612.9*	*1 049 696–1 212 844*	9–9	4.18+00	2.35−02	4.27−01	−0.675	D	1
				614.33	1 050 890–1 213 670	5–5	3.11+00	1.76−02	1.78−01	−1.056	D	LS
				611.13	1 048 400–1 212 030	3–3	1.06+00	5.91−03	3.57−02	−1.751	E+	LS
				620.58	1 050 890–1 212 030	5–3	1.68+00	5.82−03	5.95−02	−1.536	E+	LS
				[614.4]	1 048 400–1 211 160	3–1	4.15+00	7.83−03	4.75−02	−1.629	E+	LS
				605.07	1 048 400–1 213 670	3–5	1.09+00	9.94−03	5.94−02	−1.525	E+	LS
				608.20	1 047 610–1 212 030	1–3	1.42+00	2.37−02	4.75−02	−1.625	E+	LS
76	$2s^22p3s-2s2p^2(^2D)3s$	$^3P^\circ-^3D$				9–15						1
				[426.80]	1 050 890–1 285 190	5–7	2.42+01	9.26−02	6.51−01	−0.334	C	LS
77		$^1P^\circ-^1D$		[409.38]	1 061 030–1 305 300	3–5	8.57+00	3.59−02	1.45−01	−0.968	D	1
78	$2p3p-2p3d$	$^3P-^3D^\circ$		*1 488.3*	*1 125 307–1 192 497*	9–15	2.60+00	1.44−01	6.35+00	0.113	B+	2,3
				1 487.87	1 125 840–1 193 050	5–7	2.73+00	1.27−01	3.10+00	−0.197	A	2,3
				1 487.43	1 124 940–1 192 170	3–5	2.08+00	1.15−01	1.69+00	−0.462	B+	2,3
				[1 470.4]	1 123 740–1 191 750	1–3	1.85+00	1.80−01	8.71−01	−0.745	B+	2,3
				1 507.61	1 125 840–1 192 170	5–5	3.05−01	1.04−02	2.58−01	−1.284	B	2,3
				1 496.78	1 124 940–1 191 750	3–3	8.42−01	2.83−02	4.18−01	−1.071	B	2,3
				1 517.22	1 125 840–1 191 750	5–3	2.41−02	4.99−04	1.25−02	−2.603	D+	2,3
79		$^3P-^3P^\circ$		*1 392.8*	*1 125 307–1 197 106*	9–9	1.90+00	5.54−02	2.28+00	−0.302	B	2,3
				1 410.24	1 125 840–1 196 750	5–5	1.60+00	4.78−02	1.11+00	−0.622	B+	2,3
				1 379.12	1 124 940–1 197 450	3–3	1.20+00	3.43−02	4.68−01	−0.988	B	2,3
				1 396.45	1 125 840–1 197 450	5–3	7.54+07	1.32−02	3.04−01	−1.180	B	2,3
				1 371.55	1 124 940–1 197 850	3–1	2.42+00	2.28−02	3.09−01	−1.165	B	2,3
				1 392.56	1 124 940–1 196 750	3–5	1.40−02	6.80−04	9.35−03	−2.690	D+	2,3
				[1 356.7]	1 123 740–1 197 450	1–3	2.30−01	1.90−02	8.49−02	−1.721	C+	2,3
80	$2s^22p3p-2s2p^2(^4P)3p$	$^3P-^3S^\circ$?		*[909]*	*1 125 307–1 235 310*	9–3	1.41+00	5.83−03	1.57−01	−1.280	E+	1
				913.49	1 125 840–1 235 310	5–3	7.73−01	5.80−03	8.72−02	−1.538	D	LS
				906.04	1 124 940–1 235 310	3–3	4.75−01	5.85−03	5.23−02	−1.756	E+	LS
				[896.3]	1 123 740–1 235 310	1–3	1.64−01	5.91−03	1.74−02	−2.228	E+	LS
81		$^3P-^3D^\circ$?				9–15						1
				[713.2]	1 125 840–1 266 060	5–7	4.82+00	5.15−02	6.05−01	−0.589	C	LS
				714.95	1 124 940–1 264 810	3–5	3.59+00	4.59−02	3.24−01	−0.861	D+	LS
				719.58	1 125 840–1 264 810	5–5	1.17+00	9.12−03	1.08−01	−1.341	D	LS
82		$^3P-^3P^\circ$?				9–9						1
				663.75	1 125 840–1 276 500	5–5	3.57+00	2.36−02	2.58−01	−0.928	D+	LS
				659.80	1 124 940–1 276 500	3–3	1.21+00	7.92−03	5.16−02	−1.624	E+	LS
				663.75	1 125 840–1 276 500	5–3	1.99+00	7.88−03	8.61−02	−1.405	D	LS
				659.80	1 124 940–1 276 500	3–5	1.21+00	1.32−02	8.60−02	−1.402	D	LS
				[654.6]	1 123 740–1 276 500	1–3	1.66+00	3.19−02	6.87−02	−1.496	D	LS
83	$2p3p-2p4d$	$^3P-^3D^\circ$				9–15						1
				[290.22]	1 125 840–1 470 410	5–7	1.01+02	1.78−01	8.50−01	−0.051	C	LS
				[290.19]	1 124 940–1 469 540	3–5	7.56+01	1.59−01	4.56−01	−0.321	D+	LS
				[290.95]	1 125 840–1 469 540	5–5	2.50+01	3.17−02	1.52−01	−0.800	D	LS
84		$^3P-^3P^\circ$				9–9						1

TABLE 64. Transition probabilities of allowed lines for Mg VII (references for this table are as follows: 1=Luo and Pradhan,[55] 2=Tachiev and Froese Fischer,[91] 3=Aggarwal,[3] 4=Fawcett,[21] and 5=Mendoza *et al.*[62])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc	Source
				[288.77]	1 125 840–1 472 130	5–5	4.00+01	5.00−02	2.38−01	−0.602	D+	LS
				[288.03]	1 124 940–1 472 130	3–5	1.35+01	2.79−02	7.94−02	−1.077	D	LS
85	$2s^22p3d-2s2p^2(^4P)3s$	$^3D^\circ-^3P$	*4913*	*4915*	*1 192 497–1 212 844*	15–9	1.45−02	3.16−03	7.66−01	−1.324	D	1
			4 848.3	4 849.7	1 193 050–1 213 670	7–5	1.27−02	3.20−03	3.58−01	−1.650	D+	LS
			5 033.8	5 035.2	1 192 170–1 212 030	5–3	1.01−02	2.31−03	1.91−01	−1.937	D	LS
			[5 151]	[5 152]	1 191 750–1 211 160	3–1	1.26−02	1.67−03	8.50−02	−2.300	D	LS
			4 649.9	4 651.2	1 192 170–1 213 670	5–5	2.57−03	8.33−04	6.38−02	−2.380	D	LS
			4 929.6	4 931.0	1 191 750–1 212 030	3–3	3.59−03	1.31−03	6.38−02	−2.406	D	LS
			4 560.8	4 562.0	1 191 750–1 213 670	3–5	1.82−04	9.44−05	4.25−03	−3.548	E	LS
86		$^3P^\circ-^3P$	*6350*	*6354*	*1 197 106–1 212 844*	9–9	2.07−03	1.25−03	2.36−01	−1.949	E+	1
			5 909	5 910	1 196 750–1 213 670	5–5	1.93−03	1.01−03	9.83−02	−2.297	D	LS
			6 857	6 859	1 197 450–1 212 030	3–3	4.11−04	2.90−04	1.96−02	−3.060	E+	LS
			6 543	6 545	1 196 750–1 212 030	5–3	7.89−04	3.04−04	3.27−02	−2.818	E+	LS
			[7 292]	[7 294]	1 197 450–1 211 160	3–1	1.37−03	3.63−04	2.61−02	−2.963	E+	LS
			6 164	6 165	1 197 450–1 213 670	3–5	5.65−04	5.37−04	3.27−02	−2.793	E+	LS
			7 050	7 052	1 197 850–1 212 030	1–3	5.05−04	1.13−03	2.62−02	−2.947	E+	LS
87	$2s^22p3d-2s2p^2(^2D)3s$	$^1F^\circ-^1D$		[1 069.6]	1 211 810–1 305 300	7–5	4.20−01	5.14−03	1.27−01	−1.444	D	1
88	$2s^22p3d-2s2p^2(^2D)3d$	$^3F^\circ-^3F$?				21–21						1
				424.556	1 178 750–1 414 290	5–5	9.84+00	2.66−02	1.86−01	−0.876	D	LS
				424.556	1 178 750–1 414 290	5–7	8.78−01	3.32−03	2.32−02	−1.780	E+	LS
89		$^3D^\circ-^3F$?		*[450.9]*	*1 192 497–1 414 290*	15–21	2.09+00	8.93−03	1.99−01	−0.873	E+	1
				451.998	1 193 050–1 414 290	7–9	2.08+00	8.18−03	8.52−02	−1.242	D	LS
				450.207	1 192 170–1 414 290	5–7	1.87+00	7.95−03	5.89−02	−1.401	E+	LS
				449.357	1 191 750–1 414 290	3–5	1.78+00	8.96−03	3.98−02	−1.571	E+	LS
				451.998	1 193 050–1 414 290	7–7	2.31−01	7.09−04	7.39−03	−2.304	E	LS
				450.207	1 192 170–1 414 290	5–5	3.28−01	9.97−04	7.39−03	−2.302	E	LS
				451.998	1 193 050–1 414 290	7–5	9.14−03	2.00−05	2.08−04	−3.854	E	LS
90		$^3D^\circ-^3D$				15–15						1
				[435.63]	1 193 050–1 422 600	7–7	1.46+01	4.14−02	4.16−01	−0.538	D+	LS
				[435.07]	1 192 170–1 422 020	5–5	1.15+01	3.25−02	2.33−01	−0.789	D+	LS
				[436.74]	1 193 050–1 422 020	7–5	2.54+00	5.18−03	5.21−02	−1.441	E+	LS
				[433.97]	1 192 170–1 422 600	5–7	1.85+00	7.30−03	5.21−02	−1.438	E+	LS
				[434.27]	1 191 750–1 422 020	3–5	2.48+00	1.17−02	5.02−02	−1.455	E+	LS
91		$^3P^\circ-^3D$				9–15						1
				[442.77]	1 196 750–1 422 600	5–7	2.75+00	1.13−02	8.24−02	−1.248	D	LS
				[445.30]	1 197 450–1 422 020	3–5	2.02+00	1.00−02	4.40−02	−1.523	E+	LS
				[443.91]	1 196 750–1 422 020	5–5	6.80−01	2.01−03	1.47−02	−1.998	E+	LS
92		$^3P^\circ-^3S$		*416.40*	*1 197 106*–1 437 260	9–3	5.18+01	4.48−02	5.53−01	−0.394	D	1
				[415.78]	1 196 750–1 437 260	5–3	2.89+01	4.49−02	3.07−01	−0.649	D+	LS
				[417.00]	1 197 450–1 437 260	3–3	1.72+01	4.48−02	1.85−01	−0.872	D	LS
				[417.69]	1 197 850–1 437 260	1–3	5.70+00	4.47−02	6.15−02	−1.350	E+	LS
93		$^1F^\circ-^1F$?		*[441.44]*	1 211 810–*1 438 340*	7–7	4.66+00	1.36−02	1.38−01	−1.021	D	1
94	$2s^22p3d-2s2p^2(^4P)4d$	$^3D^\circ-^3F$		*241.89*	*1 192 497–1 605 903*	15–21	9.81+01	1.21−01	1.44+00	0.259	D+	1
				[241.73]	1 193 050–1 606 730	7–9	9.85+01	1.11−01	6.18−01	−0.110	C	LS
				[241.88]	1 192 170–1 605 600	5–7	8.71+01	1.07−01	4.26−01	−0.272	D+	LS

TABLE 64. Transition probabilities of allowed lines for Mg VII (references for this table are as follows: 1=Luo and Pradhan,[55] 2=Tachiev and Froese Fischer,[91] 3=Aggarwal,[3] 4=Fawcett,[21] and 5=Mendoza *et al.*[62])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	$E_i - E_k$ (cm^{-1})	$g_i - g_k$	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc	Source
				[242.08]	1 191 750–1 604 840	3–5	8.20+01	1.20−01	2.87−01	−0.444	D+	LS
				[242.40]	1 193 050–1 605 600	7–7	1.09+01	9.57−03	5.35−02	−1.174	E+	LS
				[242.32]	1 192 170–1 604 840	5–5	1.52+01	1.34−02	5.34−02	−1.174	E+	LS
				[242.84]	1 193 050–1 604 840	7–5	4.26−01	2.69−04	1.51−03	−2.725	E	LS
95	$2s2p^2(^4\mathrm{P})3s$– $2s2p^2(^4\mathrm{P})3p$	$^3\mathrm{P}-{}^3\mathrm{S}^\circ$?	*[4450]*	*[4451]*	*1 212 844–1 235 310*	9–3	1.42−01	1.41−02	1.86+00	−0.897	C	1
			4 619.8	4 621.1	1 213 670–1 235 310	5–3	7.08−02	1.36−02	1.03+00	−1.167	C	LS
			4 294.3	4 295.5	1 212 030–1 235 310	3–3	5.28−02	1.46−02	6.19−01	−1.359	C	LS
			[4 140]	[4 141]	1 211 160–1 235 310	1–3	1.96−02	1.51−02	2.06−01	−1.821	D	LS
96		$^3\mathrm{P}-{}^3\mathrm{D}^\circ$?				9–15						1
				[1 909]	1 213 670–1 266 060	5–7	1.90+00	1.45−01	4.56+00	−0.140	C+	LS
				1 894.7	1 212 030–1 264 810	3–5	1.45+00	1.30−01	2.43+00	−0.409	C+	LS
				1 955.4	1 213 670–1 264 810	5–5	4.40−01	2.52−02	8.11−01	−0.900	C	LS
97		$^3\mathrm{P}-{}^3\mathrm{P}^\circ$?				9–9						1
				1 591.60	1 213 670–1 276 500	5–5	2.59+00	9.82−02	2.57+00	−0.309	C+	LS
				1 551.11	1 212 030–1 276 500	3–3	9.32−01	3.36−02	5.15−01	−0.997	D+	LS
				1 591.60	1 213 670–1 276 500	5–3	1.44+00	3.27−02	8.57−01	−0.786	C	LS
				1 551.11	1 212 030–1 276 500	3–5	9.32−01	5.60−02	8.58−01	−0.775	C	LS
				[1 530.5]	1 211 160–1 276 500	1–3	1.29+00	1.36−01	6.85−01	−0.866	C	LS
98	$2s2p^2(^4\mathrm{P})3s$–$2s^22p4d$	$^3\mathrm{P}-{}^3\mathrm{D}^\circ$				9–15						1
				[389.50]	1 213 670–1 470 410	5–7	9.83+00	3.13−02	2.01−01	−0.805	D	LS
				[388.33]	1 212 030–1 469 540	3–5	7.43+00	2.80−02	1.07−01	−1.076	D	LS
				[390.82]	1 213 670–1 469 540	5–5	2.43+00	5.56−03	3.58−02	−1.556	E+	LS
99	$2s2p^2(^4\mathrm{P})3s$– $2s2p^2(^4\mathrm{P})4p$	$^3\mathrm{P}-{}^3\mathrm{D}^\circ$				9–15						1
				[272.75]	1 213 670–1 580 310	5–7	5.19+01	8.10−02	3.64−01	−0.393	D+	LS
100	$2s2p^2(^4\mathrm{P})3s$– $2s2p^2(^4\mathrm{P})5p$	$^3\mathrm{P}-{}^3\mathrm{D}^\circ$				9–15						1
				[198.39]	1 213 670–1 717 720	5–7	3.49+01	2.88−02	9.41−02	−0.842	D	LS
101	$2s2p^2(^4\mathrm{P})3p$– $2s2p^2(^2\mathrm{D})3s$	$^3\mathrm{D}^\circ$?$-{}^3\mathrm{D}$				15–15						1
			[5 226]	[5 227]	1 266 060–1 285 190	7–7	2.37−03	9.70−04	1.17−01	−2.168	D	LS
			[4 905]	[4 907]	1 264 810–1 285 190	5–7	3.58−04	1.81−04	1.46−02	−3.043	E+	LS
102	$2s2p^2(^4\mathrm{P})3p$– $2s2p^2(^4\mathrm{P})3d$	$^3\mathrm{S}^\circ$?$-{}^3\mathrm{P}$		*[1 109]*	*1 235 310–1 325 490*	3–9	5.56+00	3.08−01	3.37+00	−0.034	C	1
				1 115.45	1 235 310–1 324 960	3–5	5.47+00	1.70−01	1.87+00	−0.292	C	LS
				1 102.41	1 235 310–1 326 020	3–3	5.65+00	1.03−01	1.12+00	−0.510	C	LS
				[1 096.0]	1 235 310–1 326 550	3–1	5.76+00	3.46−02	3.75−01	−0.984	D+	LS
103		$^3\mathrm{D}^\circ$?$-{}^3\mathrm{F}$				15–21						1
				[1 443.8]	1 266 060–1 335 320	7–9	5.10+00	2.05−01	6.82+00	0.157	B	LS
				1 443.21	1 264 810–1 334 100	5–7	4.55+00	1.99−01	4.73+00	−0.002	C+	LS
				[1 469.7]	1 266 060–1 334 100	7–7	5.40−01	1.75−02	5.93−01	−0.912	D+	LS
				[1 462.8]	1 264 810–1 333 170	5–5	7.67−01	2.46−02	5.92−01	−0.910	D+	LS
				[1 490.1]	1 266 060–1 333 170	7–5	2.05−02	4.87−04	1.67−02	−2.467	E+	LS
104		$^3\mathrm{D}^\circ$?$-{}^3\mathrm{D}$				15–15						1

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No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc	Source
				[1 172.6]	1 266 060–1 351 340	7–7	2.34+00	4.82−02	1.30+00	−0.472	C	LS
				1 161.17	1 264 810–1 350 930	5–5	1.88+00	3.81−02	7.28−01	−0.720	C	LS
				[1 178.3]	1 266 060–1 350 930	7–5	4.04−01	6.01−03	1.63−01	−1.376	D	LS
				1 165.09	1 264 810–1 350 640	5–3	6.70−01	8.18−03	1.57−01	−1.388	D	LS
				1 155.67	1 264 810–1 351 340	5–7	3.06−01	8.58−03	1.63−01	−1.368	D	LS
105		^{3}P$^{\circ}$?–^{3}P				9–9						1
			2 062.9	2 063.6	1 276 500–1 324 960	5–5	5.95−01	3.80−02	1.29+00	−0.721	C	LS
			2 018.7	2 019.4	1 276 500–1 326 020	3–3	2.11−01	1.29−02	2.57−01	−1.412	D+	LS
			2 018.7	2 019.4	1 276 500–1 326 020	5–3	3.52−01	1.29−02	4.29−01	−1.190	D+	LS
				[1 998]	1 276 500–1 326 550	3–1	8.72−01	1.74−02	3.43−01	−1.282	D+	LS
			2 062.9	2 063.6	1 276 500–1 324 960	3–5	1.98−01	2.11−02	4.30−01	−1.199	D+	LS
106		^{3}P$^{\circ}$?–^{3}D				9–15						1
				1 336.18	1 276 500–1 351 340	5–7	5.28+00	1.98−01	4.35+00	−0.004	C+	LS
				1 343.54	1 276 500–1 350 930	3–5	3.90+00	1.76−01	2.34+00	−0.277	C+	LS
				1 343.54	1 276 500–1 350 930	5–5	1.30+00	3.52−02	7.78−01	−0.754	C	LS
				1 348.80	1 276 500–1 350 640	3–3	2.14+00	5.84−02	7.78−01	−0.756	C	LS
				1 348.80	1 276 500–1 350 640	5–3	1.43−01	2.34−03	5.20−02	−1.932	E+	LS
107	$2s2p^2(^4\mathrm{P})3p$– $2s2p^2(^2\mathrm{D})3d$	^{3}D$^{\circ}$?–^{3}D				15–15						1
				[638.8]	1 266 060–1 422 600	7–7	1.31+00	8.03−03	1.18−01	−1.250	D	LS
				[636.1]	1 264 810–1 422 020	5–5	1.04+00	6.31−03	6.61−02	−1.501	D	LS
				[641.2]	1 266 060–1 422 020	7–5	2.27−01	1.00−03	1.48−02	−2.155	E+	LS
				[633.8]	1 264 810–1 422 600	5–7	1.68−01	1.42−03	1.48−02	−2.149	E+	LS
108	$2s2p^2(^4\mathrm{P})3p$– $2s2p^2(^4\mathrm{P})4d$	^{3}D$^{\circ}$?–^{3}F			15–21							1
				[293.54]	1 266 060–1 606 730	7–9	4.90+01	8.13−02	5.50−01	−0.245	D+	LS
				[293.44]	1 264 810–1 605 600	5–7	4.35+01	7.87−02	3.80−01	−0.405	D+	LS
				[294.52]	1 266 060–1 605 600	7–7	5.41+00	7.03−03	4.77−02	−1.308	E+	LS
				[294.09]	1 264 810–1 604 840	5–5	7.60+00	9.85−03	4.77−02	−1.308	E+	LS
				[295.18]	1 266 060–1 604 840	7–5	2.12−01	1.98−04	1.35−03	−2.858	E	LS
109	$2s2p^2(^4\mathrm{P})3p$– $2s2p^2(^2\mathrm{D})4d$	^{3}D$^{\circ}$?–^{3}F				15–21						1
				[232.66]	1 266 060–1 695 870	7–9	1.15+01	1.20−02	6.43−02	−1.076	D	LS
110	$2s2p^2(^4\mathrm{P})3p$– $2s2p^2(^4\mathrm{P})5d$	^{3}D$^{\circ}$?–^{3}F				15–21						1
				[215.49]	1 266 060–1 730 130	7–9	7.34+01	6.57−02	3.26−01	−0.337	D+	LS
111	$2s2p^2(^2\mathrm{D})3s$– $2s2p^2(^2\mathrm{D})3p$	^{1}D–^{1}F$^{\circ}$	[2 237]	[2 238]	1 305 300–1 349 990	5–7	1.23+00	1.29−01	4.75+00	−0.190	C+	1
112		^{1}D–^{1}D$^{\circ}$		[1 928]	1 305 300–1 357 170	5–5	1.77+00	9.87−02	3.13+00	−0.307	C+	1
113	$2s2p^2(^2\mathrm{D})3s$–$2s^22p4d$	^{1}D–^{1}F$^{\circ}$		[581.0]	1 305 300–1 477 420	5–7	1.91+00	1.35−02	1.29−01	−1.171	D	1
114	$2s2p^2(^2\mathrm{D})3p$– $2s2p^2(^2\mathrm{D})3d$	^{1}F$^{\circ}$–^{1}F?		*[1 131.9]*	*1 349 990–1 438 340*	7–7	2.75+00	5.29−02	1.38+00	−0.431	C	1
115		^{1}D$^{\circ}$–^{1}F?		*[1 232.0]*	1 357 170–*1 438 340*	5–7	4.99+00	1.59−01	3.22+00	−0.100	C+	1
116	$2s2p^2(^4\mathrm{P})3d$– $2s2p^2(^4\mathrm{P})4p$	^{3}F–^{3}D$^{\circ}$				1–15						1

TABLE 64. Transition probabilities of allowed lines for Mg VII (references for this table are as follows: 1=Luo and Pradhan,[55] 2=Tachiev and Froese Fischer,[91] 3=Aggarwal,[3] 4=Fawcett,[21] and 5=Mendoza *et al.*[62])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc	Source
				[408.18]	1 335 320–1 580 310	9–7	2.69+01	5.22−02	6.31−01	−0.328	C	LS
				[406.16]	1 334 100–1 580 310	7–7	2.36+00	5.84−03	5.47−02	−1.388	E+	LS
				[404.63]	1 333 170–1 580 310	5–7	6.75−02	2.32−04	1.55−03	−2.936	E	LS
117		^{3}D–^{3}D$^{\circ}$				15–15						1
				[436.74]	1 351 340–1 580 310	7–7	3.74+00	1.07−02	1.08−01	−1.126	D	LS
				[435.96]	1 350 930–1 580 310	5–7	4.71−01	1.88−03	1.35−02	−2.027	E	LS
118	$2s2p^2(^2D)3d-2s^22p4d$	^{3}F?–^{3}D$^{\circ}$				21–15						1
				[1 782]	1 414 290–1 470 410	9–7	3.38−02	1.25−03	6.60−02	−1.949	D	LS
				[1 810]	1 414 290–1 469 540	7–5	3.14−02	1.10−03	4.59−02	−2.114	E+	LS
				[1 782]	1 414 290–1 470 410	7–7	2.94−03	1.40−04	5.75−03	−3.009	E	LS
				[1 810]	1 414 290–1 469 540	5–5	3.91−03	1.92−04	5.72−03	−3.018	E	LS
				[1 782]	1 414 290–1 470 410	5–7	8.27−05	5.51−06	1.62−04	−4.560	E	LS
119		^{3}D–^{3}D$^{\circ}$				15–15						1
			[2 091]	[2 092]	1 422 600–1 470 410	7–7	6.95−02	4.56−03	2.20−01	−1.496	D+	LS
			[2 104]	[2 104]	1 422 020–1 469 540	5–5	5.35−02	3.55−03	1.23−01	−1.751	D	LS
			[2 130]	[2 130]	1 422 600–1 469 540	7–5	1.16−02	5.62−04	2.76−02	−2.405	E+	LS
			[2 066]	[2 067]	1 422 020–1 470 410	5–7	9.05−03	8.11−04	2.76−02	−2.392	E+	LS
120		^{3}S–^{3}P$^{\circ}$				3–9						1
			[2 867]	[2 868]	1 437 260–1 472 130	3–5	6.67−01	1.37−01	3.88+00	−0.386	C+	LS
121		^{1}F?–^{1}D$^{\circ}$	*[3 669]*	*[3 670]*	*1 438 340*–1 465 590	7–5	1.46−02	2.11−03	1.78−01	−1.831	D	1
122	$2s2p^2(^2D)3d-2s^22p5d$	^{3}S–^{3}P$^{\circ}$				3–9						1
				[622.4]	1437 260–1 597 920	3–5	4.69+00	4.54−02	2.79−01	−0.866	D+	LS
123	$2s2p^2(^2D)3d-2s^22p6d$	^{3}S–^{3}P$^{\circ}$		*437.62*	1 437 260–*1 665 770*	3–9	4.43+00	3.81−02	1.65−01	−0.942	D	1
				[437.62]	1 437 260–1 665 770	3–5	4.43+00	2.12−02	9.16−02	−1.197	D	LS
				[437.62]	1 437 260–1 665 770	3–3	4.42+00	1.27−02	5.49−02	−1.419	E+	LS
				[437.62]	1 437 260–1 665 770	3–1	4.44+00	4.25−03	1.84−02	−1.894	E+	LS
124	$2s^22p4d-2s2p^2(^4P)4d$	^{3}D$^{\circ}$–^{3}F				15–21						1
				[733.6]	1 470 410–1 606 730	7–9	3.60+01	3.73−01	6.31+00	0.417	B	LS
				[735.0]	1 469 540–1 605 600	5–7	3.18+01	3.60−01	4.36+00	0.255	C+	LS
				[739.7]	1 470 410–1 605 600	7–7	3.91+00	3.21−02	5.47−01	−0.648	D+	LS
				[739.1]	1 469 540–1 604 840	5–5	5.49+00	4.50−02	5.47−01	−0.648	D+	LS
				[743.9]	1 470 410–1 604 840	7–5	1.52−01	9.00−04	1.54−02	−2.201	E+	LS
125	$2s^22p4d-2s2p^2(^2D)4d$	^{3}D$^{\circ}$–^{3}F				15–21						1
				[443.54]	1 470 410–1 695 870	7–9	7.70+00	2.92−02	2.98−01	−0.690	D+	LS
126	$2s2p^2(^4P)4p-$ $2s2p^2(^4P)4d$	^{3}D$^{\circ}$–^{3}F				15–21						1
			[3 784]	[3 785.0]	1 580 310–1 606 730	7–9	3.47−01	9.58−02	8.36+00	−0.174	B	LS
			[3 953]	[3 954.1]	1 580 310–1 605 600	7–7	3.39−02	7.95−03	7.24−01	−1.255	C	LS
			[4 076]	[4 076.6]	1 580 310–1 604 840	7–5	1.22−03	2.17−04	2.04−02	−2.818	E+	LS
127	$2s2p^2(^4P)4p-$ $2s2p^2(^2D)4d$	^{3}D$^{\circ}$–^{3}F				15–21						1
				[865.4]	1 580 310–1 695 870	7–9	4.38−01	6.32−03	1.26−01	−1.354	D	LS

TABLE 64. Transition probabilities of allowed lines for Mg VII (references for this table are as follows: 1=Luo and Pradhan,[55] 2=Tachiev and Froese Fischer,[91] 3=Aggarwal,[3] 4=Fawcett,[21] and 5=Mendoza *et al.*[62])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc	Source
128	$2s2p^2(^4P)4p$–$2s2p^2(^4P)5d$	$^3D^\circ-^3F$				15–21						1
				[667.5]	1 580 310–1 730 130	7–9	2.27+01	1.95−01	3.00+00	0.135	C+	LS
129	$2s2p^2(^4P)4d$–$2s2p^2(^4P)5p$	$^3F-^3D^\circ$				21–15						1
				[901.0]	1 606 730–1 717 720	9–7	3.62+00	3.43−02	9.16−01	−0.510	C	LS
				[891.9]	1 605 600–1 717 720	7–7	3.24−01	3.86−03	7.93−02	−1.568	D	LS
				[885.9]	1 604 840–1 717 720	5–7	9.35−03	1.54−04	2.25−03	−3.114	E	LS
130	$2s2p^2(^2D)4d$–$2s2p^2(^4P)5p$	$^3F-^3D^\circ$				21–15						1
			[4 575]	[4 577]	1 695 870–1 717 720	9–7	2.04−02	4.98−03	6.75−01	−1.349	C	LS
131	$2s2p^2(^4P)5p$–$2s2p^2(^4P)5d$	$^3D^\circ-^3F$				15–21						1
			[8056]	[8058]	1 717 720–1 730 130	7–9	3.52−01	4.41−01	8.19+01	0.490	B+	LS

[a] Wavelengths (Å) are always given unless cm^{-1} is indicated.

11.7.3. Forbidden Transitions for Mg VII

The results of Tachiev and Froese Fischer[91] are the product of extensive MCHF calculations with Breit-Pauli corrections to order α^2. Vilkas *et al.*[118] used a second-order MBPT theory with Breit-Pauli relativistic corrections. As part of the Iron Project, Galavis *et al.*[40] used the SUPERSTRUCTURE code with configuration interaction, relativistic effects, and semiempirical energy corrections.

To estimate accuracies, we pooled the relative standard deviation of the mean (RSDM) of each of the lines for which a transition rate is quoted by two or more references,[40,91,118] as discussed in the general introduction.

11.7.4. References for Forbidden Transitions for Mg VII

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[118] M. J. Vilkas, I. Martinson, G. Merkelis, G. Gaigalas, and R. Kisielius, Phys. Scr. **54**, 281 (1996).

TABLE 65. Wavelength finding list for forbidden lines for Mg VII

Wavelength (vac) (Å)	Mult. No.	Wavelength (vac) (Å)	Mult. No.	Wavelength (vac) (Å)	Mult. No.	Wavelength (vac) (Å)	Mult. No.
152.130	23	282.166	8	431.507	6	818.29	39
152.552	23	283.050	8	434.594	6	822.72	33
161.945	25	284.514	8	434.720	6	823.42	33
173.527	22	311.363	15	434.917	6	823.88	33
173.861	22	319.027	14	520.627	12	846.74	5
183.691	21	363.763	7	520.809	12	854.75	5
183.770	21	365.234	7	521.091	12	868.24	5
184.386	21	365.243	7	527.006	19	870.14	27
184.394	21	367.616	7	608.64	35	870.65	27
184.683	21	367.674	7	609.03	35	871.44	27
184.772	21	367.684	7	609.28	35	1 146.53	38
198.288	24	371.405	20	637.56	28	1 146.62	38
198.631	24	409.808	30	637.74	28	1 147.18	38
217.751	26	423.189	29	637.77	28	1 189.82	3
218.740	26	427.352	13	676.57	18	1 216.12	3
252.496	10	427.431	13	773.61	34	1 257.80	37
253.660	10	427.444	13	774.23	34	1 257.91	37
277.001	9	429.264	6	774.64	34	1 258.59	37

TABLE 65. Wavelength finding list for forbidden lines for Mg VII—Continued

Wavelength (vac) (Å)	Mult. No.	Wavelength (vac) (Å)	Mult. No.	Wavelength (vac) (Å)	Mult. No.	Wavelength (vac) (Å)	Mult. No.
278.402	9	431.189	6	817.96	39	1 296.14	11
280.737	16	431.313	6	818.00	39		
Wavelength (air) (Å)	Mult. No.	Wavelength (air) (Å)	Mult. No.	Wavelength (air) (Å)	Mult. No.	Wavelength (air) (Å)	Mult. No.
2 261.5	4	2 383.2	32	2 387.4	32	2 853.4	41
2 377.3	32	2 383.6	32	2 441.4	2	3 034.3	17
2 377.7	32	2 384.6	32	2 509.2	2	12 957	40
2 380.8	32	2 387.0	32	2 629.1	2		
Wavenumber (cm^{-1})	Mult. No.	Wavenumber (cm^{-1})	Mult. No.	Wavenumber (cm^{-1})	Mult. No.	Wavenumber (cm^{-1})	Mult. No.
2 924	1	1 107	1	104	31	50	36
1 817	1	171	31	67	31	43	36

TABLE 66. Transition probabilities of forbidden lines for Mg VII (references for this table are as table follows: 1=Tachiev and Froese Fischer,[91] 2=Vilkis *et al.*,[118] and 3=Galavis *et al.*[40])

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	Type	A_{ki} (s^{-1})	S (a.u.)	Acc.	Source
1	$2p^2-2p^2$	^{3}P$-^3$P									
				1 817 cm^{-1}	1 107–2 924	3–5	M1	7.95−02	2.46+00	A	1,2,3
				1 817 cm^{-1}	1 107–2 924	3–5	E2	4.54−08	1.02−01	B+	1,2
				1 107 cm^{-1}	0–1 107	1–3	M1	2.43−02	2.00+00	A	1,2,3
				2 924 cm^{-1}	0–2 924	1–5	E2	2.24−07	4.67−02	B+	1,2,3
2		^{3}P$-^1$D									
			2 441.4	2 442.1	0–40 948	1–5	E2	1.25−04	4.85−05	C+	1,2,3
			2 509.2	2 510.0	1 107–40 948	3–5	M1	1.20+00	3.52−03	B	1,2,3
			2 509.2	2 510.0	1 107–40 948	3–5	E2	3.34−04	1.49−04	C+	1,2
			2 629.1	2 629.9	2 924–40 948	5–5	M1	3.13+00	1.05−02	B+	1,2,3
			2 629.1	2 629.9	2 924–40948	5–5	E2	1.93−03	1.08−03	B	1,2
3		^{3}P$-^1$S									
				1 216.12	2 924–85 153	5–1	E2	3.85−02	9.15−05	C+	1,2,3
				1 189.82	1 107–85 153	3–1	M1	3.62+01	2.26−03	B	1,2,3
4		^{1}D$-^1$S									
			2 261.5	2 262.2	40 948–85 153	5–1	E2	3.95+00	2.09−01	B+	1,2,3
5	$2s^22p^2-2s2p^3$	^{3}P$-^5$S$^\circ$									
				[868.2]	2 924–118 100	5–5	M2	2.90−02	4.80+00	B+	1
				[854.8]	1 107–118 100	3–5	M2	4.11−02	6.29+00	B+	1
				[846.7]	0–118 100	1–5	M2	1.94−02	2.83+00	B	1
6		^{3}P$-^3$D$^\circ$									
				431.507	1 107–232 853	3–7	M2	4.47−01	3.14+00	B	1
				429.264	0–232 957	1–5	M2	4.75−01	2.32+00	B	1
				434.917	2 924–232 853	5–7	M2	1.04+00	7.63+00	B+	1
				431.313	1 107–232 957	3–5	M2	4.86−01	2.44+00	B	1
				434.720	2 924–232 957	5–5	M2	3.25−03	1.69−02	C	1
				431.189	1 107–233 024	3–3	M2	2.00−01	6.00−01	B	1
				434.594	2 924–233 024	5–3	M2	1.15−01	3.58−01	B	1
7		^{3}P$-^3$P$^\circ$									
				367.674	2 924–274 904	5–5	M2	1.55+00	3.50+00	B	1
				365.243	1 107–274 897	3–3	M2	9.69−01	1.27+00	B	1
				367.616	2 924–274 947	5–1	M2	1.01+00	4.55−01	B	1

TABLE 66. Transition probabilities of forbidden lines for Mg VII (references for this table are as table follows: 1=Tachiev and Froese Fischer,[91] 2=Vilkis *et al.*,[118] and 3=Galavis *et al.*[40])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i–E_k (cm^{-1})	g_i–g_k	Type	A_{ki} (s^{-1})	S (a.u.)	Acc.	Source
				367.684	2 924–274 897	5–3	M2	1.40−02	1.89−02	C+	1
				365.234	1 107–274 904	3–5	M2	3.42−03	7.45−03	C	1
				363.763	0–274 904	1–5	M2	2.07−01	4.42−01	B	1
8		$^3P-^1D^\circ$									
				282.166	0–354 401	1–5	M2	2.35+00	1.41+00	B	1
				283.050	1 107–354 401	3–5	M2	5.35+00	3.26+00	B	1
				284.514	2 924–354 401	5–5	M2	4.19+00	2.62+00	B	1
9		$^3P-^3S^\circ$									
				278.402	2 924–362 117	5–3	M2	4.46+00	1.50+00	B	1
				277.001	1 107–362 117	3–3	M2	1.94+00	6.35−01	B	1
10		$^3P-^1P^\circ$									
				252.496	1 107–397 153	3–3	M2	2.75+00	5.67−01	B	1
				253.660	2 924–397 153	5–3	M2	9.49+00	2.00+00	B	1
11		$^1D-^5S^\circ$									
				[1 296.1]	40 948–118 100	5–5	M2	4.05−06	4.97−03	C	1
12		$^1D-^3D^\circ$									
				520.809	40 948–232 957	5–5	M2	5.51−01	7.08+00	B+	1
				520.627	40 948–233 024	5–3	M2	2.40−01	1.85+00	B	1
				521.091	40 948–232 853	5–7	M2	6.15−01	1.11+01	B+	1
13		$^1D-^3P^\circ$									
				427.352	40 948–274 947	5–1	M2	8.02−01	7.67−01	B	1
				427.444	40 948–274 897	5–3	M2	6.71−01	1.93+00	B	1
				427.431	40 948–274 904	5–5	M2	3.91−01	1.87+00	B	1
14		$^1D-^1D^\circ$									
				319.027	40 948–354 401	5–5	M2	7.44−02	8.24−02	C+	1
15		$^1D-^3S^\circ$									
				311.363	40 948–362 117	5–3	M2	7.10−03	4.18−03	C	1
16		$^1D-^1P^\circ$									
				280.737	40 948–397 153	5–3	M2	1.12−02	3.92−03	C	1
17		$^1S-^5S^\circ$									
			[3 034]	[3 035]	85 153–118 100	1–5	M2	6.47−09	5.58−04	C	1
18		$^1S-^3D^\circ$									
				676.57	85 153–232 957	1–5	M2	6.62−05	3.15−03	C	1
19		$^1S-^3P^\circ$									
				527.006	85 153–274 904	1–5	M2	4.85−01	6.62+00	B+	1
20		$^1S-^1D^\circ$									
				371.405	85 153–354 401	1–5	M2	1.44−02	3.40−02	C+	1
21	$2s^22p^2-2p^4$	$^3P-^3P$									
				184.386	2 924–545 264	5–1	E2	3.67+04	6.99−03	B	2
				184.683	2 924–544 393	5–3	M1	2.13+00	1.49−06	D+	2
				184.683	2 924–544 393	5–3	E2	2.73+04	1.57−02	B	2
				183.770	1 107–545 264	3–1	M1	1.45+00	3.34−07	D+	2
				184.772	1 107–542 316	3–5	M1	1.43+00	1.67−06	D+	2
				184.772	1 107–542 316	3–5	E2	1.64+04	1.57−02	B	2
				183.691	0–544 393	1–3	M1	4.15−01	2.86−07	D+	2
				184.394	0–542 316	1–5	E2	7.34+03	6.99−03	B	2
22		$^3P-^1D$									

TABLE 66. Transition probabilities of forbidden lines for Mg VII (references for this table are as table follows: 1=Tachiev and Froese Fischer,[91] 2=Vilkis *et al.*,[118] and 3=Galavis *et al.*[40])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	Type	A_{ki} (s^{-1})	S (a.u.)	Acc.	Source
				173.527	0–576 280	1–5	E2	6.89−01	4.84−07	D+	2
				173.861	1 107–576 280	3–5	M1	6.46−01	6.29−07	D+	2
				173.861	1 107–576 280	3–5	E2	3.27+01	2.32−05	C	2
23		$^3\mathrm{P}-^1\mathrm{S}$									
				152.552	2 924–658 440	5–1	E2	1.83+01	1.35−06	D+	2
				152.130	1 107–658 440	3–1	M1	3.42−01	4.46−08	D	2
24		$^1\mathrm{D}-^3\mathrm{P}$									
				198.288	40 948–545 264	5–1	E2	4.81+00	1.32−06	D+	2
				198.631	40 948–544 393	5–3	M1	1.18+00	1.03−06	D+	2
				198.631	40 948–544 393	5–3	E2	2.98+01	2.47−05	C	2
25		$^1\mathrm{D}-^1\mathrm{S}$									
				161.945	40 948–658 440	5–1	E2	6.36+04	6.33−03	B	2
26		$^1\mathrm{S}-^3\mathrm{P}$									
				218.740	85 153–542 316	1–5	E2	4.12−02	9.21−08	D+	2
				217.751	85 153–544 393	1–3	M1	5.73−01	6.58−07	D+	2
27	$2s2p^3-2s2p^3$	$^5\mathrm{S}^\circ-^3\mathrm{D}^\circ$									
				[871.4]	118 100–232 853	5–7	M1	8.21−03	1.41−06	D+	1
				[871.4]	118 100–232 853	5–7	E2	2.18−02	6.84−05	C	1
				[870.6]	118 100–232 957	5–5	M1	1.27−01	1.56−05	C	1
				[870.6]	118 100–232 957	5–5	E2	1.92−02	4.29−05	C	1
				[870.1]	118 100–233 024	5–3	M1	4.35−02	3.19−06	C	1
				[870.1]	118 100–233 024	5–3	E2	8.23−03	1.10−05	C	1
28		$^5\mathrm{S}^\circ-^3\mathrm{P}^\circ$									
				[637.7]	118 100–274 904	5–5	M1	2.51+01	1.21−03	C+	1
				[637.7]	118 100–274 904	5–5	E2	1.82−04	8.56−08	D	1
				[637.8]	118 100–274 897	5–3	M1	1.40+01	4.04−04	C+	1
				[637.8]	118 100–274 897	5–3	E2	3.56−05	1.01−08	D	1
				[637.6]	118 100–274 947	5–1	E2	1.21−06	1.14−10	E+	1
29		$^5\mathrm{S}^\circ-^1\mathrm{D}^\circ$									
				[423.19]	118 100–354 401	5–5	M1	1.39−03	1.95−08	D	1
				[423.19]	118 100–354 401	5–5	E2	8.77−07	5.32−11	E+	1
30		$^5\mathrm{S}^\circ-^3\mathrm{S}^\circ$									
				[409.81]	118 100–362 117	5–3	M1	9.28−03	7.11−08	D	1
				[409.81]	118 100–362 117	5–3	E2	1.15−05	3.55−10	E+	1
31		$^3\mathrm{D}^\circ-^3\mathrm{D}^\circ$									
				171 cm^{-1}	232 853–233 024	7–3	E2	1.62−15	2.97−04	C+	1
				104 cm^{-1}	232 853–232 957	7–5	M1	2.83−05	4.66+00	A	1
				104 cm^{-1}	232 853–232 957	7–5	E2	3.53−16	1.30−03	C+	1
				67 cm^{-1}	232 957–233 024	5–3	M1	1.22−05	4.50+00	A	1
				67 cm^{-1}	232 957–233 024	5–3	E2	3.06−19	6.08−06	C	1
32		$^3\mathrm{D}^\circ-^3\mathrm{P}^\circ$									
			2 377.7	2 378.5	232 853–274 897	7–3	E2	1.12+00	2.29−01	B+	1
			2 380.8	2 381.5	232 957–274 947	5–1	E2	2.38+00	1.63−01	B+	1
			2 377.3	2 378.1	232 853–274 904	7–5	M1	3.20+00	7.97−03	B	1
			2 377.3	2 378.1	232 853–274 904	7–5	E2	1.34+00	4.56−01	B+	1
			2 383.6	2 384.4	232 957–274 897	5–3	M1	2.08−06	3.14−09	D	1
			2 383.6	2 384.4	232 957–274 897	5–3	E2	1.96−01	4.04−02	B	1
			2 384.6	2 385.3	233 024–274 947	3–1	M1	3.78+00	1.90−03	C+	1
			2 383.2	2 384.0	232 957–274 904	5–5	M1	2.26+00	5.68−03	B	1
			2 383.2	2 384.0	232 957–274 904	5–5	E2	8.27−01	2.84−01	B+	1

TABLE 66. Transition probabilities of forbidden lines for Mg VII (references for this table are as table follows: 1=Tachiev and Froese Fischer,[91] 2=Vilkis *et al.*,[118] and 3=Galavis *et al.*[40])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i–E_k (cm^{-1})	g_i–g_k	Type	A_{ki} (s^{-1})	S (a.u.)	Acc.	Source
			2 387.4	2 388.2	233 024–274 897	3–3	M1	3.76+00	5.70−03	B	1
			2 387.4	2 388.2	233 024–274 897	3–3	E2	1.05+00	2.19−01	B+	1
			2 387.0	2 387.8	233 024–274 904	3–5	M1	6.00−01	1.52−03	C+	1
			2 387.0	2 387.8	233 024–274 904	3–5	E2	2.13−01	7.38−02	B+	1
33		$^3\mathrm{D}^\circ-{}^1\mathrm{D}^\circ$									
				823.42	232 957–354 401	5–5	M1	2.05−02	2.12−06	D+	1
				823.42	232 957–354 401	5–5	E2	5.12−02	8.65−05	C	1
				822.72	232 853–354 401	7–5	M1	1.70−02	1.75−06	D+	1
				822.72	232 853–354 401	7–5	E2	9.07−02	1.53−04	C+	1
				823.88	233 024–354 401	3–5	M1	1.80−03	1.86−07	D+	1
				823.88	233 024–354 401	3–5	E2	4.63−03	7.84−06	C	1
34		$^3\mathrm{D}^\circ-{}^3\mathrm{S}^\circ$									
				773.61	232 853–362 117	7–3	E2	1.14+00	8.49−04	C+	1
				774.23	232 957–362 117	5–3	M1	1.05−01	5.41−06	C	1
				774.23	232 957–362 117	5–3	E2	1.43+00	1.07−03	C+	1
				774.64	233 024–362 117	3–3	M1	5.93−02	3.07−06	C	1
				774.64	233 024–362 117	3–3	E2	1.16+00	8.68−04	C+	1
35		$^3\mathrm{D}^\circ-{}^1\mathrm{P}^\circ$									
				608.64	232 853–397 153	7–3	E2	1.21−02	2.72−06	C	1
				609.03	232 957–397 153	5–3	M1	2.23+01	5.60−04	C+	1
				609.03	232 957–397 153	5–3	E2	7.53−03	1.69−06	D+	1
				609.28	233 024–397 153	3–3	M1	7.41+00	1.86−04	C+	1
				609.28	233 024–397 153	3–3	E2	3.31−03	7.44−07	D+	1
36		$^3\mathrm{P}^\circ-{}^3\mathrm{P}^\circ$									
				43 cm^{-1}	274 904–274 947	5–1	E2	8.56−18	5.20−04	C+	1
				50 cm^{-1}	274 897–274 947	3–1	M1	6.74−06	2.00+00	B+	1
37		$^3\mathrm{P}^\circ-{}^1\mathrm{D}^\circ$									
				1 258.59	274 947–354 401	1–5	E2	1.24−05	1.75−07	D+	1
				1 257.80	274 897–354 401	3–5	M1	2.15+00	7.94−04	C+	1
				1 257.80	274 897–354 401	3–5	E2	1.86−05	2.61−07	D+	1
				1 257.91	274 904–354 401	5–5	M1	6.44+00	2.38−03	C+	1
				1 257.91	274 904–354 401	5–5	E2	2.74−04	3.85−06	C	1
38		$^3\mathrm{P}^\circ-{}^3\mathrm{S}^\circ$									
				1 146.62	274 904–362 117	5–3	M1	2.59+00	4.34−04	C+	1
				1 146.62	274 904–362 117	5–3	E2	1.25−04	6.66−07	D+	1
				1 146.53	274 897–362 117	3–3	M1	1.56+00	2.61−04	C+	1
				1 146.53	274 897–362 117	3–3	E2	4.80−05	2.55−07	D+	1
				1 147.18	274 947–362 117	1–3	M1	2.08+00	3.50−04	C+	1
39		$^3\mathrm{P}^\circ-{}^1\mathrm{P}^\circ$									
				817.96	274 897–397 153	3–3	M1	2.31−02	1.41−06	D+	1
				817.96	274 897–397 153	3–3	E2	2.82−02	2.77−05	C	1
				818.00	274 904–397 153	5–3	M1	6.22−02	3.79−06	C	1
				818.00	274 904–397 153	5–3	E2	9.12−02	8.94−05	C	1
				818.29	274 947–397 153	1–3	M1	1.22−02	7.42−07	D+	1
40		$^1\mathrm{D}^\circ-{}^3\mathrm{S}^\circ$									
			12 957	12 960	354 401–362 117	5–3	M1	5.74−07	1.39−07	D+	1
			12 957	12 960	354 401–362 117	5–3	E2	1.07−06	1.05−03	C+	1
41		$^3\mathrm{S}^\circ-{}^1\mathrm{P}^\circ$									
			2 853.4	2 854.2	362 117–397 153	3–3	M1	5.04+00	1.30−02	B	1
			2 853.4	2 854.2	362 117–397 153	3–3	E2	2.66−06	1.35−06	D+	1

[a] Wavelengths (Å) are always given unless cm^{-1} is indicated.

11.8. Mg VIII

Boron isoelectronic sequence
Ground state: $1s^2 2s^2 2p\ ^2P^o_{1/2}$
Ionization energy: 265.96 eV = 2 145 100 cm^{-1}

11.8.1. Allowed Transitions for Mg VIII

In general, different sources for computed transition rates for this boronlike spectrum agree well. For stronger lines, this is the case for lines of the OP,[24] even from higher-lying levels. Most of the compiled data below have been taken from this source. Wherever possible, we used the high-quality data from the other references, which were available primarily for transitions from lower-lying levels. Tachiev and Froese Fischer[92] performed extensive MCHF calculations with Breit-Pauli corrections to order α^2. Merkelis *et al.*[64] used a second-order MBPT theory with Breit-Pauli relativistic corrections. As part of the Iron Project, Galavis *et al.*[41] used the SUPERSTRUCTURE code with configuration interaction, relativistic effects, and semiempirical energy corrections. Only OP (Ref. 24) results were available for energy levels above the $2s2p3s$.

To estimate accuracies, we pooled the relative standard deviation of the mean (RSDM) for each of the lines with transition rates published in two or more references,[24,41,64,92] as described in the general introduction. For this purpose the spin-allowed (non-OP) and intercombination data were treated separately and each of these was in turn divided into two upper-level energy groups below and above 700 000 cm^{-1}. OP lines constituted a fifth group; we decreased the accuracies predicted from the good agreement with Tachiev and Froese Fischer[92] for lines from higher-lying levels, because such agreement was not observed in other isoelectronic spectra. To estimate the accuracy of lines from higher-lying levels, we isoelectronically averaged the logarithmic quality factors (see Sec. 4.1 of the Introduction) observed for lines from the lower-lying levels of B-like ions of Na, Mg, Al, and Si and scaled them for lines from high-lying levels. The listed accuracies for these higher-lying transitions are thus less well established than for those from lower levels.

A NIST compilation of far-UV lines of Mg VIII was published recently.[78] The estimated accuracies are different in some cases because a different method of evaluation was used.

11.8.2. References for Allowed Transitions for Mg VIII

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[41] M. E. Galavis, C. Mendoza, and C. J. Zeippen, Astron. Astrophys., Suppl. Ser. **131**, 499 (1998).

[64] G. Merkelis, J. J. Vilkas, G. Gaigalas, and R. Kisielius, Phys. Scr.**51**, 233 (1995).

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[87] G. Tachiev and C. Froese Fischer, J. Phys B **33**, 2419 (2000).

[92] G. Tachiev and C. Froese Fischer, http://www.vuse.vanderbilt.edu/~cff/mchf_collection/ (MCHF, *ab initio*, downloaded on Mar. 28, 2002). See Tachiev and Froese Fischer (Ref. 87).

TABLE 67. Wavelength finding list for allowed lines for Mg VIII

Wavelength (vac) (Å)	Mult. No.
51.386	21
51.473	21
52.395	70
52.628	71
53.437	68
53.484	67
53.485	68
53.512	67
53.532	67
53.812	20
53.905	20
53.908	20
54.853	19
54.886	19
54.953	19
55.122	18
55.136	72
55.197	72
55.222	18
56.358	69
56.402	69
56.403	69
56.987	17
57.024	17
57.094	17
57.132	17
57.590	65
57.591	65
57.736	64
57.737	64
57.783	16
58.498	60
58.537	60
58.556	60
58.595	60
58.614	60
58.667	59
58.672	59
58.824	15
59.038	14
59.153	14
60.321	58
60.382	58
60.607	66
60.681	66
60.684	13
60.806	13
61.891	62
61.963	62
61.964	62
62.291	61
62.292	61
64.243	12
64.380	12
64.493	11
64.517	11
64.630	11
64.654	11
64.702	10
64.761	56
64.809	56
64.880	56
65.734	55
65.807	55
65.836	63
65.923	63
66.069	54
68.450	9
68.550	57
68.578	57
68.580	57
68.606	9
69.415	8
69.467	8
69.575	8
70.952	7
71.004	7
71.119	7
71.171	7
72.548	50
72.550	50
72.678	49
72.680	49
72.697	49
72.699	49
73.249	48
73.251	48
73.800	38
73.826	38
73.862	38
73.889	38
73.928	38
73.980	38
74.020	38
74.274	37
74.318	37
74.337	37
74.366	37
74.411	37
74.430	37
74.858	6
74.981	96
74.986	96
74.992	96
75.034	6
75.044	6
76.197	51
76.714	85
76.740	85
76.788	85

Table 67. Wavelength finding list for allowed lines for Mg VIII—Continued

Wavelength (vac) (Å)	Mult. No.
76.898	95
77.018	95
77.029	95
77.402	53
77.523	53
77.548	94
77.560	94
77.572	52
77.577	91
77.581	91
77.650	91
77.671	52
77.692	52
77.737	90
78.006	41
78.075	41
78.077	41
78.446	40
78.572	40
78.574	40
78.855	89
78.859	89
79.701	45
79.703	45
80.230	39
80.232	39
80.253	39
80.255	39
80.806	87
80.811	87
80.889	86
81.292	93
81.304	93
81.368	93
81.380	93
81.731	33
81.790	33
81.844	33
81.867	33
81.943	33
81.979	33
82.238	42
82.317	42
82.598	5
82.709	92
82.823	5
83.644	44
83.726	44
83.785	44
83.866	44
84.126	46
84.858	88
84.919	82
85.064	82
85.153	82
85.248	83
85.254	83
85.598	47
85.745	47
86.235	43
86.358	43
86.384	43
86.844	34
86.847	34
87.021	34
89.755	84
89.771	84
92.125	35
92.182	80
92.188	80
92.236	80
92.322	35
93.893	36
94.070	36
94.097	36
94.275	36
97.475	81
97.493	81
97.529	81
97.547	81
102.345	77
102.353	77
102.578	77
102.586	77
105.971	76
105.979	76
106.095	76
106.808	79
106.830	79
108.934	78
109.175	78
109.198	78
114.905	74
114.915	74
114.927	74
114.937	74
123.273	75
123.276	75
123.302	75
138.112	149
138.309	149
145.765	73
145.805	73
149.116	109
149.388	109
149.425	109
159.124	108
159.167	108
171.359	208
171.694	209

TABLE 67. Wavelength finding list for allowed lines for Mg VIII—Continued

Wavelength (vac) (Å)	Mult. No.
171.863	209
177.101	148
177.113	126
177.362	148
177.800	148
177.841	126
178.469	146
178.798	146
190.953	147
191.766	147
195.316	107
195.967	107
196.032	107
202.581	248
209.701	125
210.677	125
210.722	125
217.822	193
218.436	207
219.101	207
222.178	215
226.449	124
226.501	124
227.640	124
230.968	183
231.096	123
231.589	183
232.337	123
232.954	143
233.514	143
238.186	205
238.834	206
239.160	206
240.703	204
246.585	145
246.798	145
247.942	145
250.013	100
250.928	282
251.870	144
253.196	24
253.286	144
253.317	24
253.929	24
254.051	24
255.017	24
263.103	181
263.172	181
263.345	181
263.414	181
264.005	283
264.809	283
267.852	122
268.680	122
269.520	122
270.358	122
271.843	247
272.874	247
273.403	120
273.733	120
274.258	120
274.589	120
275.202	120
276.121	120
276.740	120
281.666	106
282.008	106
282.143	106
285.600	121
286.878	240
288.251	177
288.542	177
289.586	182
289.670	182
290.099	177
290.394	177
290.647	182
295.604	192
295.674	241
295.989	241
297.548	192
297.683	23
297.770	176
298.080	176
298.696	23
298.762	23
300.203	23
300.269	23
303.122	246
307.210	245
307.324	272
311.796	4
312.237	178
313.754	4
314.218	291
314.248	178
314.406	178
315.039	4
317.039	4
319.673	261
320.123	119
320.349	180
321.099	261
322.508	119
322.633	180
323.238	292
323.845	180
325.563	292
329.413	98
329.630	271

TABLE 67. Wavelength finding list for allowed lines for Mg VIII—Continued

Wavelength (vac) (Å)	Mult. No.
330.677	98
331.148	271
332.149	179
333.433	179
334.258	202
335.253	3
336.361	202
339.006	3
341.802	27
341.841	27
342.062	27
346.272	201
347.645	203
348.335	203
352.460	22
353.882	22
355.999	22
361.729	171
361.952	99
362.188	171
363.240	171
363.822	260
363.888	105
364.113	105
364.830	298
364.964	298
365.711	170
367.175	104
367.404	104
367.661	104
367.891	104
369.727	259
374.981	269
375.333	118
378.616	118
382.234	103
382.482	103
383.112	270
388.591	117
391.298	169
391.834	169
392.111	117
399.090	238
399.249	238
399.664	238
399.824	238
400.240	142
402.852	142
403.372	214
403.633	239
403.796	239
403.828	142
404.629	173
404.973	191
406.421	214
406.653	214
408.013	173
413.753	175
415.127	162
415.731	175
415.749	175
415.887	162
416.458	162
417.293	162
417.746	175
417.868	162
418.989	116
419.305	162
420.504	116
422.529	116
422.565	116
422.690	116
424.737	116
425.913	278
426.167	116
428.185	26
428.245	26
428.319	26
428.379	26
429.148	165
429.682	165
430.465	2
430.496	165
430.589	165
430.645	165
431.406	165
432.003	165
434.028	277
436.672	2
436.735	2
436.853	172
439.020	233
440.800	172
441.386	29
441.755	29
443.321	233
444.563	164
445.256	164
447.788	163
452.899	174
459.960	235
460.723	235
461.766	280
462.299	190
464.684	235
465.008	281
465.463	235
466.005	237
467.508	281
470.854	237

TABLE 67. Wavelength finding list for allowed lines for Mg VIII—Continued

Wavelength (vac) (Å)	Mult. No.
471.320	279
477.943	244
482.253	244
483.419	189
484.684	234
485.154	32
485.531	234
485.600	32
489.913	32
490.367	32
491.400	236
494.315	137
496.845	137
500.927	213
501.303	136
502.892	243
502.993	136
503.905	136
504.312	167
505.996	213
507.563	166
509.580	167
512.899	166
525.818	168
536.596	302
548.817	290
551.298	290
551.462	25
551.563	25
555.556	290
570.97	115
577.80	97
578.60	115
585.62	97
588.03	140
591.33	114
593.33	114
595.38	257
595.73	257
595.81	140
596.66	139
597.51	257
597.94	139
599.52	114
601.58	114
604.67	139
605.73	113
605.99	139
621.47	188
623.25	158
624.61	158
637.47	138
646.62	227
647.17	287
648.55	258

TABLE 67. Wavelength finding list for allowed lines for Mg VIII—Continued

Wavelength (vac) (Å)	Mult. No.
656.51	258
658.67	187
667.74	141
674.63	297
679.82	31
680.55	297
681.01	297
682.22	230
684.88	264
685.92	230
686.62	289
689.20	31
689.55	31
690.89	266
693.77	264
693.87	232
694.83	229
697.20	289
699.45	232
699.94	266
700.13	102
700.97	102
701.85	102
702.69	102
703.19	200
706.16	200
707.96	288
719.22	288
733.03	226
737.30	263
741.84	256
741.95	161
744.27	265
745.16	256
747.38	159
748.39	161
754.20	256
759.01	159
763.18	1
769.88	1
772.75	1
782.91	1
789.96	1
793.34	228
795.61	228
803.02	160
810.04	268
811.49	231
813.74	268
815.39	268
818.33	268
819.13	268
824.06	267
825.01	267
830.56	267

TABLE 67. Wavelength finding list for allowed lines for Mg VIII—Continued

Wavelength (vac) (Å)	Mult. No.
867.09	28
870.02	156
872.52	156
876.27	273
878.81	156
885.43	156
888.02	156
890.87	273
895.18	156
922.34	295
930.15	157
936.50	157
943.57	296
944.38	128
944.47	296
947.78	157
953.65	128
954.38	157
954.84	128
956.66	222
958.86	157
964.32	128
965.72	157
970.31	157
1 037.88	220
1 042.86	275
1 047.89	224
1 051.86	224
1 053.86	30
1 063.60	275
1 066.10	223
1 076.58	30
1 079.80	225
1 162.12	212
1 169.45	274
1 178.97	212
1 190.48	276
1 202.50	221
1 207.00	276
1 207.44	212
1 258.49	112
1 272.26	133
1 289.16	133
1 296.18	112
1 357.77	131
1 371.18	262
1 379.50	131
1 384.66	151
1 386.58	262
1 391.40	151
1 395.67	151
1 418.24	150
1 423.08	131
1 425.31	150
1 429.18	127
1 436.37	186
1 443.21	127
1 450.54	127
1 552.80	249
1 553.28	130
1 557.39	130
1 572.57	249
1 584.53	211
1 586.80	185
1 608.75	130
1 616.03	184
1 617.60	196
1 621.53	255
1 636.39	211
1 637.47	255
1 647.99	198
1 650.44	301
1 663.62	198
1 684.64	195
1 689.19	301
1 690.33	111
1 692.91	111
1 694.92	195
1 728.31	197
1 734.61	197
1 745.51	197
1 759.01	111
1 815.5	210
1 849.1	199
1 874.4	132
1 913.1	242
1 916.1	132
1 935.4	242

Wavelength (air) (Å)	Mult. No.
2 055.7	194
2 087.0	101
2 094.5	101
2 156.4	134
2 192.8	101
2 264.8	134
2 279.3	152
2 298.7	155
2 301.3	254
2 317.9	250
2 333.6	254
2 341.8	250
2 361.7	155
2 387.0	250
2 391.0	152
2 420.0	216
2 625.3	129
2 649.6	129

TABLE 67. Wavelength finding list for allowed lines for Mg VIII—Continued

Wavelength (air) (Å)	Mult. No.
2 668.7	154
2 686.7	219
2 710.0	154
2 754.0	154
2 787.8	129
2 796.4	153
2 797.9	154
2 815.3	129
3 231.1	217
3 269.2	217
3 555.2	218
3 576.8	110
3 713.7	110
3 836.2	135
3 899.1	110
4 062.2	110
4 259.6	284
4 327.8	286
4 392.4	286
4 417.7	300
4 785.6	286
4 811.0	293
4 834.2	293
5 480.9	299
6 852	285
7 798	253
8 075	285
8 148	294
8 181	253
8 215	294
8 656	252
9 130	252
9 613	294

Wavenumber (cm^{-1})	Mult. No.
3 370	251
2 770	251

TABLE 68. Transition probabilities of allowed lines for Mg VIII (references for this table are as follows: 1=Fernley *et al.*,[24] 2=Tachiev and Froese Fischer,[92] 3=Merkelis *et al.*,[64] and 4=Galavis *et al.*[41])

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	$E_i - E_k$ (cm^{-1})	$g_i - g_k$	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
1	$2s^22p-2s2p^2$	$^2P^\circ-^4P$										
				[782.9]	3 302–131 030	4–4	1.74−04	1.60−06	1.65−05	−5.194	D+	2,3
				[769.9]	0–129 890	2–2	8.10−04	7.20−06	3.65−05	−4.842	D+	2,3
				[790.0]	3 302–129 890	4–2	6.74−04	3.15−06	3.28−05	−4.900	D+	2,3
				[772.8]	3 302–132 710	4–6	6.26−04	8.40−06	8.55−05	−4.474	C	2,3
				[763.2]	0–131 030	2–4	1.89−05	3.30−07	1.66−06	−6.180	D	2,3
2		$^2P^\circ-^2D$		*434.62*	*2 201–232 287*	6–10	1.60+01	7.54−02	6.47−01	−0.344	A	2,3,4
				436.735	3 302–232 274	4–6	1.57+01	6.74−02	3.87−01	−0.569	A	2,3,4
				430.465	0–232 307	2–4	1.41+01	7.82−02	2.22−01	−0.806	A	2,3,4
				436.672	3 302–232 307	4–4	2.30+00	6.56−03	3.77−02	−1.581	B+	2,3,4
3		$^2P^\circ-^2S$		*337.75*	*2 201–298 282*	6–2	7.23+01	4.12−02	2.75−01	−0.607	A	2,3,4
				339.006	3 302–298 282	4–2	4.01+01	3.46−02	1.54−01	−0.859	A	2,3,4
				335.253	0–298 282	2–2	3.24+01	5.46−02	1.21−01	−0.962	A	2,3,4
4		$^2P^\circ-^2P$		*314.61*	*2 201–320 056*	6–6	1.38+02	2.05−01	1.27+00	0.090	A	2,3,4
				315.039	3 302–320 723	4–4	1.15+02	1.72−01	7.13−01	−0.162	A	2,3,4
				313.754	0–318 721	2–2	8.32+01	1.23−01	2.54−01	−0.609	A	2,3,4
				317.039	3 302–318 721	4–2	5.38+01	4.06−02	1.69−01	−0.789	A	2,3,4
				311.796	0–320 723	2–4	2.27+01	6.62−02	1.36−01	−0.878	A	2,3,4
5	$2p-3s$	$^2P^\circ-^2S$		*82.75*	*2 201*–1 210 690	6–2	7.68+02	2.63−02	4.30−02	−0.802	B+	2
				82.823	3 302–1 210 690	4–2	5.13+02	2.64−02	2.88−02	−0.976	B+	2
				82.598	0–1 210 690	2–2	2.55+02	2.61−02	1.42−02	−1.282	B	2
6	$2p-3d$	$^2P^\circ-^2D$		*74.98*	*2 201*–1 335 962	6–10	4.29+03	6.02−01	8.92−01	0.558	B+	2

TABLE 68. Transition probabilities of allowed lines for Mg VIII (references for this table are as follows: 1=Fernley *et al.*,[24] 2=Tachiev and Froese Fischer,[92] 3=Merkelis *et al.*,[64] and 4=Galavis *et al.*[41])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				75.034	3 302–1 336 030	4–6	4.28+03	5.42−01	5.35−01	0.336	A	2
				74.858	0–1 335 860	2–4	3.59+03	6.03−01	2.97−01	0.081	B+	2
				75.044	3 302–1 335 860	4–4	7.14+02	6.03−02	5.96−02	−0.618	B+	2
7	$2s^22p$ $-2s2p(^3P^\circ)3p$	$^2P^\circ-^2P$		*71.08*	*2 201–1 409 057*	6–6	1.59+03	1.20−01	1.69−01	−0.143	C	1
				71.119	3 302–1 409 400	4–4	1.32+03	1.00−01	9.37−02	−0.398	C+	LS
				71.004	0–1 408 370	2–2	1.07+03	8.05−02	3.76−02	−0.793	C	LS
				71.171	3 302–1 408 370	4–2	5.29+02	2.01−02	1.88−02	−1.095	C	LS
				70.952	0–1 409 400	2–4	2.67+02	4.03−02	1.88−02	−1.094	C	LS
8		$^2P^\circ-^2D$		*69.46*	*2 201–1441 942*	6–10	1.71+03	2.06−01	2.82−01	0.092	C+	1
				69.467	3 302–1 442 830	4–6	1.70+03	1.85−01	1.69−01	−0.131	C+	LS
				69.415	0–1440 610	2–4	1.43+03	2.06−01	9.42−02	−0.385	C+	LS
				69.575	3 302–1440 610	4–4	2.82+02	2.05−02	1.88−02	−1.086	C	LS
9		$^2P^\circ-^2S$		*68.55*	*2 201*–1 460 910	6–2	1.70+03	3.99−02	5.41−02	−0.621	C	1
				68.606	3 302–1 460 910	4–2	1.13+03	3.99−02	3.60−02	−0.797	C	LS
				68.450	0–1 460 910	2–2	5.69+02	4.00−02	1.80−02	−1.097	C	LS
10	$2s^22p$ $-2s2p(^1P^\circ)3p$	$^2P^\circ-^2D$				6–10						1
				64.702	3 302–1 548 850	4–6	1.78+02	1.68−02	1.43−02	−1.173	D+	LS
11		$^2P^\circ-^2P$		*64.59*	*2 201–1 550 370*	6–6	5.63+02	3.52−02	4.49−02	−0.675	D+	1
				64.630	3 302–1 550 560	4–4	4.68+02	2.93−02	2.49−02	−0.931	C	LS
				64.517	0–1 549 990	2–2	3.77+02	2.35−02	9.98−03	−1.328	D+	LS
				64.654	3 302–1 549 990	4–2	1.87+02	5.87−03	5.00−03	−1.629	D	LS
				64.493	0–1 550 560	2–4	9.46+01	1.18−02	5.01−03	−1.627	D	LS
12		$^2P^\circ-^2S$		*64.33*	*2 201*–1 556 590	6–2	4.78+02	9.88−03	1.26−02	−1.227	D+	1
				64.380	3 302–1 556 590	4–2	3.18+02	9.87−03	8.37−03	−1.404	D+	LS
				64.243	0–1 556 590	2–2	1.60+02	9.89−03	4.18−03	−1.704	D	LS
13	$2p-4s$	$^2P^\circ-^2S$		*60.77*	*2 201*–1 647 880	6–2	1.64+02	3.02−03	3.62−03	−1.742	D	1
				60.806	3 302–1 647 880	4–2	1.09+02	3.02−03	2.42−03	−1.918	D	LS
				60.684	0–1 647 880	2–2	5.47+01	3.02−03	1.21−03	−2.219	D	LS
14	$2p-4d$	$^2P^\circ-^2D$		*59.11*	*2 201–1 693 830*	6–10	1.43+03	1.25−01	1.45−01	−0.125	C	1
				59.153	3 302–1 693 830	4–6	1.42+03	1.12−01	8.72−02	−0.349	C+	LS
				59.038	0–1 693 830	2–4	1.20+03	1.25−01	4.86−02	−0.602	C	LS
				59.153	3 302–1 693 830	4–4	2.36+02	1.24−02	9.66−03	−1.305	D+	LS
15	$2s^22p$ $-2p^2(^3P)3d$	$^2P^\circ-^2D$				6–10						1
				[58.82]	3 302–1 703 280	4–6	1.41+02	1.10−02	8.52−03	−1.357	D+	LS
16	$2s^22p$ $-2p^2(^1D)3d$	$^2P^\circ-^2D$				6–10						1
				[57.78]	3 302–1 733 900	4–6	6.70+01	5.03−03	3.83−03	−1.696	D	LS
17		$^2P^\circ-^2P$		*57.07*	*2 201–1 754 407*	6–6	9.98+01	4.87−03	5.50−03	−1.534	D	1
				[57.09]	3 302–1 754 790	4–4	8.31+01	4.06−03	3.05−03	−1.789	D	LS
				[57.02]	0–1 753 640	2–2	6.67+01	3.25−03	1.22−03	−2.187	D	LS

TABLE 68. Transition probabilities of allowed lines for Mg VIII (references for this table are as follows: 1=Fernley *et al.*,[24] 2=Tachiev and Froese Fischer,[92] 3=Merkelis *et al.*,[64] and 4=Galavis *et al.*[41])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				[57.13]	3 302–1 753 640	4–2	3.32+01	8.12−04	6.11−04	−2.488	E+	LS
				[56.99]	0–1 754 790	2–4	1.67+01	1.63−03	6.12−04	−2.487	E+	LS
18	$2s^22p$ $-2s2p(^3P^\circ)4p$	$^2P^\circ-^2P$				6–6						1
				[55.22]	3 302–1 814 170	4–4	5.93+02	2.71−02	1.97−02	−0.965	C	LS
				[55.12]	0–1 814 170	2–4	1.20+02	1.09−02	3.96−03	−1.662	D	LS
19		$^2P^\circ-^2D$		*54.88*	*2 201–1 824 376*	6–10	6.87+02	5.17−02	5.60−02	−0.508	C	1
				[54.89]	3 302–1 825 260	4–6	6.86+02	4.65−02	3.36−02	−0.730	C	LS
				[54.85]	0–1 823 050	2–4	5.73+02	5.17−02	1.87−02	−0.985	C	LS
				[54.95]	3 302–1 823 050	4–4	1.14+02	5.16−03	3.73−03	−1.685	D	LS
20	$2p-5d$	$^2P^\circ-^2D$		*53.87*	*2 201–1 858 380*	6–10	6.45+02	4.68−02	4.98−02	−0.552	C	1
				53.905	3 302–1 858 420	4–6	6.44+02	4.21−02	2.99−02	−0.774	C	LS
				53.812	0–1 858 320	2–4	5.39+02	4.68−02	1.66−02	−1.029	D+	LS
				53.908	3 302–1 858 320	4–4	1.07+02	4.67−03	3.32−03	−1.729	D	LS
21	$2p-6d$	$^2P^\circ-^2D$		*51.44*	*2 201–1 946 060*	6–10	2.44+02	1.61−02	1.64−02	−1.015	D+	1
				51.473	3 302–1 946 060	4–6	2.43+02	1.45−02	9.83−03	−1.237	D+	LS
				51.386	0–1 946 060	2–4	2.03+02	1.61−02	5.45−03	−1.492	D+	LS
				51.473	3 302–1 946 060	4–4	4.05+01	1.61−03	1.09−03	−2.191	E+	LS
22	$2s2p^2-2p^3$	$^4P-^4S^\circ$		*354.70*	*131 680*–413 610	12–4	1.26+02	7.91−02	1.11+00	−0.023	A	2,3,4
				355.999	132 710–413 610	6–4	6.23+01	7.89−02	5.55−01	−0.325	A	2,3,4
				353.882	131 030–413 610	4–4	4.23+01	7.93−02	3.70−01	−0.499	A	2,3,4
				352.460	129 890–413 610	2–4	2.14+01	7.96−02	1.85−01	−0.798	A	2,3,4
23		$^4P-^2D^\circ$										
				[298.76]	131 030–465 745	4–6	5.93−04	1.19−06	4.68−06	−5.322	D	2,3
				[297.68]	129 890–465 818	2–4	2.67−04	7.08−07	1.39−06	−5.849	D	2,3
				[300.27]	132 710–465 745	6–6	2.44−02	3.29−05	1.95−04	−3.705	C	2,3
				[298.70]	131 030–465 818	4–4	8.41−03	1.13−05	4.43−05	−4.345	D+	2,3
				[300.20]	132 710–465 818	6–4	1.08−03	9.70−07	5.75−06	−5.235	D	2,3
24		$^4P-^2P^\circ$										
				[253.93]	131 030–524 841	4–4	1.60−02	1.54−05	5.16−05	−4.210	D+	2,3
				[253.32]	129 890–524 652	2–2	6.32−03	6.08−06	1.01−05	−4.915	D	2,3
				[255.02]	132 710–524 841	6–4	5.91−03	3.84−06	1.93−05	−4.638	D+	2,3
				[254.05]	131 030–524 652	4–2	1.35−03	6.53−07	2.18−06	−5.583	D	2,3
				[253.20]	129 890–524 841	2–4	3.08−04	5.92−07	9.87−07	−5.927	E+	2,3
25		$^2D-^4S^\circ$										
				[551.46]	232 274–413 610	6–4	6.42−05	1.95−07	2.13−06	−5.932	D	2,3
				[551.56]	232 307–413 610	4–4	1.21−05	5.52−08	4.01−07	−6.656	E+	2,3
26		$^2D-^2D^\circ$		*428.29*	*232 287–465 774*	10–10	3.41+01	9.38−02	1.32+00	−0.028	A	2,3,4
				428.319	232 274–465 745	6–6	3.18+01	8.75−02	7.40−01	−0.280	A	2,3,4
				428.245	232 307–465 818	4–4	2.95+01	8.11−02	4.57−01	−0.489	A	2,3,4
				428.185	232 274–465 818	6–4	4.24+00	7.77−03	6.57−02	−1.331	B+	2,3,4
				428.379	232 307–465 745	4–6	2.56+00	1.06−02	5.96−02	−1.373	B+	2,3,4
27		$^2D-^2P^\circ$		*341.89*	*232 287–524 778*	10–6	5.79+01	6.09−02	6.85−01	−0.215	A	2,3,4
				341.802	232 274–524 841	6–4	5.06+01	5.91−02	3.99−01	−0.450	A	2,3,4
				342.062	232 307–524 652	4–2	5.92+01	5.19−02	2.34−01	−0.683	A	2,3,4

TABLE 68. Transition probabilities of allowed lines for Mg VIII (references for this table are as follows: 1=Fernley *et al.*,[24] 2=Tachiev and Froese Fischer,[92] 3=Merkelis *et al.*,[64] and 4=Galavis *et al.*[41])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				341.841	232 307–524 841	4–4	6.62+00	1.16−02	5.22−02	−1.333	B+	2,3,4
28		$^{2}\mathrm{S}-{}^{4}\mathrm{S}^{\circ}$										
				[867.1]	298 282–413 610	2–4	2.52−05	5.67−07	3.24−06	−5.945	D	2,3
29		$^{2}\mathrm{S}-{}^{2}\mathrm{P}^{\circ}$		*441.51*	298 282–*524 778*	2–6	1.01+01	8.84−02	2.57−01	−0.753	A	2,3,4
				441.386	298 282–524 841	2–4	1.15+01	6.72−02	1.95−01	−0.872	A	2,3,4
				441.755	298 282–524 652	2–2	7.22+00	2.11−02	6.15−02	−1.375	B+	2,3,4
30		$^{2}\mathrm{P}-{}^{4}\mathrm{S}^{\circ}$										
				[1 076.6]	320 723–413 610	4–4	7.28−04	1.27−05	1.79−04	−4.294	C	2,3
				[1 053.9]	318 721–413 610	2–4	2.08−04	6.92−06	4.80−05	−4.859	D+	2,3
31		$^{2}\mathrm{P}-{}^{2}\mathrm{D}^{\circ}$		*686.3*	*320 056–465 774*	6–10	7.65+00	9.00−02	1.22+00	−0.268	B+	2,3,4
				689.55	320 723–465 745	4–6	7.51+00	8.03−02	7.29−01	−0.493	B+	2,3,4
				679.82	318 721–465 818	2–4	6.81+00	9.44−02	4.23−01	−0.724	B+	2,3,4
				689.20	320 723–465 818	4–4	1.07+00	7.65−03	6.94−02	−1.514	B+	2,3,4
32		$^{2}\mathrm{P}-{}^{2}\mathrm{P}^{\circ}$		*488.47*	*320 056–524 778*	6–6	3.36+01	1.20−01	1.16+00	−0.143	A	2,3,4
				489.913	320 723–524 841	4–4	2.87+01	1.03−01	6.67−01	−0.385	A	2,3,4
				485.600	318 721–524 652	2–2	2.49+01	8.80−02	2.81−01	−0.754	A	2,3,4
				490.367	320 723–524 652	4–2	1.05+01	1.90−02	1.23−01	−1.119	A	2,3,4
				485.154	318 721–524 841	2–4	3.85+00	2.72−02	8.68−02	−1.264	B+	2,3,4
33	$2s2p^2$ $-2s2p(^3\mathrm{P}^\circ)3s$	$^{4}\mathrm{P}-{}^{4}\mathrm{P}^{\circ}$		*81.86*	*131 680–1 353 350*	12–12	9.24+02	9.28−02	3.00−01	0.047	B+	2
				81.844	132 710–1 354 550	6–6	6.50+02	6.53−02	1.06−01	−0.407	B+	2
				81.867	131 030–1 352 530	4–4	1.23+02	1.23−02	1.33−02	−1.308	B	2
				81.867	129 890–1 351 390	2–2	1.53+02	1.53−02	8.27−03	−1.514	B	2
				81.979	132 710–1 352 530	6–4	4.14+02	2.78−02	4.50−02	−0.778	B+	2
				81.943	131 030–1 351 390	4–2	7.62+02	3.84−02	4.14−02	−0.814	B+	2
				81.731	131 030–1 354 550	4–6	2.79+02	4.20−02	4.52−02	−0.775	B+	2
				81.790	129 890–1 352 530	2–4	3.84+02	7.70−02	4.15−02	−0.812	B+	2
34		$^{2}\mathrm{D}-{}^{2}\mathrm{P}^{\circ}$		*86.90*	*232 287–1 382 990*	10–6	4.99+02	3.39−02	9.69−02	−0.470	C	1
				86.844	232 274–1 383 760	6–4	4.50+02	3.39−02	5.82−02	−0.692	C	LS
				87.021	232 307–1 381 450	4–2	4.97+02	2.82−02	3.23−02	−0.948	C	LS
				86.847	232 307–1 383 760	4–4	4.99+01	5.64−03	6.45−03	−1.647	D+	LS
35		$^{2}\mathrm{S}-{}^{2}\mathrm{P}^{\circ}$		*92.19*	298 282–*1 382 990*	2–6	1.56+02	5.97−02	3.62−02	−0.923	C	1
				92.125	298 282–1 383 760	2–4	1.56+02	3.98−02	2.41−02	−1.099	C	LS
				92.322	298 282–1 381 450	2–2	1.56+02	1.99−02	1.21−02	−1.400	D+	LS
36		$^{2}\mathrm{P}-{}^{2}\mathrm{P}^{\circ}$		*94.08*	*320 056–1 382 990*	6–6	4.31+01	5.73−03	1.06−02	−1.464	D	1
				94.070	320 723–1 383 760	4–4	3.60+01	4.77−03	5.91−03	−1.719	D+	LS
				94.097	318 721–1 381 450	2–2	2.88+01	3.82−03	2.37−03	−2.117	D	LS
				94.275	320 723–1 381 450	4–2	1.43+01	9.53−04	1.18−03	−2.419	D	LS
				93.893	318 721–1 383 760	2–4	7.23+00	1.91−03	1.18−03	−2.418	D	LS
37	$2s2p^2$ $-2s2p(^3\mathrm{P}^\circ)3d$	$^{4}\mathrm{P}-{}^{4}\mathrm{D}^{\circ}$?				12–20						1
				74.366	132 710–1 477 410	6–8	6.58+03	7.27−01	1.07+00	0.640	B+	LS
				74.318	131 030–1 476 590	4–6	4.61+03	5.73−01	5.61−01	0.360	B	LS
				74.274	129 890–1 476 260	2–4	2.75+03	4.55−01	2.23−01	−0.041	C+	LS
				74.411	132 710–1 476 590	6–6	1.98+03	1.64−01	2.41−01	−0.007	C+	LS

TABLE 68. Transition probabilities of allowed lines for Mg VIII (references for this table are as follows: 1=Fernley *et al.*,[24] 2=Tachiev and Froese Fischer,[92] 3=Merkelis *et al.*,[64] and 4=Galavis *et al.*[41])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				74.337	131 030–1 476 260	4–4	3.51+03	2.91−01	2.85−01	0.066	B	LS
				74.430	132 710–1 476 260	6–4	3.29+02	1.82−02	2.68−02	−0.962	C	LS
38		^{4}P–^{4}P°		*73.94*	*131 680–1 484 137*	12–12	3.53+03	2.89−01	8.45−01	0.540	C+	1
				74.020	132 710–1 483 690	6–6	2.46+03	2.02−01	2.95−01	0.084	B	LS
				73.889	131 030–1 484 420	4–4	4.72+02	3.86−02	3.76−02	−0.811	C	LS
				73.800	129 890–1 484 910	2–2	5.92+02	4.83−02	2.35−02	−1.015	C	LS
				73.980	132 710–1 484 420	6–4	1.59+03	8.68−02	1.27−01	−0.283	C+	LS
				73.862	131 030–1 484 910	4–2	2.96+03	1.21−01	1.18−01	−0.315	C+	LS
				73.928	131 030–1 483 690	4–6	1.06+03	1.30−01	1.27−01	−0.284	C+	LS
				73.826	129 890–1 484 420	2–4	1.48+03	2.42−01	1.18−01	−0.315	C+	LS
39		^{2}D–^{2}D°		*80.24*	*232 287–1 478 550*	10–10	1.77+03	1.71−01	4.52−01	0.233	C+	1
				80.230	232 274–1 478 690	6–6	1.66+03	1.60−01	2.54−01	−0.018	B	LS
				80.255	232 307–1 478 340	4–4	1.59+03	1.54−01	1.63−01	−0.210	C+	LS
				80.253	232 274–1 478 340	6–4	1.77+02	1.14−02	1.81−02	−1.165	C	LS
				80.232	232 307–1 478 690	4–6	1.18+02	1.71−02	1.81−02	−1.165	C	LS
40		^{2}D–^{2}F°		*78.50*	*232 287–1 506 161*	10–14	4.25+03	5.50−01	1.42+00	0.740	B	1
				78.446	232 274–1 507 040	6–8	4.26+03	5.24−01	8.12−01	0.497	B	LS
				78.574	232 307–1 504 990	4–6	3.96+03	5.50−01	5.69−01	0.342	B	LS
				78.572	232 274–1 504 990	6–6	2.83+02	2.62−02	4.07−02	−0.804	C	LS
41		^{2}D–^{2}P°		*78.05*	*232 287–1 513 487*	10–6	5.68+01	3.11−03	8.00−03	−1.507	D	1
				[78.08]	232 274–1 513 100	6–4	5.10+01	3.11−03	4.80−03	−1.729	D	LS
				[78.01]	232 307–1 514 260	4–2	5.70+01	2.60−03	2.67−03	−1.983	D	LS
				[78.08]	232 307–1 513 100	4–4	5.68+00	5.19−04	5.34−04	−2.683	E+	LS
42		^{2}S–^{2}P°		*82.29*	*298 282–1 513 487*	2–6	2.44+03	7.43−01	4.03−01	0.172	C+	1
				[82.32]	298 282–1 513 100	2–4	2.44+03	4.95−01	2.68−01	−0.004	B	LS
				[82.24]	298 282–1 514 260	2–2	2.45+03	2.48−01	1.34−01	−0.305	C+	LS
43		^{2}P–^{2}D°		*86.32*	*320 056–1 478 550*	6–10	5.32+02	9.90−02	1.69−01	−0.226	C	1
				86.358	320 723–1 478 690	4–6	5.31+02	8.91−02	1.01−01	−0.448	C+	LS
				86.235	318 721–1 478 340	2–4	4.44+02	9.91−02	5.63−02	−0.703	C	LS
				86.384	320 723–1 478 340	4–4	8.85+01	9.90−03	1.13−02	−1.402	D+	LS
44		^{2}P–^{2}P°		*83.79*	*320 056–1 513 487*	6–6	3.86+02	4.06−02	6.72−02	−0.613	C	1
				[83.87]	320 723–1 513 100	4–4	3.21+02	3.38−02	3.73−02	−0.869	C	LS
				[83.64]	318 721–1 514 260	2–2	2.58+02	2.71−02	1.49−02	−1.266	D+	LS
				[83.78]	320 723–1 514 260	4–2	1.29+02	6.77−03	7.47−03	−1.567	D+	LS
				[83.73]	318 721–1 513 100	2–4	6.42+01	1.35−02	7.44−03	−1.569	D+	LS
45	$2s2p^2$ $-2s2p(^1P^\circ)3s$	^{2}D–^{2}P°		*79.70*	*232 287–1 486 970*	10–6	4.34+02	2.48−02	6.51−02	−0.606	C	1
				79.701	232 274–1 486 970	6–4	3.91+02	2.48−02	3.90−02	−0.827	C	LS
				79.703	232 307–1 486 970	4–2	4.35+02	2.07−02	2.17−02	−1.082	C	LS
				79.703	232 307–1 486 970	4–4	4.34+01	4.13−03	4.33−03	−1.782	D	LS
46		^{2}S–^{2}P°		*84.13*	*298 282–1 486 970*	2–6	3.41+02	1.09−01	6.02−02	−0.662	C	1
				84.126	298 282–1 486 970	2–4	3.41+02	7.24−02	4.01−02	−0.839	C	LS
				84.126	298 282–1 486 970	2–2	3.41+02	3.62−02	2.01−02	−1.140	C	LS
47		^{2}P–^{2}P°		*85.70*	*320 056–1 486 970*	6–6	6.11+02	6.72−02	1.14−01	−0.394	C	1

TABLE 68. Transition probabilities of allowed lines for Mg VIII (references for this table are as follows: 1=Fernley *et al.*,[24] 2=Tachiev and Froese Fischer,[92] 3=Merkelis *et al.*,[64] and 4=Galavis *et al.*[41])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				85.745	320 723–1 486 970	4–4	5.08+02	5.60−02	6.32−02	−0.650	C	LS
				85.598	318 721–1 486 970	2–2	4.09+02	4.49−02	2.53−02	−1.047	C	LS
				85.745	320 723–1 486 970	4–2	2.03+02	1.12−02	1.26−02	−1.349	D+	LS
				85.598	318 721–1 486 970	2–4	1.02+02	2.24−02	1.26−02	−1.349	D+	LS
48	$2s2p^2-2s2p(^1P^\circ)3d$	$^2D-^2F^\circ$		*73.25*	*232 287–1 597 480*	10–14	3.16+03	3.56−01	8.58−01	0.551	B	1
				[73.25]	232 274–1 597 480	6–8	3.16+03	3.39−01	4.90−01	0.308	B	LS
				[73.25]	232 307–1 597 480	4–6	2.95+03	3.56−01	3.43−01	0.154	B	LS
				[73.25]	232 274–1 597 480	6–6	2.11+02	1.70−02	2.46−02	−0.991	C	LS
49		$^2D-^2D^\circ$		*72.69*	*232 287–1 608 066*	10–10	5.46+02	4.33−02	1.04−01	−0.364	C	1
				72.678	232 274–1 608 210	6–6	5.10+02	4.04−02	5.80−02	−0.615	C	LS
				72.699	232 307–1 607 850	4–4	4.91+02	3.89−02	3.72−02	−0.808	C	LS
				72.697	232 274–1 607 850	6–4	5.45+01	2.88−03	4.14−03	−1.762	D	LS
				72.680	232 307–1 608 210	4–6	3.64+01	4.32−03	4.13−03	−1.762	D	LS
50		$^2D-^2P^\circ$		*72.55*	*232 287–1 610 670*	10–6	7.81+01	3.70−03	8.83−03	−1.432	D	1
				72.548	232 274–1 610 670	6–4	7.03+01	3.70−03	5.30−03	−1.654	D+	LS
				72.550	232 307–1 610 670	4–2	7.81+01	3.08−03	2.94−03	−1.909	D	LS
				72.550	232 307–1 610 670	4–4	7.81+00	6.16−04	5.89−04	−2.608	E+	LS
51		$^2S-^2P^\circ$		*76.20*	298 282–*1 610 670*	2–6	1.28+03	3.35−01	1.68−01	−0.174	C+	1
				76.197	298 282–1 610 670	2–4	1.28+03	2.23−01	1.12−01	−0.351	C+	LS
				76.197	298 282–1 610 670	2–2	1.29+03	1.12−01	5.62−02	−0.650	C	LS
52		$^2P-^2D^\circ$		*77.64*	*320 056–1 608 066*	6–10	4.60+03	6.93−01	1.06+00	0.619	B	1
				77.671	320 723–1 608 210	4–6	4.59+03	6.23−01	6.37−01	0.397	B	LS
				77.572	318 721–1 607 850	2–4	3.85+03	6.94−01	3.54−01	0.142	B	LS
				77.692	320 723–1 607 850	4–4	7.66+02	6.93−02	7.09−02	−0.557	C	LS
53		$^2P-^2P^\circ$		*77.48*	*320 056–1 610 670*	6–6	2.29+03	2.06−01	3.15−01	0.092	C+	1
				77.523	320 723–1 610 670	4–4	1.91+03	1.72−01	1.76−01	−0.162	C+	LS
				77.402	318 721–1 610 670	2–2	1.53+03	1.37−01	6.98−02	−0.562	C	LS
				77.523	320 723–1 610 670	4–2	7.61+02	3.43−02	3.50−02	−0.863	C	LS
				77.402	318 721–1 610 670	2–4	3.82+02	6.87−02	3.50−02	−0.862	C	LS
54	$2s2p^2-2p^2(^3P)3p$	$^4P-^4D^\circ$				12–20						1
				66.069	132 710–1 646 280	6–8	5.41+02	4.72−02	6.16−02	−0.548	C	LS
55		$^4P-^4P^\circ$?				12–12						1
				65.807	132 710–1 652 310	6–6	5.38+02	3.49−02	4.54−02	−0.679	C	LS
				65.734	131 030–1 652 310	4–6	2.32+02	2.25−02	1.95−02	−1.046	C	LS
56		$^4P-^4S^\circ$?		*[64.84]*	*131 680–1 674 020*	12–4	9.66+02	2.03−02	5.20−02	−0.613	C	1
				64.880	132 710–1 674 020	6–4	4.83+02	2.03−02	2.60−02	−0.914	C	LS
				64.809	131 030–1 674 020	4–4	3.22+02	2.03−02	1.73−02	−1.090	C	LS
				64.761	129 890–1 674 020	2–4	1.61+02	2.03−02	8.66−03	−1.391	D+	LS
57	$2s2p^2-2p^2(^1D)3p$	$^2D-^2F^\circ$		*68.56*	*232 287–1 690 803*	10–14	4.93+02	4.86−02	1.10−01	−0.313	C	1
				[68.55]	232 274–1 691 060	6–8	4.93+02	4.63−02	6.27−02	−0.556	C	LS
				[68.58]	232 307–1 690 460	4–6	4.60+02	4.86−02	4.39−02	−0.711	C	LS

TABLE 68. Transition probabilities of allowed lines for Mg VIII (references for this table are as follows: 1=Fernley *et al.*,[24] 2=Tachiev and Froese Fischer,[92] 3=Merkelis *et al.*,[64] and 4=Galavis *et al.*[41])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				[68.58]	232 274–1 690 460	6–6	3.29+01	2.32−03	3.14−03	−1.856	D	LS
58	$2s2p^2$ $-2s2p(^3P^\circ)4s$	$^4P-^4P^\circ$?				12–12						1
				60.382	132 710–1 788 830	6–6	1.55+02	8.46−03	1.01−02	−1.294	D+	LS
				60.321	131 030–1 788 830	4–6	6.65+01	5.44−03	4.32−03	−1.662	D	LS
59	$2s2p^2$ $-2s2p(^3P^\circ)4d$	$^4P-^4D^\circ$				12–20						1
				58.667	132 710–1 837 250	6–8	2.25+03	1.55−01	1.80−01	−0.032	C+	LS
				58.614	131 030–1 837 110	4–6	1.58+03	1.22−01	9.42−02	−0.312	C+	LS
				58.672	132 710–1 837 110	6–6	6.74+02	3.48−02	4.03−02	−0.680	C	LS
60		$^4P-^4P^\circ$				12–12						1
				58.614	132 710–1 838 790	6–6	8.54+02	4.40−02	5.09−02	−0.578	C	LS
				58.537	131 030–1 839 350	4–4	1.63+02	8.38−03	6.46−03	−1.475	D+	LS
				58.595	132 710–1 839 350	6–4	5.48+02	1.88−02	2.18−02	−0.948	C	LS
				58.556	131 030–1 838 790	4–6	3.67+02	2.83−02	2.18−02	−0.946	C	LS
				58.498	129 890–1 839 350	2–4	5.11+02	5.24−02	2.02−02	−0.980	C	LS
61		$^2D-^2D^\circ$		*62.29*	*232 287–1 837 640*	10–10	5.05+02	2.94−02	6.02−02	−0.532	C	1
				62.291	232 274–1 837 640	6–6	4.71+02	2.74−02	3.37−02	−0.784	C	LS
				62.292	232 307–1 837 640	4–4	4.54+02	2.64−02	2.17−02	−0.976	C	LS
				62.291	232 274–1 837 640	6–4	5.05+01	1.96−03	2.41−03	−1.930	D	LS
				62.292	232 307–1 837 640	4–6	3.37+01	2.94−03	2.41−03	−1.930	D	LS
62		$^2D-^2F^\circ$		*61.92*	*232 287–1 847 219*	10–14	1.88+03	1.51−01	3.08−01	0.179	C+	1
				[61.89]	232 274–1 848 020	6–8	1.88+03	1.44−01	1.76−01	−0.063	C+	LS
				[61.96]	232 307–1 846 150	4–6	1.75+03	1.51−01	1.23−01	−0.219	C+	LS
				[61.96]	232 274–1 846 150	6–6	1.25+02	7.20−03	8.81−03	−1.365	D+	LS
63		$^2P-^2D^\circ$		*65.89*	*320 056–1 837 640*	6–10	3.91+02	4.25−02	5.53−02	−0.593	C	1
				65.923	320 723–1 837 640	4–6	3.91+02	3.82−02	3.32−02	−0.816	C	LS
				65.836	318 721–1 837 640	2–4	3.27+02	4.25−02	1.84−02	−1.071	C	LS
				65.923	320 723–1 837 640	4–4	6.52+01	4.25−03	3.69−03	−1.770	D	LS
64	$2s2p^2$ $-2s2p(^1P^\circ)4d$	$^2D-^2F^\circ$		*57.74*	*232 287–1 964 300*	10–14	7.27+02	5.09−02	9.67−02	−0.293	C	1
				[57.74]	232 274–1 964 300	6–8	7.26+02	4.84−02	5.52−02	−0.537	C	LS
				[57.74]	232 307–1 964 300	4–6	6.79+02	5.09−02	3.87−02	−0.691	C	LS
				[57.74]	232 274–1 964 300	6–6	4.84+01	2.42−03	2.76−03	−1.838	D	LS
65		$^2D-^2D^\circ$		*57.59*	*232 287–1 968 690*	10–10	2.52+02	1.25−02	2.38−02	−0.903	D+	1
				[57.59]	232 274–1 968 690	6–6	2.35+02	1.17−02	1.33−02	−1.154	D+	LS
				[57.59]	232 307–1 968 690	4–4	2.27+02	1.13−02	8.57−03	−1.345	D+	LS
				[57.59]	232 274–1 968 690	6–4	2.52+01	8.36−04	9.51−04	−2.300	E+	LS
				[57.59]	232 307–1 968 690	4–6	1.68+01	1.25−03	9.48−04	−2.301	E+	LS
66		$^2P-^2D^\circ$		*60.66*	*320 056–1 968 690*	6–10	1.45+03	1.33−01	1.60−01	−0.098	C	1
				[60.68]	320 723–1 968 690	4–6	1.45+03	1.20−01	9.59−02	−0.319	C+	LS
				[60.61]	318 721–1 968 690	2–4	1.21+03	1.33−01	5.31−02	−0.575	C	LS
				[60.68]	320 723–1 968 690	4–4	2.41+02	1.33−02	1.06−02	−1.274	D+	LS

TABLE 68. Transition probabilities of allowed lines for Mg VIII (references for this table are as follows: 1=Fernley *et al.*,[24] 2=Tachiev and Froese Fischer,[92] 3=Merkelis *et al.*,[64] and 4=Galavis *et al.*[41])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
67	$2s2p^2$ $-2s2p(^3\mathrm{P}^\circ)5d$	$^4\mathrm{P}-{}^4\mathrm{D}^\circ$				12–20						1
				53.512	132 710–2 001 450	6–8	1.13+03	6.47−02	6.84−02	−0.411	C	LS
				53.484	131 030–2 000 750	4–6	7.93+02	5.10−02	3.59−02	−0.690	C	LS
				53.532	132 710–2 000 750	6–6	3.38+02	1.45−02	1.53−02	−1.060	D+	LS
68		$^4\mathrm{P}-{}^4\mathrm{P}^\circ$				12–12						1
				53.485	132 710–2 002 380	6–6	4.20+02	1.80−02	1.90−02	−0.967	C	LS
				53.437	131 030–2 002 380	4–6	1.81+02	1.16−02	8.16−03	−1.333	D+	LS
69		$^2\mathrm{D}-{}^2\mathrm{F}^\circ$		*56.38*	*232 287–2 006 054*	10–14	9.30+02	6.20−02	1.15−01	−0.208	C	1
				[56.36]	232 274–2 006 650	6–8	9.31+02	5.91−02	6.58−02	−0.450	C	LS
				[56.40]	232 307–2 005 260	4–6	8.67+02	6.20−02	4.61−02	−0.606	C	LS
				[56.40]	232 274–2 005 260	6–6	6.19+01	2.95−03	3.29−03	−1.752	D	LS
70	$2s2p^2$ $-2p^2(^3\mathrm{P})4p$	$^4\mathrm{P}-{}^4\mathrm{D}^\circ$				12–20						1
				52.395	132 710–2 041 290	6–8	3.13+02	1.72−02	1.78−02	−0.986	C	LS

^{a}Wavelengths (Å) are always given unless cm^{-1} is indicated.

11.8.3. Forbidden Transitions for Mg VIII

The results of Tachiev and Froese Fischer[92] are the product of extensive MCHF calculations with Breit-Pauli corrections to order α^2. As part of the Iron Project, Galavis *et al.*[41] used the SUPERSTRUCTURE code with configuration interaction, relativistic effects, and semiempirical energy corrections. Verhey *et al.*[116] used a Multiconfiguration Dirac-Fock extended average level approach.

To estimate accuracies, we pooled the relative standard deviation of the mean (RSDM) of each of the lines for which a transition rate is given by two or more references,[41,92,116] as discussed in the Introduction.

11.8.4. References for Forbidden Transitions for Mg VIII

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TABLE 69. Wavelength finding list for forbidden lines for Mg VIII

Wavelength (vac) (Å)	Mult. No.	Wavelength (vac) (Å)	Mult. No.	Wavelength (vac) (Å)	Mult. No.	Wavelength (vac) (Å)	Mult. No.
214.710	3	603.97	6	789.96	2	1 697.59	11
529.574	7	753.52	2	976.72	5		
537.603	7	772.75	2	1 156.78	9		
593.85	6	782.91	2	1 514.97	8		

Wavelength (air) (Å)	Mult. No.
4 891.2	10

Wavenumber (cm^{-1})	Mult. No.	Wavenumber (cm^{-1})	Mult. No.	Wavenumber (cm^{-1})	Mult. No.	Wavenumber (cm^{-1})	Mult. No.
3 302	1	2 820	4	1 680	4	1 140	4

TABLE 70. Transition probabilities of forbidden lines for Mg VIII (references for this table are as follows: 1 = Tachiev and Froese Fischer,[92] 2 = Galavis *et al.*,[41] and 3 = Verhey *et al.*[116])

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i–E_k (cm^{-1})	g_i–g_k	Type	A_{ki} (s^{-1})	S (a.u.)	Acc.	Source
1	$2p-2p$	$^2P^\circ-^2P^\circ$									
				3 302 cm^{-1}	0–3 302	2–4	M1	3.23−01	1.33+00	A	1,2,3
				3 302 cm^{-1}	0–3 302	2–4	E2	8.64−07	7.86−02	B+	1
2	$2s^22p-2s2p^2$	$^2P^\circ-^4P$									
				[782.9]	3 302–131 030	4–4	M2	4.40−03	3.47−01	B	1
				[790.0]	3 302–129 890	4–2	M2	2.12−02	8.73−01	B+	1
				[772.8]	3 302–132 710	4–6	M2	9.97−02	1.11+01	A	1
				[753.5]	0–132 710	2–6	M2	3.46−02	3.38+00	B+	1
3	$2s^22p-2p^3$	$^2P^\circ-^2D^\circ$									
				214.710	0–465 745	2–6	E2	3.02+03	7.37−03	B	2
4	$2s2p^2-2s2p^2$	$^4P-^4P$									
				1 680 cm^{-1}	131 030–132 710	4–6	M1	7.62−02	3.57+00	A	1,2
				1 680 cm^{-1}	131 030–132 710	4–6	E2	3.01−08	1.21−01	B+	1
				1 140 cm^{-1}	129 890–131 030	2–4	M1	3.33−02	3.34+00	A	1,2
				1 140 cm^{-1}	129 890–131 030	2–4	E2	5.16−10	9.56−03	B	1
				2 820 cm^{-1}	129 890–132 710	2–6	E2	2.86−07	8.58−02	B+	1,2
5		$^4P-^2D$									
				[976.7]	129 890–232 274	2–6	E2	1.31−03	6.24−06	D	2
6		$^4P-^2S$									
				[604.0]	132 710–298 282	6–2	E2	5.54−02	7.95−06	D	2
				[593.9]	129 890–298 282	2–2	M1	1.12+01	1.73−04	C	2
7		$^4P-^2P$									
				[529.57]	129 890–318 721	2–2	M1	3.32+00	3.65−05	C	2
				[537.60]	132 710–318 721	6–2	E2	7.36−03	5.91−07	E+	2
8		$^2D-^2S$									
				1 514.97	232 274–298 282	6–2	E2	1.56+01	2.23−01	B+	2
9		$^2D-^2P$									
				1 156.78	232 274–318 721	6–2	E2	1.61−01	5.95−04	C+	2
10		$^2S-^2P$									
			4 891.2	4 892.6	298 282–318 721	2–2	M1	2.42+00	2.10−02	B+	2
11	$2p^3-2p^3$	$^2D^\circ-^2P^\circ$									
				1 697.59	465 745–524 652	6–2	E2	4.26+00	1.07−01	B+	2

[a] Wavelengths (Å) are always given unless cm^{-1} is indicated.

11.9. Mg IX

Beryllium isoelectronic sequence
Ground state: $1s^2 2s^2\ ^1S_0$
Ionization energy: 328.06 eV=2 646 000 cm^{-1}

11.9.1. Allowed Transitions for Mg IX

In general, different sources for computed transition rates for this berylliumlike spectrum agree well down to line strengths of about 10^{-3}. This includes the results of the OP,[112] from which most of the compiled data below have been taken. Tachiev and Froese Fischer[92] performed extensive MCHF calculations with Breit-Pauli corrections to order α^2. Curtis *et al.*[19] used beam-foil lifetime measurements and branching ratio determinations to arrive at transition probabilities. Safronova *et al.*[80,82] used relativistic second-order MBPT calculations. Only OP results were available for energy levels above the $2p3d$.

To estimate accuracies, we pooled the relative standard deviation of the mean (RSDM) for each of the lines with transition rates published in two or more references,[19,29,30,46,79,80,82,92,109,112] as described in the introduction. For this purpose the spin-allowed (non-OP) and intercombination data were treated separately and each of these was in turn divided into two upper-level energy groups below and above 1 770 000 cm^{-1}. OP lines constituted a fifth group. The $2s2p\ ^1P_1^0$ level is highly mixed, and therefore transitions from it were assigned lower accuracies.

A NIST compilation of far-UV lines of Mg IX was published recently.[78] The estimated accuracies are different in some cases because a different method of evaluation was used.

11.9.2. References for Allowed Transitions for Mg IX

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TABLE 71. Wavelength finding list for allowed lines for Mg IX

Wavelength (vac) (Å)	Mult. No.
46.657	26
46.711	26
47.947	24
48.024	47
48.340	6
48.794	48
49.586	27
50.777	25
51.561	22
51.591	22
51.654	22
51.656	22
53.075	43
53.112	43
53.127	43
53.173	43
53.188	43
53.222	42
54.011	45
54.302	5
54.463	44
55.060	23
56.861	46
57.371	4
61.037	18
61.043	18
61.085	18
61.128	18
61.177	18
61.354	17
61.397	17
61.490	17
61.921	16
61.924	16
61.926	16
61.964	16
62.020	16
62.059	16
62.751	3
65.609	21
67.090	14
67.135	14
67.141	14
67.239	14
67.246	14
67.252	14
67.350	20
67.395	20
67.731	19
68.949	36
68.986	36
69.011	36
69.058	36
69.114	36
69.162	36
69.374	35
69.411	35
69.437	35
69.467	35
69.515	35
69.542	35
69.616	40
69.950	39
70.300	34
70.407	34
70.866	38
70.916	38
71.842	12
71.900	12
72.027	12
72.226	37
72.312	15
74.253	31
74.328	31
74.373	31
74.400	31
74.461	31
74.520	41
74.742	32
77.737	13
80.424	33
81.450	28
81.537	28
81.681	28
84.140	29
91.410	30
124.395	60
136.482	78
136.977	78
138.353	53
142.144	79
143.854	98
143.930	59
144.373	98
148.892	99
151.823	100
163.436	109
183.372	77
190.803	75
191.773	75
193.862	74
195.848	52
196.005	90
200.787	76
202.224	92
202.310	58
202.437	92
202.634	92
202.803	89
202.848	92

TABLE 71. Wavelength finding list for allowed lines for Mg IX—Continued

Wavelength (vac) (Å)	Mult. No.
203.343	91
203.882	92
204.382	91
208.511	93
208.738	93
212.188	95
212.422	95
212.775	95
213.011	95
213.557	94
217.061	97
224.548	96
233.628	105
233.924	105
234.472	105
237.040	104
237.603	104
241.249	106
241.488	67
246.069	107
250.300	108
289.981	73
304.127	113
328.645	119
368.071	2
377.601	102
377.715	102
379.133	102
379.551	8
379.881	102
383.129	8
405.959	103
438.700	11
439.176	7
441.199	7
443.404	7
443.973	7
445.981	7
448.294	7
450.674	129
455.166	112
462.385	130
468.494	131
494.389	57
510.986	137
514.139	138
515.517	138
518.188	118
526.371	139
531.237	140
534.817	66
538.532	63
540.044	63
540.424	63
540.657	51
542.947	63
543.331	63
543.774	63
549.089	144
555.216	65
562.78	62
563.25	62
565.55	62
565.96	62
566.44	62
567.28	62
567.70	62
580.05	111
586.79	117
588.24	115
590.04	115
590.32	115
594.25	114
594.53	114
599.88	146
601.87	147
603.57	143
647.17	56
652.23	116
661.86	128
685.68	135
688.14	135
706.06	1
718.49	136
740.41	64
749.55	10
857.49	142
963.48	145
1 024.14	9
1 047.43	9
1 061.92	9
1 070.21	81
1 130.45	61
1 412.03	150
1 454.76	70
1 458.79	70
1 482.80	70
1 513.09	70
1 543.45	70
1 580.78	152
1 632.39	83
1 635.32	49
1 639.88	55
1 646.36	83
1 660.03	69
1 673.64	83
1 673.92	83
1 691.19	69
1 702.13	83
1 753.16	151

TABLE 71. Wavelength finding list for allowed lines for Mg IX—Continued

Wavelength (vac) (Å)	Mult. No.
1 770.54	69
1 777.78	83
1 838.9	149
1 892.9	72
1 908.8	82
1 928.6	82
1 945.9	82
1 966.6	82
Wavelength (air) (Å)	**Mult. No.**
2 003.8	82
2 044.8	82
2 156.8	84
2 181.3	84
2 188.0	88
2 205.4	68
2 210.7	68
2 218.1	68
2 229.5	84
2 260.7	68
2 348.4	68
2 404.8	68
2 407.7	80
2 512.4	127
2 575.2	87
2 628.0	86
2 660.9	54
2 664.5	86
2 670.1	54
2 736.7	86
2 760.1	86

TABLE 71. Wavelength finding list for allowed lines for Mg IX—Continued

Wavelength (air) (Å)	Mult. No.
2 814.5	50
2 818.5	132
2 837.7	86
2 860.4	132
3 142.8	133
3 324.6	134
3 427.2	85
3 462.8	85
3 491.8	85
3 587.1	85
3 657.9	85
5 069.6	121
5 204.2	110
5 398.1	120
5 802	126
6 454	125
6 838	123
7 040	155
7 090	123
7 750	122
11 817	156
12 528	154
13 034	153
13 312	141
16 047	101
18 792	148
19 680	71
Wavenumber ($\mathrm{cm^{-1}}$)	**Mult. No.**
2 240	157
130	124

TABLE 72. Transitions probabilities of allowed lines for Mg IX (reference for this table are as follows: 1=Tully *et al.*,[112] 2=Tachiev and Froese Fischer,[92] 3=Curtis *et al.*,[19] 4=Safronova *et al.*,[80] 5=Safronova *et al.*,[82] 6=Träbert *et al.*,[109] 7=Fritzsche and Grant,[30] 8=Johnson and Huang,[46] 9=Ralchenko and Vainshtein,[79] and 10=Fleming *et al.*[29])

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ ($\mathrm{cm^{-1}}$)^{a}	$E_i - E_k$ ($\mathrm{cm^{-1}}$)	$g_i - g_k$	A_{ki} ($10^8\ \mathrm{s^{-1}}$)	f_{ik}	S (a.u.)	log gf	Acc.	Source
1	$2s^2-2s2p$	$^1S-^3P^\circ$										
				706.06	0–141 631	1–3	9.04−04	2.03−05	4.71−05	−4.693	D	2,5,9,10
2		$^1S-^1P^\circ$		368.071	0–271 687	1–3	5.15+01	3.14−01	3.80−01	−0.503	A	2,5,6,8
3	$2s^2-2s3p$	$^1S-^1P^\circ$		62.751	0–1 593 600	1–3	2.95+03	5.22−01	1.08−01	−0.282	A	2,3,4,7
4	$2s^2-2p3s$	$^1S-^1P^\circ$		57.371	0–1 743 040	1–3	1.31+02	1.94−02	3.66−03	−1.712	C	4
5	$2s^2-2p3d$	$^1S-^1P^\circ$		54.302	0–1 841 560	1–3	2.41+02	3.20−02	5.72−03	−1.495	C	4
6	$2s^2-2s4p$	$^1S-^1P^\circ$		48.340	0–2 068 680	1–3	1.36+03	1.43−01	2.28−02	−0.845	D	1
7	$2s2p-2p^2$	$^3P^\circ-^3P$		*443.76*	*142 872–368 220*	9–9	4.03+01	1.19−01	1.56+00	0.030	A	2,5
				443.973	144 091–369 330	5–5	3.01+01	8.90−02	6.51−01	−0.352	A+	2,5
				443.404	141 631–367 159	3–3	1.01+01	2.98−02	1.30−01	−1.049	A	2,5
				448.294	144 091–367 159	5–3	1.63+01	2.94−02	2.17−01	−0.833	A	2,5

TABLE 72. Transitions probabilities of allowed lines for Mg IX (reference for this table are as follows: 1=Tully *et al.*,[112] 2=Tachiev and Froese Fischer,[92] 3=Curtis *et al.*,[19] 4=Safronova *et al.*,[80] 5=Safronova *et al.*,[82] 6=Träbert *et al.*,[109] 7=Fritzsche and Grant,[30] 8=Johnson and Huang,[46] 9=Ralchenko and Vainshtein,[79] and 10=Fleming *et al.*[29])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	$E_i - E_k$ (cm^{-1})	$g_i - g_k$	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				445.981	141 631–365 856	3–1	3.97+01	3.94−02	1.74−01	−0.927	A	2,5
				439.176	141 631–369 330	3–5	1.04+01	5.01−02	2.18−01	−0.823	A	2,5
				441.199	140 504–367 159	1–3	1.37+01	1.20−01	1.74−01	−0.921	A	2,5
8		^{3}P°−^{1}D										
				379.551	141 631–405 100	3–5	5.38−03	1.94−05	7.25−05	−4.235	D	2,5
				383.129	144 091–405 100	5–5	8.90−02	1.96−04	1.23−03	−3.009	D+	2,5
9		^{1}P°−^{3}P										
				1 047.43	271 687–367 159	3–3	1.18−04	1.94−06	2.01−05	−5.235	E+	2,5
				1 061.92	271 687–365 856	3–1	1.35−03	7.63−06	8.00−05	−4.640	D	2,5
				1 024.14	271 687–369 330	3–5	4.16−03	1.09−04	1.10−03	−3.485	D+	2,5
10		^{1}P°−^{1}D		749.55	271 687–405 100	3–5	7.89+00	1.11−01	8.20−01	−0.478	A+	2,5
11		^{1}P°−^{1}S		438.700	271 687–499 633	3–1	7.58+01	7.29−02	3.16−01	−0.660	A+	2,5
12	$2s2p-2s3s$	^{3}P°−^{3}S		*71.96*	*142 872*–1 532 450	9–3	1.34+03	3.47−02	7.39−02	−0.505	A	2,4
				72.027	144 091–1 532 450	5–3	7.45+02	3.48−02	4.12−02	−0.759	A	2,4
				71.900	141 631–1 532 450	3–3	4.46+02	3.46−02	2.46−02	−0.984	A	2,4
				71.842	140 504–1 532 450	1–3	1.48+02	3.45−02	8.15−03	−1.462	A	2,4
13		^{1}P°−^{1}S		77.737	271 687–1 558 080	3–1	4.40+02	1.33−02	1.02−02	−1.399	B+	2,4
14	$2s2p-2s3d$	^{3}P°−^{3}D		*67.19*	*142 872–1 631 214*	9–15	6.23+03	7.03−01	1.40+00	0.801	A	2,4
				67.239	144 091–1 631 320	5–7	6.22+03	5.90−01	6.53−01	0.470	A+	2,4
				67.135	141 631–1 631 170	3–5	4.68+03	5.27−01	3.50−01	0.199	A	2,4
				67.090	140 504–1 631 040	1–3	3.48+03	7.04−01	1.55−01	−0.152	A	2,4
				67.246	144 091–1 631 170	5–5	1.56+03	1.06−01	1.17−01	−0.276	A	2,4
				67.141	141 631–1 631 040	3–3	2.60+03	1.76−01	1.17−01	−0.277	A	2,4
				67.252	144 091–1 631 040	5–3	1.73+02	7.04−03	7.80−03	−1.453	A	2,4
15		^{1}P°−^{1}D		72.312	271 687–1 654 580	3–5	4.00+03	5.22−01	3.73−01	0.195	A	2,4
16	$2s2p-2p3p$	^{3}P°−^{3}D		*61.94*	*142 872–1 757 437*	9–15	8.01+02	7.67−02	1.41−01	−0.161	C+	4
				61.924	144 091–1 758 970	5–7	8.11+02	6.53−02	6.65−02	−0.486	B	4
				[61.93]	141 631–1 756 470	3–5	6.32+02	6.05−02	3.70−02	−0.741	C+	4
				[61.92]	140 504–1 755 470	1–3	4.63+02	7.98−02	1.63−02	−1.098	C+	4
				[62.02]	144 091–1 756 470	5–5	1.72+02	9.90−03	1.01−02	−1.305	C	4
				[61.96]	141 631–1 755 470	3–3	2.90+02	1.67−02	1.02−02	−1.300	C	4
				[62.06]	144 091–1 755 470	5–3	1.89+01	6.55−04	6.70−04	−2.485	D+	4
17		^{3}P°−^{3}S		*61.44*	*142 872*–1 770 380	9–3	1.39+03	2.61−02	4.76−02	−0.629	C+	4
				61.490	144 091–1 770 380	5–3	5.94+02	2.02−02	2.04−02	−0.996	C+	4
				61.397	141 631–1 770 380	3–3	5.70+02	3.22−02	1.95−02	−1.015	C+	4
				61.354	140 504–1 770 380	1–3	2.22+02	3.76−02	7.60−03	−1.425	C	4
18		^{3}P°−^{3}P				9–9						4
				61.128	144 091–1 779 990	5–5	1.15+03	6.44−02	6.48−02	−0.492	B	4
				61.085	141 631–1 778 690	3–3	2.83+02	1.59−02	9.56−03	−1.321	C	4
				61.177	144 091–1 778 690	5–3	8.10+02	2.73−02	2.75−02	−0.865	C+	4
				61.037	141 631–1 779 990	3–5	3.37+02	3.14−02	1.89−02	−1.026	C+	4
				61.043	140 504–1 778 690	1–3	3.98+02	6.66−02	1.34−02	−1.177	C+	4
19		^{1}P°−^{1}P		67.731	271 687–1 748 120	3–3	1.70+03	1.17−01	7.82−02	−0.455	B	4

TABLE 72. Transitions probabilities of allowed lines for Mg IX (reference for this table are as follows: 1=Tully *et al.*,[112] 2=Tachiev and Froese Fischer,[92] 3=Curtis *et al.*,[19] 4=Safronova *et al.*,[80] 5=Safronova *et al.*,[82] 6=Träbert *et al.*,[109] 7=Fritzsche and Grant,[30] 8=Johnson and Huang,[46] 9=Ralchenko and Vainshtein,[79] and 10=Fleming *et al.*[29])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})$^{\mathrm{a}}$	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
20		$^{1}\mathrm{P}^{\circ}-{}^{3}\mathrm{D}$										
				[67.35]	271 687–1 756 470	3–5	8.93−01	1.01−04	6.73−05	−3.519	E	4
				[67.39]	271 687–1 755 470	3–3	5.60+01	3.81−03	2.54−03	−1.942	D	4
21		$^{1}\mathrm{P}^{\circ}-{}^{1}\mathrm{D}$		65.609	271 687–1 795 870	3–5	2.41+03	2.59−01	1.68−01	−0.110	B	4
22	$2s2p-2s4d$	$^{3}\mathrm{P}^{\circ}-{}^{3}\mathrm{D}$		*51.62*	*142 872–2 080 007*	9–15	1.99+03	1.32−01	2.03−01	0.075	D	1
				51.654	144 091–2 080 050	5–7	1.98+03	1.11−01	9.44−02	−0.256	D+	LS
				51.591	141 631–2 079 970	3–5	1.49+03	9.94−02	5.06−02	−0.525	D	LS
				51.561	140 504–2 079 970	1–3	1.11+03	1.33−01	2.26−02	−0.876	D	LS
				51.656	144 091–2 079 970	5–5	4.97+02	1.99−02	1.69−02	−1.002	D	LS
				51.591	141 631–2 079 970	3–3	8.30+02	3.31−02	1.69−02	−1.003	D	LS
				51.656	144 091–2 079 970	5–3	5.50+01	1.32−03	1.12−03	−2.180	E	LS
23		$^{1}\mathrm{P}^{\circ}-{}^{1}\mathrm{D}$		55.060	271 687–2 087 890	3–5	1.53+03	1.16−01	6.31−02	−0.458	D+	1
24	$2s2p-2p4p$	$^{3}\mathrm{P}^{\circ}-{}^{3}\mathrm{D}$				9–15						1
				47.947	144 091–2 229 730	5–7	5.82+02	2.81−02	2.22−02	−0.852	D	LS
25		$^{1}\mathrm{P}^{\circ}-{}^{1}\mathrm{D}$		50.777	271 687–2 241 080	3–5	8.30+02	5.35−02	2.68−02	−0.795	D	1
26	$2s2p-2s5d$	$^{3}\mathrm{P}^{\circ}-{}^{3}\mathrm{D}$				9–15						1
				46.711	144 091–2 284 920	5–7	8.71+02	3.99−02	3.07−02	−0.700	D	LS
				46.657	141 631–2 284 920	3–5	6.54+02	3.56−02	1.64−02	−0.971	D	LS
				46.711	144 091–2 284 920	5–5	2.18+02	7.12−03	5.47−03	−1.449	E+	LS
27		$^{1}\mathrm{P}^{\circ}-{}^{1}\mathrm{D}$		49.586	271 687–2 288 380	3–5	7.83+02	4.81−02	2.36−02	−0.841	D	1
28	$2p^{2}-2s3p$	$^{3}\mathrm{P}-{}^{1}\mathrm{P}^{\circ}$										
				81.537	367 159–1 593 600	3–3	7.59−02	7.57−06	6.09−06	−4.644	E+	2,4
				81.681	369 330–1 593 600	5–3	8.66−01	5.20−05	6.99−05	−3.585	D	2,4
				81.450	365 856–1 593 600	1–3	4.24−02	1.27−05	3.39−06	−4.896	E	2,4
29		$^{1}\mathrm{D}-{}^{1}\mathrm{P}^{\circ}$		84.140	405 100–1 593 600	5–3	1.70+02	1.08−02	1.50−02	−1.268	C+	2,4
30		$^{1}\mathrm{S}-{}^{1}\mathrm{P}^{\circ}$		91.410	499 633–1 593 600	1–3	5.38+00	2.02−03	6.08−04	−2.695	C	2,4
31	$2p^{2}-2p3s$	$^{3}\mathrm{P}-{}^{3}\mathrm{P}^{\circ}$		*74.38*	*368 220–1 712 599*	9–9	1.05+03	8.67−02	1.91−01	−0.108	A	4
				74.373	369 330–1 713 900	5–5	7.85+02	6.51−02	7.97−02	−0.487	A	4
				74.400	367 159–1 711 250	3–3	2.56+02	2.13−02	1.56−02	−1.194	B+	4
				74.520	369 330–1 711 250	5–3	4.33+02	2.16−02	2.65−02	−0.967	B+	4
				74.461	367 159–1 710 140	3–1	1.03+03	2.86−02	2.10−02	−1.067	B+	4
				74.253	367 159–1 713 900	3–5	2.67+02	3.68−02	2.70−02	−0.957	B+	4
				74.328	365 856–1 711 250	1–3	3.48+02	8.66−02	2.12−02	−1.062	B+	4
32		$^{1}\mathrm{D}-{}^{1}\mathrm{P}^{\circ}$		74.742	405 100–1 743 040	5–3	7.77+02	3.91−02	4.81−02	−0.709	C+	4
33		$^{1}\mathrm{S}-{}^{1}\mathrm{P}^{\circ}$		80.424	499 633–1 743 040	1–3	3.03+02	8.80−02	2.33−02	−1.056	C+	4
34	$2p^{2}-2p3d$	$^{3}\mathrm{P}-{}^{1}\mathrm{D}^{\circ}$										
				70.300	367 159–1 789 640	3–5	1.70+01	2.10−03	1.46−03	−2.201	D	4
				70.407	369 330–1 789 640	5–5	4.28+00	3.18−04	3.68−04	−2.799	E+	4
35		$^{3}\mathrm{P}-{}^{3}\mathrm{D}^{\circ}$		*69.44*	*368 220–1 808 219*	9–15	7.59+03	9.15−01	1.88+00	0.916	B+	4
				69.467	369 330–1 808 860	5–7	7.64+03	7.74−01	8.85−01	0.588	B+	4
				69.411	367 159–1 807 860	3–5	6.45+03	7.76−01	5.32−01	0.367	B+	4

TABLE 72. Transitions probabilities of allowed lines for Mg IX (reference for this table are as follows: 1=Tully *et al.*,[112] 2=Tachiev and Froese Fischer,[92] 3=Curtis *et al.*,[19] 4=Safronova *et al.*,[80] 5=Safronova *et al.*,[82] 6=Träbert *et al.*,[109] 7=Fritzsche and Grant,[30] 8=Johnson and Huang,[46] 9=Ralchenko and Vainshtein,[79] and 10=Fleming *et al.*[29])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				69.374	365 856–1 807 320	1–3	4.80+03	1.04+00	2.37−01	0.017	B	4
				69.515	369 330–1 807 860	5–5	1.07+03	7.74−02	8.85−02	−0.412	B	4
				69.437	367 159–1 807 320	3–3	2.72+03	1.96−01	1.35−01	−0.231	B	4
				69.542	369 330–1 807 320	5–3	8.79+01	3.82−03	4.38−03	−1.719	C	4
36		^{3}P−^{3}P°		*69.08*	*368 220–1 815 718*	9–9	4.11+03	2.94−01	6.02−01	0.423	B	4
				69.162	369 330–1 815 220	5–5	3.85+03	2.76−01	3.14−01	0.140	B+	4
				69.011	367 159–1 816 210	3–3	1.49+03	1.07−01	7.26−02	−0.493	B	4
				69.114	369 330–1 816 210	5–3	1.80+03	7.75−02	8.82−02	−0.412	B	4
				68.986	367 159–1 816 730	3–1	4.05+03	9.62−02	6.56−02	−0.540	B	4
				69.058	367 159–1 815 220	3–5	2.78+02	3.31−02	2.26−02	−1.003	C+	4
				68.949	365 856–1 816 210	1–3	7.96+02	1.70−01	3.87−02	−0.770	C+	4
37		^{1}D−^{1}D°		72.226	405 100–1 789 640	5–5	2.11+03	1.65−01	1.97−01	−0.084	B	4
38		^{1}D−^{3}P°										
				70.866	405 100–1 816 210	5–3	1.15+00	5.19−05	6.05−05	−3.586	E	4
				70.916	405 100–1 815 220	5–5	1.82+01	1.38−03	1.61−03	−2.161	D	4
39		^{1}D−^{1}F°		69.950	405 100–1 834 690	5–7	9.03+03	9.28−01	1.07+00	0.667	B+	4
40		^{1}D−^{1}P°		69.616	405 100–1 841 560	5–3	2.82+02	1.23−02	1.41−02	−1.211	C+	4
41		^{1}S−^{1}P°		74.520	499 633–1 841 560	1–3	4.97+03	1.24+00	3.05−01	0.093	B+	4
42	$2p^2-2p4d$	^{3}P−^{3}D°				9–15						1
				53.222	369 330–2 248 250	5–7	2.67+03	1.59−01	1.39−01	−0.100	D+	LS
43		^{3}P−^{3}P°				9–9						1
				53.188	369 330–2 249 450	5–5	1.04+03	4.41−02	3.86−02	−0.657	D	LS
				53.112	367 159–2 249 970	3–3	3.48+02	1.47−02	7.71−03	−1.356	E+	LS
				53.173	369 330–2 249 970	5–3	5.78+02	1.47−02	1.29−02	−1.134	E+	LS
				53.127	367 159–2 249 450	3–5	3.47+02	2.45−02	1.29−02	−1.134	E+	LS
				53.075	365 856–2 249 970	1–3	4.65+02	5.89−02	1.03−02	−1.230	E+	LS
44		^{1}D−^{1}D°		54.463	405 100–2 241 210	5–5	8.88+02	3.95−02	3.54−02	−0.704	D	1
45		^{1}D−^{1}F°		54.011	405 100–2 256 570	5–7	3.28+03	2.01−01	1.79−01	0.002	C	1
46		^{1}S−^{1}P°		56.861	499 633–2 258 310	1–3	1.53+03	2.22−01	4.16−02	−0.654	D	1
47	$2p^2-2p5d$	^{3}P−^{3}D°				9–15						1
				48.024	369 330–2 451 620	5–7	1.27+03	6.13−02	4.85−02	−0.514	D	LS
48		^{1}D−^{1}F°		48.794	405 100–2 454 530	5–7	1.58+03	7.90−02	6.35−02	−0.403	D+	1
49	$2s3s-2s3p$	^{3}S−^{1}P°										
				1 635.32	1 532 450–1 593 600	3–3	3.97−02	1.59−03	2.57−02	−2.321	C+	2
50		^{1}S−^{1}P°	2 814.5	2 815.3	1 558 080–1 593 600	1–3	3.53−01	1.26−01	1.17+00	−0.900	A	2
51	$2s3s-2p3s$	^{1}S−^{1}P°		540.657	1 558 080–1 743 040	1–3	2.33+01	3.06−01	5.45−01	−0.514	C	1
52	$2s3s-2s4p$	^{1}S−^{1}P°		195.848	1 558 080–2 068 680	1–3	1.72+02	2.97−01	1.91−01	−0.527	C	1
53	$2s3s-2s5p$	^{1}S−^{1}P°		138.353	1 558 080–2 280 870	1–3	8.07+01	6.95−02	3.17−02	−1.158	D	1
54	$2s3p-2s3d$	^{1}P°−^{3}D										

TABLE 72. Transitions probabilities of allowed lines for Mg IX (reference for this table are as follows: 1=Tully *et al.*,[112] 2=Tachiev and Froese Fischer,[92] 3=Curtis *et al.*,[19] 4=Safronova *et al.*,[80] 5=Safronova *et al.*,[82] 6=Träbert *et al.*,[109] 7=Fritzsche and Grant,[30] 8=Johnson and Huang,[46] 9=Ralchenko and Vainshtein,[79] and 10=Fleming *et al.*[29])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
			2 660.9	2 661.7	1 593 600–1 631 170	3–5	5.80−03	1.03−03	2.70−02	−2.510	C+	2
			2 670.1	2 670.9	1 593 600–1 631 040	3–3	2.87−03	3.07−04	8.10−03	−3.036	C	2
55		$^1P^\circ-{}^1D$		1 639.88	1 593 600–1 654 580	3–5	1.88+00	1.26−01	2.04+00	−0.423	A	2
56	$2s3p-2p3p$	$^1P^\circ-{}^1P$		647.17	1 593 600–1 748 120	3–3	1.57+01	9.87−02	6.31−01	−0.529	C+	1
57		$^1P^\circ-{}^1D$		494.389	1 593 600–1 795 870	3–5	1.93+00	1.18−02	5.76−02	−1.451	D+	1
58	$2s3p-2s4d$	$^1P^\circ-{}^1D$		202.310	1 593 600–2 087 890	3–5	4.05+02	4.14−01	8.27−01	0.094	C+	1
59	$2s3p-2s5d$	$^1P^\circ-{}^1D$		143.930	1 593 600–2 288 380	3–5	2.18+02	1.13−01	1.61−01	−0.470	C	1
60	$2s3p-2s6d$	$^1P^\circ-{}^1D$		124.395	1 593 600–2 397 490	3–5	1.29+02	4.97−02	6.11−02	−0.827	D+	1
61	$2s3d-2p3s$	$^1D-{}^1P^\circ$		1 130.45	1 654 580–1 743 040	5–3	3.53−01	4.06−03	7.55−02	−1.693	D+	1
62	$2s3d-2p3d$	$^3D-{}^3D^\circ$		*565.0*	*1 631 214–1 808 219*	1 58–15	1.20+01	5.73−02	1.60+00	−0.066	C	1
				563.25	1 631 320–1 808 860	7–7	1.07+01	5.10−02	6.62−01	−0.447	C+	LS
				565.96	1 631 170–1 807 860	5–5	8.29+00	3.98−02	3.71−01	−0.701	C	LS
				567.28	1 631 040–1 807 320	3–3	8.85+00	4.27−02	2.39−01	−0.892	C	LS
				566.44	1 631 320–1 807 860	7–5	1.85+00	6.36−03	8.30−02	−1.351	D+	LS
				567.70	1 631 170–1 807 320	5–3	2.95+00	8.54−03	7.98−02	−1.370	D+	LS
				562.78	1 631 170–1 808 860	5–7	1.35+00	8.96−03	8.30−02	−1.349	D+	LS
				565.55	1 631 040–1 807 860	3–5	1.79+00	1.43−02	7.99−02	−1.368	D+	LS
63		$^3D-{}^3P^\circ$		*541.99*	*1 631 214–1 815 718*	15–9	1.37+01	3.63−02	9.71−01	−0.264	C	1
				543.774	1 631 320–1 815 220	7–5	1.14+01	3.61−02	4.52−01	−0.597	C	LS
				540.424	1 631 170–1 816 210	5–3	1.04+01	2.73−02	2.43−01	−0.865	C	LS
				538.532	1 631 040–1 816 730	3–1	1.40+01	2.03−02	1.08−01	−1.215	D+	LS
				543.331	1 631 170–1 815 220	5–5	2.04+00	9.04−03	8.08−02	−1.345	D+	LS
				540.044	1 631 040–1 816 210	3–3	3.48+00	1.52−02	8.11−02	−1.341	D+	LS
				542.947	1 631 040–1 815 220	3–5	1.37−01	1.01−03	5.42−03	−2.519	E+	LS
64		$^1D-{}^1D^\circ$		740.41	1 654 580–1 789 640	5–5	4.78+00	3.93−02	4.79−01	−0.707	C	1
65		$^1D-{}^1F^\circ$		555.216	1 654 580–1 834 690	5–7	2.43+00	1.57−02	1.43−01	−1.105	D+	1
66		$^1D-{}^1P^\circ$		534.817	1 654 580–1 841 560	5–3	1.47+01	3.78−02	3.33−01	−0.724	C	1
67	$2s3d-2s4p$	$^1D-{}^1P^\circ$		241.488	1 654 580–2 068 680	5–3	4.42+01	2.32−02	9.22−02	−0.936	D+	1
68	$2p3s-2p3p$	$^3P^\circ-{}^3D$	*2 230*	*2 230*	*1 712 599–1 757 437*	9–15	1.04+00	1.29−01	8.53+00	0.065	B	1
			2 218.1	2 218.8	1 713 900–1 758 970	5–7	1.05+00	1.09−01	3.98+00	−0.264	B	LS
			[2 211]	[2 211]	1 711 250–1 756 470	3–5	7.99−01	9.76−02	2.13+00	−0.533	B	LS
			[2 205]	[2 206]	1 710 140–1 755 470	1–3	5.98−01	1.31−01	9.51−01	−0.883	C+	LS
			[2 348]	[2 349]	1 713 900–1 756 470	5–5	2.22−01	1.84−02	7.11−01	−1.036	C+	LS
			[2 261]	[2 261]	1 711 250–1 755 470	3–3	4.15−01	3.18−02	7.10−01	−1.020	C+	LS
			[2 405]	[2 406]	1 713 900–1 755 470	5–3	2.31−02	1.20−03	4.75−02	−2.222	D	LS
69		$^3P^\circ-{}^3S$		*1 730.7*	*1 712 599*–1 770 380	9–3	2.19+00	3.27−02	1.68+00	−0.531	C+	1
				1 770.54	1 713 900–1 770 380	5–3	1.13+00	3.20−02	9.33−01	−0.796	C+	LS
				1 691.19	1 711 250–1 770 380	3–3	7.81−01	3.35−02	5.60−01	−0.998	C+	LS
				1 660.03	1 710 140–1 770 380	1–3	2.75−01	3.41−02	1.86−01	−1.467	C	LS
70		$^3P^\circ-{}^3P$				9–9						1
				1 513.09	1 713 900–1 779 990	5–5	2.78+00	9.55−02	2.38+00	−0.321	B	LS
				1 482.80	1 711 250–1 778 690	3–3	9.86−01	3.25−02	4.76−01	−1.011	C	LS

TABLE 72. Transitions probabilities of allowed lines for Mg IX (reference for this table are as follows: 1=Tully *et al.*,[112] 2=Tachiev and Froese Fischer,[92] 3=Curtis *et al.*,[19] 4=Safronova *et al.*,[80] 5=Safronova *et al.*,[82] 6=Träbert *et al.*,[109] 7=Fritzsche and Grant,[30] 8=Johnson and Huang,[46] 9=Ralchenko and Vainshtein,[79] and 10=Fleming *et al.*[29])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				1 543.45	1 713 900–1 778 690	5–3	1.46+00	3.12−02	7.93−01	−0.807	C+	LS
				1 454.76	1 711 250–1 779 990	3–5	1.04+00	5.52−02	7.93−01	−0.781	C+	LS
				1 458.79	1 710 140–1 778 690	1–3	1.38+00	1.32−01	6.34−01	−0.879	C+	LS
71		$^1P^{\circ}-{}^1P$	19 680	19 685	1 743 040–1 748 120	3–3	1.11−03	6.47−03	1.26+00	−1.712	C+	1
72		$^1P^{\circ}-{}^1D$		1 892.9	1 743 040–1 795 870	3–5	2.11+00	1.89−01	3.53+00	−0.246	B	1
73	$2p3s-2s4d$	$^1P^{\circ}-{}^1D$		289.981	1 743 040–2 087 890	3–5	2.85+01	5.98−02	1.71−01	−0.746	C	1
74	$2p3s-2p4p$	$^3P^{\circ}-{}^3D$				9–15						1
				193.862	1 713 900–2 229 730	5–7	1.85+02	1.46−01	4.66−01	−0.137	C	LS
75		$^3P^{\circ}-{}^3P$				9–9						1
				191.773	1 713 900–2 235 350	5–5	1.23+02	6.80−02	2.15−01	−0.469	C	LS
				190.803	1 711 250–2 235 350	3–5	4.17+01	3.79−02	7.14−02	−0.944	D+	LS
76		$^1P^{\circ}-{}^1D$		200.787	1 743 040–2 241 080	3–5	1.55+02	1.56−01	3.09−01	−0.330	C	1
77	$2p3s-2s5d$	$^1P^{\circ}-{}^1D$		183.372	1 743 040–2 288 380	3–5	1.46+01	1.23−02	2.23−02	−1.433	D	1
78	$2p3s-2p5p$	$^3P^{\circ}-{}^3P$				9–9						1
				136.977	1 713 900–2 443 950	5–5	7.32+01	2.06−02	4.64−02	−0.987	D	LS
				136.482	1 711 250–2 443 950	3–5	2.47+01	1.15−02	1.55−02	−1.462	E+	LS
79		$^1P^{\circ}-{}^1D$		142.144	1 743 040–2 446 550	3–5	8.93+01	4.51−02	6.33−02	−0.869	D+	1
80	$2p3p-2p3d$	$^1P-{}^1D^{\circ}$	2 407.7	2 408.5	1 748 120–1 789 640	3–5	5.17−01	7.50−02	1.78+00	−0.648	B	1
81		$^1P-{}^1P^{\circ}$		1 070.21	1 748 120–1 841 560	3–3	4.28+00	7.35−02	7.77−01	−0.657	C+	1
82		$^3D-{}^3D^{\circ}$		*1 969*	*1 757 437–1 808 219*	15–15	2.67−01	1.55−02	1.51+00	−0.634	C	1
			2 003.8	2 004.4	1 758 970–1 808 860	7–7	2.24−01	1.35−02	6.24−01	−1.025	C+	LS
				[1 946]	1 756 470–1 807 860	5–5	1.92−01	1.09−02	3.49−01	−1.264	C	LS
				[1 929]	1 755 470–1 807 320	3–3	2.13−01	1.19−02	2.27−01	−1.447	C	LS
			2 044.8	2 045.4	1 758 970–1 807 860	7–5	3.71−02	1.66−03	7.82−02	−1.935	D+	LS
				[1 967]	1 756 470–1 807 320	5–3	6.70−02	2.33−03	7.54−02	−1.934	D+	LS
				[1 909]	1 756 470–1 808 860	5–7	3.27−02	2.50−03	7.85−02	−1.903	D+	LS
				[1 909]	1 755 470–1 807 860	3–5	4.39−02	4.00−03	7.54−02	−1.921	D+	LS
83		$^3D-{}^3P^{\circ}$		*1 715.8*	*1 757 437–1 815 718*	15–9	3.77−01	9.98−03	8.46−01	−0.825	C	1
				1 777.78	1 758 970–1 815 220	7–5	2.85−01	9.63−03	3.95−01	−1.171	C	LS
				[1 673.9]	1 756 470–1 816 210	5–3	3.04−01	7.67−03	2.11−01	−1.416	C	LS
				[1 632.4]	1 755 470–1 816 730	3–1	4.38−01	5.83−03	9.40−02	−1.757	D+	LS
				[1 702.1]	1 756 470–1 815 220	5–5	5.80−02	2.52−03	7.06−02	−1.900	D+	LS
				[1 646.4]	1 755 470–1 816 210	3–3	1.07−01	4.33−03	7.04−02	−1.886	D+	LS
				[1 673.6]	1 755 470–1 815 220	3–5	4.06−03	2.84−04	4.69−03	−3.070	E+	LS
84		$^3S-{}^3P^{\circ}$	*2 205*	*2 206*	*1 770 380–1 815 718*	3–9	6.90−01	1.51−01	3.29+00	−0.344	C+	1
			2 229.5	2 230.2	1 770 380–1 815 220	3–5	6.68−01	8.30−02	1.83+00	−0.604	B	LS
			2 181.3	2 182.0	1 770 380–1 816 210	3–3	7.13−01	5.09−02	1.10+00	−0.816	C+	LS
			2 156.8	2 157.5	1 770 380–1 816 730	3–1	7.39−01	1.72−02	3.67−01	−1.287	C	LS
85		$^3P-{}^3D^{\circ}$				9–15						1
			3 462.8	3 463.8	1 779 990–1 808 860	5–7	1.79−01	4.50−02	2.57+00	−0.648	B	LS
			3 427.2	3 428.2	1 778 690–1 807 860	3–5	1.38−01	4.06−02	1.37+00	−0.914	C+	LS

TABLE 72. Transitions probabilities of allowed lines for Mg IX (reference for this table are as follows: 1=Tully *et al.*,[112] 2=Tachiev and Froese Fischer,[92] 3=Curtis *et al.*,[19] 4=Safronova *et al.*,[80] 5=Safronova *et al.*,[82] 6=Träbert *et al.*,[109] 7=Fritzsche and Grant,[30] 8=Johnson and Huang,[46] 9=Ralchenko and Vainshtein,[79] and 10=Fleming *et al.*[29])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
			3 587.1	3 588.1	1 779 990–1 807 860	5–5	4.03−02	7.77−03	4.59−01	−1.411	C	LS
			3 491.8	3 492.8	1 778 690–1 807 320	3–3	7.27−02	1.33−02	4.59−01	−1.399	C	LS
			3 657.9	3 659.0	1 779 990–1 807 320	5–3	4.22−03	5.08−04	3.06−02	−2.595	D	LS
86		$^{3}\mathrm{P}-{}^{3}\mathrm{P}^{\circ}$				9–9						1
			2 837.7	2 838.5	1 779 990–1 815 220	5–5	1.00−01	1.21−02	5.65−01	−1.218	C+	LS
			2 664.5	2 665.2	1 778 690–1 816 210	3–3	4.03−02	4.29−03	1.13−01	−1.890	D+	LS
			2 760.1	2 760.9	1 779 990–1 816 210	5–3	6.04−02	4.14−03	1.88−01	−1.684	C	LS
			2 628.0	2 628.8	1 778 690–1 816 730	3–1	1.68−01	5.80−03	1.51−01	−1.759	D+	LS
			2 736.7	2 737.5	1 778 690–1 815 220	3–5	3.72−02	6.97−03	1.88−01	−1.680	C	LS
87		$^{1}\mathrm{D}-{}^{1}\mathrm{F}^{\circ}$	2 575.2	2 576.0	1 795 870–1 834 690	5–7	6.49−01	9.04−02	3.83+00	−0.345	B	1
88		$^{1}\mathrm{D}-{}^{1}\mathrm{P}^{\circ}$	2 188.0	2 188.7	1 795 870–1 841 560	5–3	4.80−02	2.07−03	7.46−02	−1.985	D+	1
89	2*p*3*p*−2*p*4*d*	$^{1}\mathrm{P}-{}^{1}\mathrm{D}^{\circ}$		202.803	1 748 120–2 241 210	3–5	3.65+02	3.75−01	7.51−01	0.051	C+	1
90		$^{1}\mathrm{P}-{}^{1}\mathrm{P}^{\circ}$		196.005	1 748 120–2 258 310	3–3	1.61+02	9.29−02	1.80−01	−0.555	C	1
91		$^{3}\mathrm{D}-{}^{3}\mathrm{D}^{\circ}$				15–15						1
				204.382	1 758 970–2 248 250	7–7	9.93+01	6.22−02	2.93−01	−0.361	C	LS
				[203.34]	1 756 470–2 248 250	5–7	1.27+01	1.10−02	3.68−02	−1.260	D	LS
92		$^{3}\mathrm{D}-{}^{3}\mathrm{P}^{\circ}$				15–9						1
				203.882	1 758 970–2 249 450	7–5	1.17+01	5.22−03	2.45−02	−1.437	D	LS
				[202.63]	1 756 470–2 249 970	5–3	1.07+01	3.94−03	1.31−02	−1.706	E+	LS
				[202.85]	1 756 470–2 249 450	5–5	2.12+00	1.31−03	4.37−03	−2.184	E+	LS
				[202.22]	1 755 470–2 249 970	3–3	3.57+00	2.19−03	4.37−03	−2.182	E+	LS
				[202.44]	1 755 470–2 249 450	3–5	1.43−01	1.46−04	2.92−04	−3.359	E	LS
93		$^{3}\mathrm{S}-{}^{3}\mathrm{P}^{\circ}$				3–9						1
				2 08.738	1 770 380–2 249 450	3–5	2.42+02	2.64−01	5.44−01	−0.101	C	LS
				2 08.511	1 770 380–2 249 970	3–3	2.44+02	1.59−01	3.27−01	−0.321	C	LS
94		$^{3}\mathrm{P}-{}^{3}\mathrm{D}^{\circ}$				9–15						1
				213.557	1 779 990–2 248 250	5–7	3.47+02	3.32−01	1.17+00	0.220	C+	LS
95		$^{3}\mathrm{P}-{}^{3}\mathrm{P}^{\circ}$				9–9						1
				213.011	1 779 990–2 249 450	5–5	1.29+02	8.77−02	3.08−01	−0.358	C	LS
				212.188	1 778 690–2 249 970	3–3	4.36+01	2.94−02	6.16−02	−1.055	D+	LS
				212.775	1 779 990–2 249 970	5–3	7.19+01	2.93−02	1.03−01	−0.834	D+	LS
				212.422	1 778 690–2 249 450	3–5	4.34+01	4.89−02	1.03−01	−0.834	D+	LS
96		$^{1}\mathrm{D}-{}^{1}\mathrm{D}^{\circ}$		2 24.548	1 795 870–2 241 210	5–5	1.26+02	9.52−02	3.52−01	−0.322	C	1
97		$^{1}\mathrm{D}-{}^{1}\mathrm{F}^{\circ}$		217.061	1 795 870–2 256 570	5–7	4.09+02	4.04−01	1.44+00	0.305	B	1
98	2*p*3*p*−2*p*5*d*	$^{3}\mathrm{D}-{}^{3}\mathrm{D}^{\circ}$				15–15						1
				144.373	1 758 970–2 451 620	7–7	5.47+01	1.71−02	5.69−02	−0.922	D+	LS
				[143.85]	1 756 470–2 451 620	5–7	6.93+00	3.01−03	7.13−03	−1.822	E+	LS
99		$^{3}\mathrm{P}-{}^{3}\mathrm{D}^{\circ}$				9–15						1
				148.892	1 779 990–2 451 620	5–7	1.74+02	8.11−02	1.99−01	−0.392	C	LS
100		$^{1}\mathrm{D}-{}^{1}\mathrm{F}^{\circ}$		1 581.823	1 795 870–2 454 530	5–7	2.04+02	9.87−02	2.47−01	−0.307	C	1

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No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
101	$2p3d-2p3p$	$^{1}D^{\circ}-{}^{1}D$	16 047	16 051	1789 640–1 795 870	5–5	4.74−04	1.83−03	4.84−01	−2.039	C	1
102	$2p3d-2s4d$	$^{3}P^{\circ}-{}^{3}D$		*378.37*	*1815 718–2 080 007*	9–15	2.86+00	1.02−02	1.15−01	−1.037	D	1
				377.601	1 815 220–2 080 050	5–7	2.88+00	8.62−03	5.36−02	−1.366	D	LS
				379.133	1 816 210–2 079 970	3–5	2.13+00	7.66−03	2.87−02	−1.639	D	LS
				379.881	1 816 730–2 079 970	1–3	1.57+00	1.02−02	1.28−02	−1.991	E+	LS
				377.715	1 815 220–2 079 970	5–5	7.20−01	1.54−03	9.57−03	−2.114	E+	LS
				379.133	1 816 210–2 079 970	3–3	1.18+00	2.55−03	9.55−03	−2.116	E+	LS
				377.715	1 815 220–2 079 970	5–3	8.03−02	1.03−04	6.40−04	−3.288	E	LS
103		$^{1}P^{\circ}-{}^{1}D$		405.959	1 841 560–2 087 890	3–5	3.04+00	1.25−02	5.01−02	−1.426	D	1
104	$2p3d-2p4p$	$^{3}D^{\circ}-{}^{3}D$				15–15						1
				237.603	1 808 860–2 229 730	7–7	5.26+00	4.45−03	2.44−02	−1.507	D	LS
				237.040	1 807 860–2 229 730	5–7	6.64−01	7.83−04	3.06−03	−2.407	E	LS
105		$^{3}D^{\circ}-{}^{3}P$				15–9						1
				234.472	1 808 860–2 235 350	7–5	2.34+01	1.38−02	7.46−02	−1.015	D+	LS
				233.924	1 807 860–2 235 350	5–5	4.22+00	3.46−03	1.33−02	−1.762	E+	LS
				233.628	1 807 320–2 235 350	3–5	2.82−01	3.85−04	8.88−04	−2.937	E	LS
106		$^{3}P^{\circ}-{}^{3}D$				9–15						1
				241.249	1 815 220–2 229 730	5–7	1.19+01	1.45−02	5.76−02	−1.140	D+	LS
107		$^{1}F^{\circ}-{}^{1}D$		246.069	1 834 690–2 241 080	7–5	3.50+01	2.27−02	1.29−01	−0.799	D+	1
108		$^{1}P^{\circ}-{}^{1}D$		250.300	1 841 560–2 241 080	3–5	1.29+01	2.02−02	4.99−02	−1.218	D	1
109	$2p3d-2p5p$	$^{1}F^{\circ}-{}^{1}D$		163.436	1 834 690–2 446 550	7–5	1.52+01	4.35−03	1.64−02	−1.516	D	1
110	$2s4p-2s4d$	$^{1}P^{\circ}-{}^{1}D$	5 204.2	5 205.6	2 068 680–2 087 890	3–5	2.92−01	1.98−01	1.02+01	−0.226	B+	1
111	$2s4p-2p4p$	$^{1}P^{\circ}-{}^{1}D$		580.05	2 068 680–2 241 080	3–5	3.81+00	3.20−02	1.83−01	−1.018	C	1
112	$2s4p-2s5d$	$^{1}P^{\circ}-{}^{1}D$		455.166	2 068 680–2 288 380	3–5	8.23+01	4.26−01	1.92+00	0.107	B	1
113	$2s4p-2s6d$	$^{1}P^{\circ}-{}^{1}D$		304.127	2 068 680–2 397 490	3–5	5.32+01	1.23−01	3.69−01	−0.433	C	1
114	$2s4d-2p4d$	$^{3}D-{}^{3}D^{\circ}$				15–15						1
				594.53	2 080 050–2 248 250	7–7	8.15+00	4.32−02	5.92−01	−0.519	C+	LS
				594.25	2 079 970–2 248 250	5–7	1.02+00	7.59−03	7.42−02	−1.421	D+	LS
115		$^{3}D-{}^{3}P^{\circ}$				15–9						1
				590.32	2 080 050–2 249 450	7–5	1.24+01	4.61−02	6.27−01	−0.491	C+	LS
				588.24	2 079 970–2 249 970	5–3	1.11+01	3.47−02	3.36−01	−0.761	C	LS
				590.04	2 079 970–2 249 450	5–5	2.20+00	1.15−02	1.12−01	−1.240	D+	LS
				588.24	2 079 970–2 249 970	3–3	3.72+00	1.93−02	1.12−01	−1.237	D+	LS
				590.04	2 079 970–2 249 450	3–5	1.47−01	1.28−03	7.46−03	−2.416	E+	LS
116		$^{1}D-{}^{1}D^{\circ}$		652.23	2 087 890–2 241 210	5–5	6.91+00	4.41−02	4.73−01	−0.657	C	1
117		$^{1}D-{}^{1}P^{\circ}$		586.79	2 087 890–2 258 310	5–3	1.69+01	5.24−02	5.06−01	−0.582	C	1
118	$2s4d-2s5p$	$^{1}D-{}^{1}P^{\circ}$		518.188	2 087 890–2 280 870	5–3	1.40+01	3.37−02	2.87−01	−0.773	C	1
119	$2s4d-2s6p$	$^{1}D-{}^{1}P^{\circ}$		328.645	2 087 890–2 392 170	5–3	1.02+01	9.90−03	5.36−02	−1.305	D	1
120	$2p4p-2p4d$	$^{3}D-{}^{3}D^{\circ}$				15–15						1

TABLE 72. Transitions probabilities of allowed lines for Mg IX (reference for this table are as follows: 1=Tully *et al.*,[112] 2=Tachiev and Froese Fischer,[92] 3=Curtis *et al.*,[19] 4=Safronova *et al.*,[80] 5=Safronova *et al.*,[82] 6=Träbert *et al.*,[109] 7=Fritzsche and Grant,[30] 8=Johnson and Huang,[46] 9=Ralchenko and Vainshtein,[79] and 10=Fleming *et al.*[29])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
			5 398.1	5 399.6	2 229 730–2 248 250	7–7	5.72−02	2.50−02	3.11+00	−0.757	B	LS
121		^{3}D$-^{3}$P$^{\circ}$				15–9						1
			5 069.6	5 071.0	2 229 730–2 249 450	7–5	2.93−02	8.06−03	9.42−01	−1.249	C+	LS
122		^{3}P$-^{3}$D$^{\circ}$				9–15						1
			7 750	7 752	2 235 350–2 248 250	5–7	6.87−02	8.67−02	1.11+01	−0.363	B+	LS
123		^{3}P$-^{3}$P$^{\circ}$				9–9						1
			7 090	7 092	2 235 350–2 249 450	5–5	2.78−02	2.10−02	2.45+00	−0.979	B	LS
			6 838	6 840	2 235 350–2 249 970	5–3	1.72−02	7.24−03	8.15−01	−1.441	C+	LS
124		^{1}D$-^{1}$D$^{\circ}$		130 cm^{-1}	2 241 080–2 241 210	5–5	1.87−08	1.66−04	2.10+00	−3.081	B	1
125		^{1}D$-^{1}$F$^{\circ}$	6 454	6 456	2 241 080–2 256 570	5–7	1.58−01	1.38−01	1.47+01	−0.161	B+	1
126		^{1}D$-^{1}$P$^{\circ}$	5 802	5 804	2 241 080–2 258 310	5–3	8.12−03	2.46−03	2.35−01	−1.910	C	1
127	$2p4p-2s5p$	^{1}D$-^{1}$P$^{\circ}$	2 512.4	2 513.2	2 241 080–2 280 870	5–3	6.13−02	3.48−03	1.44−01	−1.759	D+	1
128	$2p4p-2s6p$	^{1}D$-^{1}$P$^{\circ}$		661.86	2 241 080–2 392 170	5–3	1.58+00	6.22−03	6.78−02	−1.507	D+	1
129	$2p4p-2p5d$	^{3}D$-^{3}$D$^{\circ}$				15–15						1
				450.674	2 229 730–2 451 620	7–7	1.83+01	5.58−02	5.80−01	−0.408	C+	LS
130		^{3}P$-^{3}$D$^{\circ}$				9–15						1
				462.385	2 235 350–2 451 620	5–7	7.04+01	3.16−01	2.41+00	0.199	B	LS
131		^{1}D$-^{1}$F$^{\circ}$		468.494	2 241 080–2 454 530	5–7	8.23+01	3.79−01	2.92+00	0.278	B	1
132	$2p4d-2s5d$	^{3}P$^{\circ}-^{3}$D				9–15						1
			2 818.5	2 819.3	2 249 450–2 284 920	5–7	1.04−01	1.73−02	8.03−01	−1.063	C+	LS
			2 860.4	2 861.2	2 249 970–2 284 920	3–5	7.43−02	1.52−02	4.30−01	−1.341	C	LS
			2 818.5	2 819.3	2 249 450–2 284 920	5–5	2.59−02	3.09−03	1.43−01	−1.811	D+	LS
133		^{1}F$^{\circ}-^{1}$D	3 142.8	3 143.7	2 256 570–2 288 380	7–5	1.04−01	1.10−02	7.97−01	−1.114	C+	1
134		^{1}P$^{\circ}-^{1}$D	3 324.6	3 325.6	2 258 310–2 288 380	3–5	1.27−01	3.50−02	1.15+00	−0.979	C+	1
135	$2p4d-2s6d$	^{3}P$^{\circ}-^{3}$D				9–15						1
				685.68	2 249 450–2 395 290	5–7	4.43−01	4.37−03	4.93−02	−1.661	D	LS
				688.14	2 249 970–2 395 290	3–5	3.29−01	3.89−03	2.64−02	−1.933	D	LS
				685.68	2 249 450–2 395 290	5–5	1.11−01	7.80−04	8.80−03	−2.409	E+	LS
136		^{1}P$^{\circ}-^{1}$D		718.49	2 258 310–2 397 490	3–5	3.24−01	4.18−03	2.97−02	−1.902	D	1
137	$2p4d-2p5p$	^{3}D$^{\circ}-^{3}$P				15–9						1
				510.986	2 248 250–2 443 950	7–5	1.16+01	3.23−02	3.80−01	−0.646	C	LS
138		^{3}P$^{\circ}-^{3}$P				9–9						1
				514.139	2 249 450–2 443 950	5–5	2.98+00	1.18−02	9.99−02	−1.229	D+	LS
				515.517	2 249 970–2 443 950	3–5	9.85−01	6.54−03	3.33−02	−1.707	D	LS
139		^{1}F$^{\circ}-^{1}$D		526.371	2 256 570–2 446 550	7–5	1.57+01	4.66−02	5.65−01	−0.487	C+	1
140		^{1}P$^{\circ}-^{1}$D		531.237	2 258 310–2 446 550	3–5	4.50+00	3.17−02	1.66−01	−1.022	C	1
141	$2s5p-2s5d$	^{1}P$^{\circ}-^{1}$D	13 312	13 316	2 280 870–2 288 380	3–5	4.67−02	2.07−01	2.72+01	−0.207	A	1

Table 72. Transitions probabilities of allowed lines for Mg IX (reference for this table are as follows: 1=Tully *et al.*,[112] 2=Tachiev and Froese Fischer,[92] 3=Curtis *et al.*,[19] 4=Safronova *et al.*,[80] 5=Safronova *et al.*,[82] 6=Träbert *et al.*,[109] 7=Fritzsche and Grant,[30] 8=Johnson and Huang,[46] 9=Ralchenko and Vainshtein,[79] and 10=Fleming *et al.*[29])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
142	$2s5p-2s6d$	^{1}P$^\circ$–^{1}D		857.49	2 280 870–2 397 490	3–5	2.49+01	4.58−01	3.88+00	0.138	B	1
143	$2s5p-2p5p$	^{1}P$^\circ$–^{1}D		603.57	2 280 870–2 446 550	3–5	1.70+00	1.55−02	9.24−02	−1.333	D+	1
144	$2s5p-2s7d$	^{1}P$^\circ$–^{1}D		549.089	2 280 870–2 462 990	3–5	1.62+01	1.22−01	6.62−01	−0.437	D+	1
145	$2s5d-2s6p$	^{1}D–^{1}P$^\circ$		963.48	2 288 380–2 392 170	5–3	1.09+01	9.14−02	1.45+00	−0.340	B	1
146	$2s5d-2p5d$	^{3}D–^{3}D$^\circ$				15–15						1
				599.88	2 284 920–2 451 620	7–7	7.80+00	4.21−02	5.82−01	−0.531	C+	LS
				599.88	2 284 920–2 451 620	5–7	9.78−01	7.39−03	7.30−02	−1.432	D+	LS
147		^{1}D–^{1}F$^\circ$		601.87	2 288 380–2 454 530	5–7	2.17+00	1.65−02	1.63−01	−1.084	C	1
148	$2s6p-2s6d$	^{1}P$^\circ$–^{1}D	18 792	18 797	2 392 170–2 397 490	3–5	3.82−02	3.37−01	6.26+01	0.005	A	1
149	$2s6p-2p5p$	^{1}P$^\circ$–^{1}D		1 838.9	2 392 170–2 446 550	3–5	8.32−02	7.03−03	1.28−01	−1.676	D+	1
150	$2s6p-2s7d$	^{1}P$^\circ$–^{1}D		1 412.03	2 392 170–2 462 990	3–5	8.55+00	4.26−01	5.94+00	0.107	B	1
151	$2s6d-2p5d$	^{1}D–^{1}F$^\circ$		1 753.16	2 397 490–2 454 530	5–7	1.11+00	7.13−02	2.06+00	−0.448	B	1
152	$2s6d-2s7p$	^{1}D–^{1}P$^\circ$		1 580.78	2 397 490–2 460 750	5–3	4.33+00	9.74−02	2.53+00	−0.312	C	1
153	$2p5p-2p5d$	^{3}P–^{3}D$^\circ$				9–15						1
			13 034	13 038	2 443 950–2 451 620	5–7	3.95−02	1.41−01	3.03+01	−0.152	A	LS
154		^{1}D–^{1}F$^\circ$	12 528	12 531	2 446 550–2 454 530	5–7	5.61−02	1.85−01	3.82+01	−0.034	A	1
155	$2p5p-2s7p$	^{1}D–^{1}P$^\circ$	7 040	7 042	2 446 550–2 460 750	5–3	3.07−03	1.37−03	1.59−01	−2.164	D	1
156	$2p5d-2s7d$	^{1}F$^\circ$–^{1}D	11 817	11 820	2 454 530–2 462 990	7–5	1.14−02	1.71−02	4.66+00	−0.922	C+	1
157	$2s7p-2s7d$	^{1}P$^\circ$–^{1}D		2 240 cm^{-1}	2 460 750–2 462 990	3–5	5.14−03	2.56−01	1.13+02	−0.115	B+	1

[a] Wavelengths (Å) are always given unless cm^{-1} is indicated.

11.9.3. Forbidden Transitions for Mg IX

Tachiev and Froese Fischer[92] performed extensive MCHF calculations with Breit-Pauli corrections to order α^2 for the $2s2p$ upper levels. Kingston and Hibbert[51] used the CIV3 code to perform configuration interaction calculations with large basis sets in the Breit-Pauli approximation. Excellent agreement was found for the cases where both transitions were available.

To estimate accuracies, we pooled the relative standard deviation of the mean (RSDM) of each of the lines for which a transition rate is quoted by both of the references cited below, as discussed in the general introduction.

11.9.4. References for Forbidden Transitions for Mg IX

[51] A. E. Kingston and A. Hibbert, J. Phys. B **34**, 81 (2001).

[86] G. Tachiev and C. Froese Fischer, J. Phys. B **32**, 5805 (1999).

[92] G. Tachiev and C. Froese Fischer, http://www.vuse.vanderbilt.edu/~cff/mchf_collection/ (MCHF, *ab initio* downloaded on Mar. 28, 2002). See Tachiev and Froese Fischer (Ref. 86).

Table 73. Wavelength finding list for forbidden lines for Mg IX

Wavelength (vac) (Å)	Mult. No.	Wavelength (vac) (Å)	Mult. No.	Wavelength (vac) (Å)	Mult. No.	Wavelength (vac) (Å)	Mult. No.
246.853	3	383.129	7	448.294	6	768.90	5
270.761	2	437.013	6	694.01	1	783.72	5
272.362	2	439.176	6	749.55	10	1 024.14	9
281.261	8	443.404	6	754.87	13	1 047.43	9
377.935	7	443.973	6	762.29	5	1 057.83	14
379.551	7	445.981	6	767.44	13		

TABLE 73. Wavelength finding list for forbidden lines for Mg IX—Continued

Wavelength (air) (Å)	Mult. No.	Wavelength (air) (Å)	Mult. No.	Wavelength (air) (Å)	Mult. No.
2 547.4	12	2 634.9	12	2 794.8	12
Wavenumber (cm^{-1})	Mult. No.	Wavenumber (cm^{-1})	Mult. No.	Wavenumber (cm^{-1})	Mult. No.
3 587	4	2 460	4	1 303	11
3 474	11	2 171	11	1 127	4

TABLE 74. Transition probabilities of forbidden lines for Mg IX (reference for this table are as follows: 1 = Tachiev and Froese Fischer[92] and 2 = Kingston and Hibbert[51])

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	Type	A_{ki} (s^{-1})	S (a.u.)	Acc.	Source
1	$2s^2-2s2p$	$^1S-^3P^\circ$									
				694.01	0–144 091	1–5	M2	1.25−01	6.73+00	A+	1,2
2	$2s^2-2p^2$	$^1S-^3P$									
				270.761	0–369 330	1–5	E2	6.28+00	4.08−05	D+	2
				272.362	0–367 159	1–3	M1	4.04+00	9.08−06	D	2
3		$^1S-^1D$									
				246.853	0–405 100	1–5	E2	3.93+03	1.61−02	B+	2
4	$2s2p-2s2p$	$^3P^\circ-^3P^\circ$									
				2 460 cm^{-1}	141 631–144 091	3–5	M1	2.01−01	2.51+00	A+	1,2
				2 460 cm^{-1}	141 631–144 091	3–5	E2	1.85−07	9.17−02	A	1,2
				1 127 cm^{-1}	140 504–141 631	1–3	M1	2.57−02	2.00+00	A+	1,2
				3 587 cm^{-1}	140 504–144 091	1–5	E2	5.40−07	4.06−02	A	1,2
5		$^3P^\circ-^1P^\circ$									
				768.90	141 631–271 687	3–3	M1	5.52+00	2.79−04	C+	1,2
				768.90	141 631–271 687	3–3	E2	5.58−02	4.01−05	C	1,2
				783.72	144 091–271 687	5–3	M1	8.70+00	4.66−04	C+	1,2
				783.72	144 091–271 687	5–3	E2	2.40−02	1.90−05	C	1,2
				762.29	140 504–271 687	1–3	M1	7.56+00	3.73−04	C+	1,2
6	$2s2p-2p^2$	$^3P^\circ-^3P$									
				443.973	144 091–369 330	5–5	M2	9.69−01	5.61+00	A	2
				443.404	141 631–367 159	3–3	M2	7.99−01	2.76+00	A	2
				448.294	144 091–367 159	5–3	M2	2.26−04	8.23−04	D+	2
				445.981	141 631–365 856	3–1	M2	7.13−01	8.44−01	A	2
				439.176	141 631–369 330	3–5	M2	1.89−03	1.04−02	C+	2
				437.013	140 504–369 330	1–5	M2	1.97−01	1.05+00	A	2
7		$^3P^\circ-^1D$									
				377.935	140 504–405 100	1–5	M2	7.35−01	1.90+00	A	2
				379.551	141 631–405 100	3–5	M2	1.73+00	4.57+00	A	2
				383.129	144 091–405 100	5–5	M2	1.45+00	4.01+00	A	2
8		$^3P^\circ-^1S$									
				281.261	144 091–499 633	5–1	M2	5.64+00	6.66−01	A	2
9		$^1P^\circ-^3P$									
				1 047.43	271 687–367 159	3–3	M2	5.63−03	1.43+00	A	2
				1 024.14	271 687–369 330	3–5	M2	1.17−02	4.42+00	A	2
10		$^1P^\circ-^1D$									
				749.55	271 687–405 100	3–5	M2	9.39−04	7.45−02	B	2
11	$2p^2-2p^2$	$^3P-^3P$									
				2 171 cm^{-1}	367 159–369 330	3–5	M1	1.38−01	2.50+00	A+	2
				2 171 cm^{-1}	367 159–369 330	3–5	E2	9.28−08	8.59−02	B+	2

TABLE 74. Transition probabilities of forbidden lines for Mg IX (reference for this table are as follows: 1 = Tachiev and Froese Fischer[92] and 2 = Kingston and Hibbert[51])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	Type	A_{ki} (s^{-1})	S (a.u.)	Acc.	Source
				1 303 cm^{-1}	365 856–367 159	1–3	M1	4.07−02	2.05+00	A+	2
				3 474 cm^{-1}	365 856–369 330	1–5	E2	4.40−07	3.88−02	B+	2
12		^{3}P − ^{1}D									
			2 547.4	2 548.2	365 856–405 100	1–5	E2	9.62−07	4.61−07	E+	2
			2 634.9	2 635.7	367 159–405 100	3–5	M1	1.76+00	5.97−03	B	2
			2 634.9	2 635.7	367 159–405 100	3–5	E2	3.74−04	2.12−04	C	2
			2 794.8	2 795.6	369 330–405 100	5–5	M1	4.42+00	1.79−02	B+	2
			2 794.8	2 795.6	369 330–405 100	5–5	E2	1.94−03	1.48−03	C+	2
13		^{3}P − ^{1}S									
				767.44	369 330–499 633	5–1	E2	7.16−01	1.70−04	C	2
				754.87	367 159–499 633	3–1	M1	7.93+01	1.26−03	C+	2
14		^{1}D − ^{1}S									
				1 057.83	405 100–499 633	5–1	E2	1.21+02	1.43−01	A	2

[a] Wavelengths (Å) are always given unless cm^{-1} is indicated.

11.10. Mg X

Lithium isoelectronic sequence
Ground state: $1s^2 2s\ {}^2S_{1/2}$
Ionization energy: 367.497 eV = 2 964 060 cm^{-1}

11.10.1. Allowed Transitions for Mg X

In general, different sources for computed transition rates for this Li-like spectrum agree very well, including the results of the OP.[75] Most of the compiled data below have been taken from this source. The high-quality data (based on extensive comparisons) from the other references were available primarily for transitions involving lower-lying levels. Tachiev and Froese Fischer[102] performed extensive MCHF calculations with Breit-Pauli corrections to order α^2. In this same source, these authors also computed multiconfiguration Dirac-Hartree-Fock calculations. Comparisons between the Hartree-Fock and Dirac-Fock calculations indicate that the perturbative treatment of relativistic effects is still valid at this level of ionization, at least for this spectrum. Yan *et al.*[127] used a relativistic fully correlated Hylleraas-type variational method; these state-of-the-art calculations provide uniquely high accuracy. Zhang *et al.*[129] performed relativistic distorted-wave calculations.

To estimate accuracies, we pooled the relative standard deviation of the mean (RSDM) of each of the lines for which a transition rate is quoted by two or more references,[75,102,127,129] as discussed in the general introduction.

A NIST compilation of far-UV lines of Mg X was published recently.[78] The estimated accuracies are different in some cases because a different method of evaluation was used.

11.10.2. References for Allowed Transitions for Mg X

[75] G. Peach, H. E. Saraph, and M. J. Seaton, J. Phys. B **21**, 3669 (1988). http://legacy.gsfc.nasa.gov/topbase, downloaded on July 28, 1995 (Opacity Project).

[78] L. I. Podobedova, D. E. Kelleher, J. Reader, and W. L. Wiese, J. Phys. Chem. Ref. Data **33**, 495 (2004).

[102] G. Tachiev and C. Froese Fischer, http://www.vuse.vanderbilt.edu/~cff/mchf_collection/ (MCHF, *ab initio*, downloaded on July 22, 2004).

[127] Z.-C. Yan, M. Tambasco, and G. W. F. Drake, Phys. Rev. A **57**, 1652 (1998).

[129] H. L. Zhang, D. H. Sampson, and C. J. Fontes, At. Data Nucl. Data Tables **44**, 31 (1990).

TABLE 75. Wavelength finding list for allowed lines for Mg X

Wavelength (vac) (Å)	Mult. No.
35.366	8
35.827	7
36.518	6
37.644	5
38.766	16
38.826	16
39.668	4
40.019	15
40.083	15
42.294	14
42.362	14
42.366	14
42.525	13
42.597	13
44.050	3
47.229	12
47.310	12
47.317	12
47.788	11
47.879	11

TABLE 75. Wavelength finding list for allowed lines for Mg X—Continued

Wavelength (vac) (Å)	Mult. No.
57.876	2
57.920	2
63.152	10
63.295	10
63.311	10
65.673	9
65.845	9
87.344	23
90.212	22
92.242	36
92.276	36
94.724	21
95.447	35
95.483	35
98.709	30
98.837	30
100.513	34
100.552	34
102.690	20
107.264	29
107.415	29
109.529	33
109.576	33
119.303	19
125.332	28
125.507	28
125.538	28
127.376	27
127.588	27
128.634	32
128.698	32
170.227	18
173.913	42
181.534	26
181.745	52
181.851	52
181.861	26
181.967	26
185.667	41
189.879	31
190.020	31
190.085	25
190.560	25
194.621	51
194.742	51
205.846	40
213.015	47
216.910	50
217.061	50
247.586	39
257.301	46
263.769	49
263.992	49
316.456	57
329.815	64
330.033	64
357.654	56
372.717	38
374.813	63
375.094	63
393.005	45
393.314	45
410.644	48
411.184	48
414.164	44
440.917	55
457.247	60
467.290	62
467.727	62
592.42	69
609.79	1
624.94	1
690.13	54
725.16	59
755.29	68
757.00	61
758.15	61
1 136.36	72
1 203.37	66
1 256.28	67
1 938.0	71

Wavelength (air) (Å)	Mult. No.
2 215.1	17
2 281.4	17
5 696	37
5 888	24
6 225	24
6 380	24
10 750	53
13 241	43
13 827	43

Wavenumber (cm^{-1})	Mult. No.
3 700	58
3 500	58
2 300	65
1 200	70

TABLE 76. Transition probabilities of allowed lines for Mg X (references for this table are as follows: 1=Peach *et al.*,[75] 2=Tachiev and Froese Fischer,[102] 3=Yan *et al.*,[127] 4=Zhang *et al.*[129])

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
1	$2s-2p$	$^2\mathrm{S}-{}^2\mathrm{P}^\circ$		*614.8*	0–*162 665*	2–6	7.32+00	1.24−01	5.04−01	−0.606	AA	3
				609.79	0–163 990	2–4	7.51+00	8.38−02	3.36−01	−0.776	AA	3
				624.94	0–160 015	2–2	6.95+00	4.07−02	1.67−01	−1.089	AA	3
2	$2s-3p$	$^2\mathrm{S}-{}^2\mathrm{P}^\circ$		*57.89*	0–*1 727 393*	2–6	2.16+03	3.26−01	1.24−01	−0.186	A+	2,4
				57.876	0–1 727 830	2–4	2.16+03	2.16−01	8.25−02	−0.365	A+	2,4
				57.920	0–1 726 520	2–2	2.17+03	1.09−01	4.16−02	−0.662	A+	2,4
3	$2s-4p$	$^2\mathrm{S}-{}^2\mathrm{P}^\circ$		*44.05*	0–*2 270 150*	2–6	9.90+02	8.64−02	2.51−02	−0.762	B+	4
				44.050	0–2 270 150	2–4	9.88+02	5.75−02	1.67−02	−0.939	B+	4
				44.050	0–2 270 150	2–2	9.93+02	2.89−02	8.38−03	−1.238	B+	4
4	$2s-5p$	$^2\mathrm{S}-{}^2\mathrm{P}^\circ$		*39.67*	0–*2 520 900*	2–6	5.16+02	3.65−02	9.53−03	−1.137	B+	4
				39.668	0–2 520 900	2–4	5.15+02	2.43−02	6.35−03	−1.313	B+	4
				39.668	0–2 520 900	2–2	5.17+02	1.22−02	3.19−03	−1.613	B	4
5	$2s-6p$	$^2\mathrm{S}-{}^2\mathrm{P}^\circ$		*37.64*	0–*2 656 500*	2–6	2.97+02	1.89−02	4.68−03	−1.423	B+	1
				37.644	0–2 656 500	2–4	2.97+02	1.26−02	3.12−03	−1.599	B+	LS
				37.644	0–2 656 500	2–2	2.97+02	6.30−03	1.56−03	−1.900	B+	LS
6	$2s-7p$	$^2\mathrm{S}-{}^2\mathrm{P}^\circ$		*36.52*	0–*2 738 400*	2–6	1.87+02	1.12−02	2.70−03	−1.650	C+	1
				36.518	0–2 738 400	2–4	1.87+02	7.48−03	1.80−03	−1.825	C+	LS
				36.518	0–2 738 400	2–2	1.87+02	3.74−03	8.99−04	−2.126	C+	LS
7	$2s-8p$	$^2\mathrm{S}-{}^2\mathrm{P}^\circ$		*35.83*	0–*2 791 200*	2–6	1.26+02	7.26−03	1.71−03	−1.838	C+	1
				35.827	0–2 791 200	2–4	1.26+02	4.84−03	1.14−03	−2.014	C+	LS
				35.827	0–2 791 200	2–2	1.26+02	2.42−03	5.71−04	−2.315	C+	LS
8	$2s-9p$	$^2\mathrm{S}-{}^2\mathrm{P}^\circ$		*35.37*	0–*2 827 600*	2–6	8.82+01	4.96−03	1.15−03	−2.003	C	1
				35.366	0–2 827 600	2–4	8.83+01	3.31−03	7.71−04	−2.179	C	LS
				35.366	0–2 827 600	2–2	8.80+01	1.65−03	3.84−04	−2.481	C	LS
9	$2p-3s$	$^2\mathrm{P}^\circ-{}^2\mathrm{S}$		*65.79*	*162 665*–1 682 700	6–2	1.02+03	2.21−02	2.87−02	−0.877	A	2,4
				65.845	163 990–1 682 700	4–2	6.81+02	2.21−02	1.92−02	−1.054	A	2,4
				65.673	160 015–1 682 700	2–2	3.39+02	2.19−02	9.49−03	−1.359	A	2,4
10	$2p-3d$	$^2\mathrm{P}^\circ-{}^2\mathrm{D}$		*63.25*	*162 665–1 743 734*	6–10	6.56+03	6.55−01	8.19−01	0.594	A	2,4
				63.295	163 990–1 743 890	4–6	6.55+03	5.90−01	4.92−01	0.373	A	2,4
				63.152	160 015–1 743 500	2–4	5.48+03	6.55−01	2.72−01	0.117	A	2,4
				63.311	163 990–1 743 500	4–4	1.09+03	6.56−02	5.47−02	−0.581	A	2,4
11	$2p-4s$	$^2\mathrm{P}^\circ-{}^2\mathrm{S}$		*47.85*	*162 665*–2 252 600	6–2	4.01+02	4.59−03	4.33−03	−1.560	B+	2,4
				47.879	163 990–2 252 600	4–2	2.67+02	4.59−03	2.89−03	−1.736	B+	2,4
				47.788	160 015–2 252 600	2–2	1.34+02	4.58−03	1.44−03	−2.038	B+	2,4
12	$2p-4d$	$^2\mathrm{P}^\circ-{}^2\mathrm{D}$		*47.28*	*162 665–2 277 572*	6–10	2.21+03	1.24−01	1.16−01	−0.128	A	4
				47.310	163 990–2 277 700	4–6	2.21+03	1.11−01	6.94−02	−0.353	A	4
				47.229	160 015–2 277 380	2–4	1.85+03	1.24−01	3.84−02	−0.606	A	4
				47.317	163 990–2 277 380	4–4	3.66+02	1.23−02	7.66−03	−1.308	B+	4
13	$2p-5s$	$^2\mathrm{P}^\circ-{}^2\mathrm{S}$		*42.57*	*162 665*–2 511 600	6–2	1.95+02	1.77−03	1.49−03	−1.974	B	4
				42.597	163 990–2 511 600	4–2	1.32+02	1.80−03	1.01−03	−2.143	B	4

TABLE 76. Transition probabilities of allowed lines for Mg X (references for this table are as follows: 1=Peach *et al.*,[75] 2=Tachiev and Froese Fischer,[102] 3=Yan *et al.*,[127] 4=Zhang *et al.*[129])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log *gf*	Acc.	Source
				42.525	160 015–2 511 600	2–2	6.27+01	1.70−03	4.76−04	−2.469	B	4
14	2*p*−5*d*	^{2}P°−^{2}D		*42.34*	*162 665–2 524 520*	6–10	1.03+03	4.62−02	3.86−02	−0.557	B+	4
				42.362	163 990–2 524 600	4–6	1.03+03	4.16−02	2.32−02	−0.779	B+	4
				42.294	160 015–2 524 400	2–4	8.61+02	4.62−02	1.29−02	−1.034	B+	4
				42.366	163 990–2 524 400	4–4	1.71+02	4.60−03	2.57−03	−1.735	B+	4
15	2*p*−6*d*	^{2}P°−^{2}D		*40.06*	*162 665–2 658 800*	6–10	5.54+02	2.22−02	1.76−02	−0.875	B+	1
				40.083	163 990–2 658 800	4–6	5.54+02	2.00−02	1.06−02	−1.097	B+	LS
				40.019	160 015–2 658 800	2–4	4.62+02	2.22−02	5.85−03	−1.353	B+	LS
				40.083	163 990–2 658 800	4–4	9.22+01	2.22−03	1.17−03	−2.052	B	LS
16	2*p*−7*d*	^{2}P°−^{2}D		*38.81*	*162 665–2 739 600*	6–10	3.37+02	1.27−02	9.72−03	−1.118	B	1
				38.826	163 990–2 739 600	4–6	3.36+02	1.14−02	5.83−03	−1.341	B	LS
				38.766	160 015–2 739 600	2–4	2.82+02	1.27−02	3.24−03	−1.595	B	LS
				38.826	163 990–2 739 600	4–4	5.62+01	1.27−03	6.49−04	−2.294	C+	LS
17	3*s*−3*p*	^{2}S−^{2}P°	*2 237*	*2 237*	1 682 700–*1 727 393*	2–6	9.39−01	2.11−01	3.11+00	−0.375	A	2
			2 215.1	2 215.8	1 682 700–1 727 830	2–4	9.67−01	1.42−01	2.08+00	−0.547	A	2
			2 281.4	2 282.1	1 682 700–1 726 520	2–2	8.85−01	6.91−02	1.04+00	−0.859	A	2
18	3*s*−4*p*	^{2}S−^{2}P°		*170.23*	1 682 700–*2 270 150*	2–6	2.69+02	3.50−01	3.92−01	−0.155	A	1
				170.227	1 682 700–2 270 150	2–4	2.68+02	2.33−01	2.61−01	−0.332	A	LS
				170.227	1 682 700–2 270 150	2–2	2.69+02	1.17−01	1.31−01	−0.631	A	LS
19	3*s*−5*p*	^{2}S−^{2}P°		*119.30*	1 682 700–*2 520 900*	2–6	1.52+02	9.72−02	7.64−02	−0.711	A	1
				119.303	1 682 700–2 520 900	2–4	1.52+02	6.48−02	5.09−02	−0.887	A	LS
				119.303	1 682 700–2 520 900	2–2	1.52+02	3.24−02	2.55−02	−1.188	B+	LS
20	3*s*−6*p*	^{2}S−^{2}P°		*102.69*	1 682 700–*2 656 500*	2–6	9.02+01	4.28−02	2.89−02	−1.068	B+	1
				102.690	1 682 700–2 656 500	2–4	9.01+01	2.85−02	1.93−02	−1.244	B+	LS
				102.690	1 682 700–2 656 500	2–2	9.05+01	1.43−02	9.67−03	−1.544	B+	LS
21	3*s*−7*p*	^{2}S−^{2}P°		*94.72*	1 682 700–*2 738 400*	2–6	5.76+01	2.32−02	1.45−02	−1.333	B	1
				94.724	1 682 700–2 738 400	2–4	5.76+01	1.55−02	9.67−03	−1.509	B	LS
				94.724	1 682 700–2 738 400	2–2	5.76+01	7.75−03	4.83−03	−1.810	B	LS
22	3*s*−8*p*	^{2}S−^{2}P°		*90.21*	1 682 700–*2 791 200*	2–6	3.87+01	1.42−02	8.42−03	−1.547	B	1
				90.212	1 682 700–2 791 200	2–4	3.87+01	9.45−03	5.61−03	−1.724	B	LS
				90.212	1 682 700–2 791 200	2–2	3.87+01	4.72−03	2.80−03	−2.025	C+	LS
23	3*s*−9*p*	^{2}S−^{2}P°		*87.34*	1 682 700–*2 827 600*	2–6	2.73+01	9.36−03	5.38−03	−1.728	C	1
				87.344	1 682 700–2 827 600	2–4	2.73+01	6.24−03	3.59−03	−1.904	C+	LS
				87.344	1 682 700–2 827 600	2–2	2.73+01	3.12−03	1.79−03	−2.205	C	LS
24	3*p*−3*d*	^{2}P°−^{2}D	*6 120*	*6 120*	*1 727 393–1 743 734*	6–10	3.59−02	3.37−02	4.08+00	−0.694	A	2
			6 225	6 227	1 727 830–1 743 890	4–6	3.43−02	2.99−02	2.45+00	−0.922	A	2
			5 888	5 889	1 726 520–1 743 500	2–4	3.38−02	3.51−02	1.36+00	−1.154	A	2
			6 380	6 382	1 727 830–1 743 500	4–4	5.31−03	3.24−03	2.72−01	−1.887	A	2
25	3*p*−4*s*	^{2}P°−^{2}S		*190.40*	*1 727 393*–2 252 600	6–2	2.83+02	5.13−02	1.93−01	−0.512	A	2
				190.560	1 727 830–2 252 600	4–2	1.88+02	5.12−02	1.29−01	−0.689	A	2
				190.085	1 726 520–2 252 600	2–2	9.47+01	5.13−02	6.42−02	−0.989	A	2

TABLE 76. Transition probabilities of allowed lines for Mg X (references for this table are as follows: 1=Peach *et al.*,[75] 2=Tachiev and Froese Fischer,[102] 3=Yan *et al.*,[127] 4=Zhang *et al.*[129])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log *gf*	Acc.	Source
26	$3p-4d$	$^2P^\circ-^2D$		*181.76*	*1 727 393–2 277 572*	6–10	6.97+02	5.76−01	2.07+00	0.539	A	1
				181.861	1 727 830–2 277 700	4–6	6.96+02	5.18−01	1.24+00	0.316	A	LS
				181.534	1 726 520–2 2 77 380	2–4	5.83+02	5.76−01	6.88−01	0.061	A	LS
				181.967	1 727 830–2 277 380	4–4	1.16+02	5.75−02	1.38−01	−0.638	A	LS
27	$3p-5s$	$^2P^\circ-^2S$		*127.52*	*1 727 393*–2 511 600	6–2	1.32+02	1.07−02	2.70−02	−1.192	B+	1
				127.588	1 727 830–2 511 600	4–2	8.77+01	1.07−02	1.80−02	−1.369	B+	LS
				127.376	1 726 520–2 511 600	2–2	4.44+01	1.08−02	9.06−03	−1.666	B+	LS
28	$3p-5d$	$^2P^\circ-^2D$		*125.45*	*1 727 393–2 524 520*	6–10	3.45+02	1.36−01	3.36−01	−0.088	A	1
				125.507	1 727 830–2 524 600	4–6	3.44+02	1.22−01	2.02−01	−0.312	A	LS
				125.332	1 726 520–2 524 400	2–4	2.89+02	1.36−01	1.12−01	−0.565	A	LS
				125.538	1 727 830–2 524 400	4–4	5.76+01	1.36−02	2.25−02	−1.264	B+	LS
29	$3p-6d$	$^2P^\circ-^2D$		*107.36*	*1 727 393–2 658 800*	6–10	1.93+02	5.56−02	1.18−01	−0.477	A	1
				107.415	1 727 830–2 658 800	4–6	1.93+02	5.00−02	7.07−02	−0.699	A	LS
				107.264	1 726 520–2 658 800	2–4	1.61+02	5.56−02	3.93−02	−0.954	A	LS
				107.415	1 727 830–2 658 800	4–4	3.21+01	5.55−03	7.85−03	−1.654	B+	LS
30	$3p-7d$	$^2P^\circ-^2D$		*98.79*	*1 727 393–2 739 600*	6–10	1.19+02	2.90−02	5.66−02	−0.759	B	1
				98.837	1 727 830–2 739 600	4–6	1.19+02	2.61−02	3.40−02	−0.981	B+	LS
				98.709	1 726 520–2 739 600	2–4	9.93+01	2.90−02	1.88−02	−1.237	B	LS
				98.837	1 727 830–2 739 600	4–4	1.98+01	2.90−03	3.77−03	−1.936	B	LS
31	$3d-4p$	$^2D-^2P^\circ$		*189.96*	*1 743 734–2 270 150*	10–6	4.25+01	1.38−02	8.63−02	−0.860	A	1
				190.020	1 743 890–2 270 150	6–4	3.82+01	1.38−02	5.18−02	−1.082	A	LS
				189.879	1 743 500–2 270 150	4–2	4.26+01	1.15−02	2.88−02	−1.337	A	LS
				189.879	1 743 500–2 270 150	4–4	4.26+00	2.30−03	5.75−03	−2.036	B+	LS
32	$3d-5p$	$^2D-^2P^\circ$		*128.67*	*1 743 734–2 520 900*	10–6	1.83+01	2.72−03	1.15−02	−1.565	B+	1
				128.698	1 743 890–2 520 900	6–4	1.64+01	2.72−03	6.91−03	−1.787	B+	LS
				128.634	1 743 500–2 520 900	4–2	1.83+01	2.27−03	3.85−03	−2.042	B+	LS
				128.634	1 743 500–2 520 900	4–4	1.83+00	4.53−04	7.67−04	−2.742	B	LS
33	$3d-6p$	$^2D-^2P^\circ$		*109.56*	*1 743 734–2 656 500*	10–6	9.54+00	1.03−03	3.71−03	−1.987	B+	1
				109.576	1 743 890–2 656 500	6–4	8.58+00	1.03−03	2.23−03	−2.209	B+	LS
				109.529	1 743 500–2 656 500	4–2	9.54+00	8.58−04	1.24−03	−2.464	B	LS
				109.529	1 743 500–2 656 500	4–4	9.56−01	1.72−04	2.48−04	−3.162	B	LS
34	$3d-7p$	$^2D-^2P^\circ$		*100.54*	*1 743 734–2 738 400*	10–6	5.66+00	5.15−04	1.70−03	−2.288	C+	1
				100.552	1 743 890–2 738 400	6–4	5.10+00	5.15−04	1.02−03	−2.510	C+	LS
				100.513	1 743 500–2 738 400	4–2	5.66+00	4.29−04	5.68−04	−2.765	C+	LS
				100.513	1 743 500–2 738 400	4–4	5.66−01	8.58−05	1.14−04	−3.464	C	LS
35	$3d-8p$	$^2D-^2P^\circ$		*95.47*	*1 743 734–2 791 200*	10–6	3.65+00	2.99−04	9.39−04	−2.524	C	1
				95.483	1 743 890–2 791 200	6–4	3.28+00	2.99−04	5.64−04	−2.746	C+	LS
				95.447	1 743 500–2 791 200	4–2	3.65+00	2.49−04	3.13−04	−3.002	C	LS
				95.447	1 743 500–2 791 200	4–4	3.65−01	4.98−05	6.26−05	−3.701	C	LS
36	$3d-9p$	$^2D-^2P^\circ$		*92.26*	*1 743 734–2 827 600*	10–6	2.49+00	1.91−04	5.80−04	−2.719	D+	1
				92.276	1 743 890–2 827 600	6–4	2.24+00	1.91−04	3.48−04	−2.941	C	LS
				92.242	1 743 500–2 827 600	4–2	2.49+00	1.59−04	1.93−04	−3.197	D+	LS
				92.242	1 743 500–2 827 600	4–4	2.49−01	3.18−05	3.86−05	−3.896	D	LS

TABLE 76. Transition probabilities of allowed lines for Mg X (references for this table are as follows: 1=Peach *et al.*,[75] 2=Tachiev and Froese Fischer,[102] 3=Yan *et al.*,[127] 4=Zhang *et al.*[129])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^{a}	$E_i - E_k$ (cm^{-1})	$g_i - g_k$	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
37	4*s*–4*p*	^{2}S–^{2}P°	*5 700*	*5 698*	2 252 600–*2 270 150*	2–6	1.91−01	2.79−01	1.05+01	−0.253	A+	1
			5 696	5 698	2 252 600–2 270 150	2–4	1.91−01	1.86−01	6.98+00	−0.429	A+	LS
			5 696	5 698	2 252 600–2 270 150	2–2	1.91−01	9.31−02	3.49+00	−0.730	A+	LS
38	4*s*–5*p*	^{2}S–^{2}P°		*372.72*	2 252 600–*2 520 900*	2–6	6.15+01	3.84−01	9.42−01	−0.115	A	1
				372.717	2 252 600–2 520 900	2–4	6.15+01	2.56−01	6.28−01	−0.291	A	LS
				372.717	2 252 600–2 520 900	2–2	6.15+01	1.28−01	3.14−01	−0.592	A	LS
39	4*s*–6*p*	^{2}S–^{2}P°		*247.59*	*2 252 600–2 656 500*	2–6	3.94+01	1.09−01	1.77−01	−0.662	A	1
				247.586	2 252 600–2 656 500	2–4	3.94+01	7.24−02	1.18−01	−0.839	A	LS
				247.586	2 252 600–2 656 500	2–2	3.94+01	3.62−02	5.90−02	−1.140	A	LS
40	4*s*–7*p*	^{2}S–^{2}P°		*205.85*	2 252 600–*2 738 400*	2–6	2.56+01	4.87−02	6.60−02	−1.011	B+	1
				205.846	2 252 600–2 738 400	2–4	2.56+01	3.25−02	4.40−02	−1.187	B+	LS
				205.846	2 252 600–2 738 400	2–2	2.55+01	1.62−02	2.20−02	−1.489	B	LS
41	4*s*–8*p*	^{2}S–^{2}P°		*185.67*	2 252 600–*2 791 200*	2–6	1.73+01	2.69−02	3.28−02	−1.269	B	1
				185.667	2 252 600–2 791 200	2–4	1.73+01	1.79−02	2.19−02	−1.446	B	LS
				185.667	2 252 600–2 791 200	2–2	1.73+01	8.96−03	1.10−02	−1.747	B	LS
42	4*s*–9*p*	^{2}S–^{2}P°		*173.91*	2 252 600–*2 827 600*	2–6	1.22+01	1.67−02	1.91−02	−1.476	C+	1
				173.913	2 252 600–2 827 600	2–4	1.22+01	1.11−02	1.27−02	−1.654	C+	LS
				173.913	2 252 600–2 827 600	2–2	1.23+01	5.56−03	6.37−03	−1.954	C+	LS
43	4*p*–4*d*	^{2}P°–^{2}D	*13 470*	*13 473*	*2 270 150–2 277 572*	6–10	1.39−02	6.45−02	1.73+01	−0.412	A+	1
			13 241	13 245	2 270 150–2 277 700	4–6	1.51−02	5.96−02	1.04+01	−0.623	A+	LS
			13 827	13 831	2 270 150–2 277 380	2–4	1.11−02	6.35−02	5.78+00	−0.896	A+	LS
			13 827	13 831	2 270 150–2 277 380	4–4	2.21−03	6.35−03	1.16+00	−1.595	A	LS
44	4*p*–5*s*	^{2}P°–^{2}S		*414.16*	*2 270 150*–2 511 600	6–2	9.44+01	8.09−02	6.62−01	−0.314	A	1
				414.164	2 270 150–2 511 600	4–2	6.29+01	8.09−02	4.41−01	−0.490	A	LS
				414.164	2 270 150–2 511 600	2–2	3.15+01	8.09−02	2.21−01	−0.791	A	LS
45	4*p*–5*d*	^{2}P°–^{2}D		*393.13*	*2 270 150–2 524 520*	6–10	1.45+02	5.60−01	4.35+00	0.526	A	1
				393.005	2 270 150–2 524 600	4–6	1.45+02	5.04−01	2.61+00	0.304	A+	LS
				393.314	*2 270 150–2 524 400*	2–4	1.21+02	5.60−01	1.45+00	0.049	A	LS
				393.314	2 270 150–2 524 400	4–4	2.41+01	5.60−02	2.90−01	−0.650	A	LS
46	4*p*–6*d*	^{2}P°–^{2}D		*257.30*	*2 270 150–2 658 800*	6–10	8.59+01	1.42−01	7.22−01	−0.070	A	1
				257.301	2 270 150–2 658 800	4–6	8.60+01	1.28−01	4.34−01	−0.291	A	LS
				257.301	2 270 150–2 658 800	2–4	7.15+01	1.42−01	2.41−01	−0.547	A	LS
				257.301	2 270 150–2 658 800	4–4	1.43+01	1.42−02	4.81−02	−1.246	A	LS
47	4*p*–7*d*	^{2}P°–^{2}D		*213.02*	*2 270 150–2 739 600*	6–10	5.37+01	6.09−02	2.56−01	−0.437	B+	1
				213.015	2 270 150–2 739 600	4–6	5.37+01	5.48−02	1.54−01	−0.659	B+	LS
				213.015	2 270 150–2 739 600	2–4	4.48+01	6.09−02	8.54−02	−0.914	B+	LS
				213.015	2 270 150–2 739 600	4–4	8.95+00	6.09−03	1.71−02	−1.613	B	LS
48	4*d*–5*p*	^{2}D–^{2}P°		*410.97*	*2 277 572–2 520 900*	10–6	2.25+01	3.41−02	4.62−01	−0.467	A	1
				411.184	2 277 700–2 520 900	6–4	2.02+01	3.41−02	2.77−01	−0.689	A	LS
				410.644	2 277 380–2 520 900	4–2	2.25+01	2.85−02	1.54−01	−0.943	A	LS
				410.644	2 277 380–2 520 900	4–4	2.25+00	5.69−03	3.08−02	−1.643	A	LS

TABLE 76. Transition probabilities of allowed lines for Mg X (references for this table are as follows: 1=Peach *et al.*,[75] 2=Tachiev and Froese Fischer,[102] 3=Yan *et al.*,[127] 4=Zhang *et al.*[129])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
49	$4d-6p$	$^{2}\mathrm{D}-{}^{2}\mathrm{P}^{\circ}$		*263.90*	*2 277 572–2 656 500*	10–6	1.12+01	7.01−03	6.09−02	−1.154	B+	1
				263.992	2 277 700–2 656 500	6–4	1.00+01	7.00−03	3.65−02	−1.377	A	LS
				263.769	2 277 380–2 656 500	4–2	1.12+01	5.84−03	2.03−02	−1.632	B+	LS
				263.769	2 277 380–2 656 500	4–4	1.12+00	1.17−03	4.06−03	−2.330	B+	LS
50	$4d-7p$	$^{2}\mathrm{D}-{}^{2}\mathrm{P}^{\circ}$		*217.00*	*2 277 572–2 738 400*	10–6	6.40+00	2.71−03	1.94−02	−1.567	B	1
				217.061	2 277 700–2 738 400	6–4	5.75+00	2.71−03	1.16−02	−1.789	B	LS
				216.910	2 277 380–2 738 400	4–2	6.41+00	2.26−03	6.46−03	−2.044	B	LS
				216.910	2 277 380–2 738 400	4–4	6.41−01	4.52−04	1.29−03	−2.743	C+	LS
51	$4d-8p$	$^{2}\mathrm{D}-{}^{2}\mathrm{P}^{\circ}$		*194.69*	*2 277 572–2 791 200*	10–6	4.05+00	1.38−03	8.85−03	−1.860	B	1
				194.742	2 277 700–2 791 200	6–4	3.64+00	1.38−03	5.31−03	−2.082	B	LS
				194.621	2 277 380–2 791 200	4–2	4.05+00	1.15−03	2.95−03	−2.337	C+	LS
				194.621	2 277 380–2 791 200	4–4	4.05−01	2.30−04	5.89−04	−3.036	C+	LS
52	$4d-9p$	$^{2}\mathrm{D}-{}^{2}\mathrm{P}^{\circ}$		*181.81*	*2 277 572–2 827 600*	10–6	2.72+00	8.09−04	4.84−03	−2.092	C	1
				181.851	2 277 700–2 827 600	6–4	2.45+00	8.09−04	2.91−03	−2.314	C	LS
				181.745	2 277 380–2 827 600	4–2	2.72+00	6.74−04	1.61−03	−2.569	C	LS
				181.745	2 277 380–2 827 600	4–4	2.73−01	1.35−04	3.23−04	−3.268	C	LS
53	$5s-5p$	$^{2}\mathrm{S}-{}^{2}\mathrm{P}^{\circ}$	*10 750*	*10 753*	2 511 600–*2 520 900*	2–6	7.15−02	3.72−01	2.63+01	−0.128	A+	1
			10 750	10 753	2 511 600–2 520 900	2–4	7.15−02	2.48−01	1.76+01	−0.305	A+	LS
			10 750	10 753	2 511 600–2 520 900	2–2	7.15−02	1.24−01	8.78+00	−0.606	A+	LS
54	$5s-6p$	$^{2}\mathrm{S}-{}^{2}\mathrm{P}^{\circ}$		*690.1*	2 511 600–*2 656 500*	2–6	1.98+01	4.24−01	1.93+00	−0.072	A	1
				690.13	2 511 600–2 656 500	2–4	1.98+01	2.83−01	1.29+00	−0.247	A	LS
				690.13	2 511 600–2 656 500	2–2	1.97+01	1.41−01	6.41−01	−0.550	A	LS
55	$5s-7p$	$^{2}\mathrm{S}-{}^{2}\mathrm{P}^{\circ}$		*440.92*	2 511 600–*2 738 400*	2–6	1.38+01	1.20−01	3.49−01	−0.620	B+	1
				440.917	2 511 600–2 738 400	2–4	1.38+01	8.02−02	2.33−01	−0.795	B+	LS
				440.917	2 511 600–2 738 400	2–2	1.38+01	4.01−02	1.16−01	−1.096	B+	LS
56	$5s-8p$	$^{2}\mathrm{S}-{}^{2}\mathrm{P}^{\circ}$		*357.65*	2 511 600–*2 791 200*	2–6	9.40+00	5.41−02	1.27−01	−0.966	B+	1
				357.654	2 511 600–2 791 200	2–4	9.41+00	3.61−02	8.50−02	−1.141	B+	LS
				357.654	2 511 600–2 791 200	2–2	9.39+00	1.80−02	4.24−02	−1.444	B+	LS
57	$5s-9p$	$^{2}\mathrm{S}-{}^{2}\mathrm{P}^{\circ}$		*316.46*	2 511 600–*2 827 600*	2–6	6.71+00	3.02−02	6.29−02	−1.219	B	1
				316.456	2 511 600–2 827 600	2–4	6.69+00	2.01−02	4.19−02	−1.396	B	LS
				316.456	2 511 600–2 827 600	2–2	6.73+00	1.01−02	2.10−02	−1.695	B	LS
58	$5p-5d$	$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{D}$		*3 620* cm^{-1}	*2 520 900–2 524 520*	6–10	4.49−03	8.65−02	4.75+01	−0.285	A+	1
				3 700 cm^{-1}	2 520 900–2 524 600	4–6	4.87−03	8.00−02	2.85+01	−0.495	A+	LS
				3 500 cm^{-1}	2 520 900–2 524 400	2–4	3.44−03	8.41−02	1.58+01	−0.774	A+	LS
				3 500 cm^{-1}	2 520 900–2 524 400	4–4	6.87−04	8.41−03	3.16+00	−1.473	A+	LS
59	$5p-6d$	$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{D}$		*725.2*	*2 520 900–2 658 800*	6–10	4.31+01	5.67−01	8.12+00	0.532	A+	1
				725.16	2 520 900–2 658 800	4–6	4.31+01	5.10−01	4.87+00	0.310	A+	LS
				725.16	2 520 900–2 658 800	2–4	3.60+01	5.67−01	2.71+00	0.055	A+	LS
				725.16	2 520 900–2 658 800	4–4	7.19+00	5.67−02	5.41−01	−0.644	A	LS
60	$5p-7d$	$^{2}\mathrm{P}^{\circ}-{}^{2}\mathrm{D}$		*457.25*	*2 520 900–2 739 600*	6–10	2.85+01	1.49−01	1.35+00	−0.049	A	1
				457.247	2 520 900–2 739 600	4–6	2.85+01	1.34−01	8.07−01	−0.271	A	LS
				457.247	2 520 900–2 739 600	2–4	2.38+01	1.49−01	4.49−01	−0.526	A	LS

TABLE 76. Transition probabilities of allowed lines for Mg X (references for this table are as follows: 1=Peach *et al.*,[75] 2=Tachiev and Froese Fischer,[102] 3=Yan *et al.*,[127] 4=Zhang *et al.*[129])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				457.247	2 520 900–2 739 600	4–4	4.75+00	1.49−02	8.97−02	−1.225	B+	LS
61	$5d-6p$	$^2\mathrm{D}-^2\mathrm{P}^\circ$		*757.7*	*2 524 520–2 656 500*	10–6	1.12+01	5.80−02	1.45+00	−0.237	A	1
				758.15	2 524 600–2 656 500	6–4	1.01+01	5.80−02	8.69−01	−0.458	A	LS
				757.00	2 524 400–2 656 500	4–2	1.13+00	4.84−02	4.82−01	−0.713	A	LS
				757.00	2 524 400–2 656 500	4–4	1.13+00	9.69−03	9.66−02	−1.412	A	LS
62	$5d-7p$	$^2\mathrm{D}-^2\mathrm{P}^\circ$		*467.55*	*2 524 520–2 738 400*	10–6	6.21+00	1.22−02	1.88−01	−0.914	B+	1
				467.727	2 524 600–2 738 400	6–4	5.58+00	1.22−02	1.13−01	−1.135	B+	LS
				467.290	2 524 400–2 738 400	4–2	6.23+00	1.02−02	6.28−02	−1.389	B+	LS
				467.290	2 524 400–2 738 400	4–4	6.20−01	2.03−03	1.25−02	−2.090	B	LS
63	$5d-8p$	$^2\mathrm{D}-^2\mathrm{P}^\circ$		*374.98*	*2 524 520–2 791 200*	10–6	3.79+00	4.79−03	5.91−02	−1.320	B	1
				375.094	2 524 600–2 791 200	6–4	3.41+00	4.79−03	3.55−02	−1.542	B+	LS
				374.813	2 524 400–2 791 200	4–2	3.79+00	3.99−03	1.97−02	−1.797	B	LS
				374.813	2 524 400–2 791 200	4–4	3.79−01	7.98−04	3.94−03	−2.496	B	LS
64	$5d-9p$	$^2\mathrm{D}-^2\mathrm{P}^\circ$		*329.95*	*2 524 520–2 827 600*	10–6	2.50+00	2.45−03	2.66−02	−1.611	C+	1
				330.033	2 524 600–2 827 600	6–4	2.25+00	2.45−03	1.60−02	−1.833	C+	LS
				329.815	2 524 400–2 827 600	4–2	2.50+01	2.04−03	8.86−03	−2.088	C+	LS
				329.815	2 524 400–2 827 600	4–4	2.51−01	4.09−04	1.78−03	−2.786	C	LS
65	$6p-6d$	$^2\mathrm{P}^\circ-^2\mathrm{D}$		*2 300 cm^{-1}*	*2 656 500–2 658 800*	6–10	2.56−03	1.21−01	1.04+02	−0.139	A+	1
				2 300 cm^{-1}	2 656 500–2 658 800	4–6	2.56−03	1.09−01	6.24+01	−0.361	A+	LS
				2 300 cm^{-1}	2 656 500–2 658 800	2–4	2.13−03	1.21−01	3.46+01	−0.616	A+	LS
				2 300 cm^{-1}	2 656 500–2 658 800	4–4	4.27−04	1.21−02	6.93+00	−1.315	A+	LS
66	$6p-7d$	$^2\mathrm{P}^\circ-^2\mathrm{D}$		*1 203.4*	*2 656 500–2 739 600*	6–10	1.62+01	5.87−01	1.39+01	0.547	A	1
				1 203.37	2 656 500–2 739 600	4–6	1.62+01	5.28−01	8.37+00	0.325	A	LS
				1 203.37	2 656 500–2 739 600	2–4	1.35+01	5.87−01	4.65+00	0.070	A	LS
				1 203.37	2 656 500–2 739 600	4–4	2.70+00	5.87−02	9.30−01	−0.629	A	LS
67	$6d-7p$	$^2\mathrm{D}-^2\mathrm{P}^\circ$		*1 256.3*	*2 658 800–2 738 400*	10–6	5.94+00	8.43−02	3.49+00	−0.074	A	1
				1 256.28	2 658 800–2 738 400	6–4	5.34+00	8.43−02	2.09+00	−0.296	A	LS
				1 256.28	2 658 800–2 738 400	4–2	5.94+00	7.03−02	1.16+00	−0.551	A	LS
				1 256.28	2 658 800–2 738 400	4–4	5.96−01	1.41−02	2.33−01	−1.249	B+	LS
68	$6d-8p$	$^2\mathrm{D}-^2\mathrm{P}^\circ$		*755.3*	*2 658 800–2 791 200*	10–6	3.51+00	1.80−02	4.47−01	−0.745	B+	1
				755.29	2 658 800–2 791 200	6–4	3.16+00	1.80−02	2.69−01	−0.967	B+	LS
				755.29	2 658 800–2 791 200	4–2	3.51+00	1.50−02	1.49−01	−1.222	B+	LS
				755.29	2 658 800–2 791 200	4–4	3.50−01	2.99−03	2.97−02	−1.922	B+	LS
69	$6d-9p$	$^2\mathrm{D}-^2\mathrm{P}^\circ$		*592.4*	*2 658 800–2 827 600*	10–6	2.26+00	7.13−03	1.39−01	−1.147	B	1
				592.42	2 658 800–2 827 600	6–4	2.03+00	7.13−03	8.34−02	−1.369	B	LS
				592.42	2 658 800–2 827 600	4–2	2.26+01	5.94−03	4.63−02	−1.624	B	LS
				592.42	2 658 800–2 827 600	4–4	2.26−01	1.19−03	9.28−03	−2.322	C+	LS
70	$7p-7d$	$^2\mathrm{P}^\circ-^2\mathrm{D}$		*1 200 cm^{-1}*	*2 738 400–2 739 600*	6–10	6.98−04	1.21−01	1.99+02	−0.139	A+	1
				1 200 cm^{-1}	2 738 400–2 739 600	4–6	6.98−04	1.09−01	1.20+02	−0.361	A+	LS
				1 200 cm^{-1}	2 738 400–2 739 600	2–4	5.81−04	1.21−01	6.64+01	−0.616	A+	LS
				1 200 cm^{-1}	2 738 400–2 739 600	4–4	1.16−04	1.21−02	1.33+01	−1.315	A	LS
71	$7d-8p$	$^2\mathrm{D}-^2\mathrm{P}^\circ$		*1 938*	*2 739 600–2 791 200*	10–6	3.31+00	1.12−01	7.14+00	0.049	A	1

TABLE 76. Transition probabilities of allowed lines for Mg X (references for this table are as follows: 1=Peach *et al.*,[75] 2=Tachiev and Froese Fischer,[102] 3=Yan *et al.*,[127] 4=Zhang *et al.*[129])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				1 938.0	2 739 600–2 791 200	6–4	2.98+00	1.12−01	4.29+00	−0.173	A	LS
				1 938.0	2 739 600–2 791 200	4–2	3.31+00	9.31−02	2.38+00	−0.429	A	LS
				1 938.0	2 739 600–2 791 200	4–4	3.30−01	1.86−02	4.75−01	−1.128	A	LS
72	$7d-9p$	^{2}D$-^2$P$^{\circ}$		*1 136.4*	*2 739 600–2 827 600*	10–6	2.08+00	2.42−02	9.06−01	−0.616	B	1
				1 136.36	2 739 600–2 827 600	6–4	1.88+00	2.42−02	5.43−01	−0.838	B	LS
				1 136.36	2 739 600–2 827 600	4–2	2.09+00	2.02−02	3.02−01	−1.093	B	LS
				1 136.36	2 739 600–2 827 600	4–4	2.09−01	4.04−03	6.05−02	−1.792	C+	LS

[a] Wavelengths (Å) are always given unless cm^{-1} is indicated.

11.11. Mg XI

Helium isoelectronic sequence
Ground state: $1s^2\ ^1S_0$
Ionization energy: 1761.804 eV=14 209 908 cm^{-1}

11.11.1. Allowed Transitions for Mg XI

Not surprisingly, the computed transition rates for this heliumlike spectrum are very accurate. This applies as well to the results of the OP.[26] Most of the compiled data below have been taken from this source. Khan *et al.*[50] started with hydrogenic wave functions and then applied the effective-charge technique.

To estimate accuracies, we pooled the relative standard deviation of the mean (RSDM) of each of the lines for which a transition rate is quoted by both of the references cited below, as discussed in the General Introduction.

11.11.2. References for Allowed Transitions for Mg XI

[22] J. A. Fernley, K. T. Taylor, and M. J. Seaton, J. Phys B **20**, 6457 (1987).

[26] J. A. Fernley, K. T. Taylor, and M. J. Seaton, http://legacy.gsfc.nasa.gov/topbase, downloaded on July 28, 1995 (Opacity Project). See Fernley *et al.* (Ref. 22).

[50] F. Khan, G. S. Khandelwal, and J. W.Wilson, Astrophys. J. **329**, 489 (1988).

TABLE 77. Wavelength finding list for allowed lines for Mg XI

Wavelength (vac) (Å)	Mult. No.
7.104	9
7.119	8
7.142	7
7.174	6
7.225	5
7.310	4
7.473	3
7.851	2
9.169	1
30.879	22
31.179	21
31.608	20
32.254	19
33.304	18
34.022	16
34.025	16
34.026	16
35.132	33
35.142	33
35.185	33
35.186	33
35.204	17
35.241	31
35.251	31
35.295	31
36.074	34
36.120	32
37.918	14
37.925	14
37.926	14
39.256	29
39.268	29
39.269	29
39.321	29
39.323	29
39.324	29
39.332	15
39.526	27
39.539	27
39.595	27
40.433	30
40.545	28
50.438	12
50.464	12
50.471	12
52.599	25
52.620	25
52.621	25
52.653	13
52.709	25
52.719	25

TABLE 77. Wavelength finding list for allowed lines for Mg XI—Continued

Wavelength (vac) (Å)	Mult. No.
52.721	25
53.787	23
53.811	23
53.915	23
54.714	26
55.197	24
73.590	45
74.466	64
75.314	44
76.233	63
77.866	43
78.848	62
81.912	42
83.000	61
89.040	41
90.327	60
101.605	39
101.628	39
101.634	39
104.052	40
104.063	53
104.091	53
104.092	53
104.196	53
104.205	53
104.206	53
105.025	51
105.054	51
105.171	51
105.813	59
106.135	58
106.140	58
106.161	58
106.165	58
106.167	58
106.183	58
106.307	54
106.709	52
142.002	73
143.398	86
146.583	37
146.678	37
146.702	37
148.568	72
150.096	85
150.838	38
151.076	49
151.133	49
151.136	49
151.337	49
151.374	49
151.378	49
154.567	57
155.153	47
155.216	47
155.471	47
155.806	50
156.202	56
156.212	56
156.305	56
156.311	56
156.321	56
156.338	56
157.488	48
158.834	71
160.582	84
176.633	70
178.797	83
213.486	69
216.656	82
248.722	93
250.933	100
269.590	92
272.190	99
305.410	91
308.751	98
319.095	67
319.328	67
319.387	67
326.386	68
327.225	77
327.337	77
327.345	77
327.724	77
327.813	77
327.822	77
333.853	81
336.231	78
336.932	75
337.059	75
337.564	75
337.847	80
337.864	80
338.049	80
338.107	80
338.125	80
338.174	80
340.284	76
378.809	90
383.963	97
601.49	89
614.58	96
997.49	10
1 034.32	10
1 043.26	10
1 474.19	11

Wavelength (air) (Å)	Mult. No.
3 620.1	35
3 764.1	35
3 801.9	35

TABLE 77. Wavelength finding list for allowed lines for Mg XI—Continued

Wavelength (vac) (Å)	Mult. No.
5 074.2	36
6 360	46
17 359	87
6 452	46
6 469	46
6 747	46
6 925	46
6 944	46
18 075	87
8 780	65
9 136	65
9 230	65
12 062	66
15 233	74
18 267	87
15 461	74
15 497	74
16 166	74
16 601	74
16 643	74

Wavenumber (cm^{-1})	Mult. No.
4 226	88
3 708	55
3 331	94
3 281	94
3 273	94
3 136	94
3 053	94
3 045	94
1 435	79
683	95

TABLE 78. Transition probabilities of allowed lines for Mg XI (references for this table are as follows: 1=Fernley *et al.*[26] and 2=Khan *et al.*[50])

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
1	$1s^2-1s2p$	$^1S-^1P^\circ$		9.169	0–10 906 612	1–3	1.96+05	7.41−01	2.24−02	−0.130	A+	1,2
2	$1s^2-1s3p$	$^1S-^1P^\circ$		7.851	0–12 738 006	1–3	5.43+04	1.50−01	3.89−03	−0.824	A+	1,2
3	$1s^2-1s4p$	$^1S-^1P^\circ$		7.473	0–13 381 265	1–3	2.24+04	5.62−02	1.38−03	−1.250	A+	1,2
4	$1s^2-1s5p$	$^1S-^1P^\circ$		7.310	0–13 679 363	1–3	1.13+04	2.72−02	6.56−04	−1.565	A+	1,2
5	$1s^2-1s6p$	$^1S-^1P^\circ$		7.225	0–13 841 392	1–3	6.52+03	1.53−02	3.64−04	−1.815	A+	1,2
6	$1s^2-1s7p$	$^1S-^1P^\circ$		7.174	0–13 939 122	1–3	4.10+03	9.50−03	2.24−04	−2.022	A	1,2
7	$1s^2-1s8p$	$^1S-^1P^\circ$		7.142	0–14 002 566	1–3	2.74+03	6.29−03	1.48−04	−2.201	A	1,2
8	$1s^2-1s9p$	$^1S-^1P^\circ$		7.119	0–14 046 070	1–3	1.92+03	4.39−03	1.03−04	−2.358	A	1,2
9	$1s^2-1s10p$	$^1S-^1P^\circ$		7.104	0–14 077 192	1–3	1.40+03	3.18−03	7.44−05	−2.498	A+	1,2
10	$1s2s-1s2p$	$^3S-^3P^\circ$		*1 014.5*	*10 736 136–10 834 709*	3–9	1.39+00	6.41−02	6.43−01	−0.716	A	1
				997.49	10 736 136–10 836 388	3–5	1.46+00	3.62−02	3.57−01	−0.964	A	LS
				1 034.32	10 736 136–10 832 818	3–3	1.31+00	2.10−02	2.15−01	−1.201	A	LS
				1 043.26	10 736 136–10 831 989	3–1	1.27+00	6.93−03	7.14−02	−1.682	A	LS
11		$^1S-^1P^\circ$		1 474.19	10 838 778–10 906 612	1–3	4.72−01	4.61−02	2.24−01	−1.336	A	1
12	$1s2s-1s3p$	$^3S-^3P^\circ$		*50.45*	10 736 136–*12 718 287*	3–9	3.30+03	3.78−01	1.88−01	0.055	A	1
				50.438	10 736 136–12 718 786	3–5	3.30+03	2.10−01	1.05−01	−0.201	A	LS
				50.464	10 736 136–12 717 729	3–3	3.30+03	1.26−01	6.28−02	−0.423	A	LS
				50.471	10 736 136–12 717 465	3–1	3.30+03	4.20−02	2.09−02	−0.900	A	LS
13		$^1S-^1P^\circ$		52.653	10 838 778–12 738 006	1–3	3.18+03	3.96−01	6.86−02	−0.402	A	1
14	$1s2s-1s4p$	$^3S-^3P^\circ$		*37.92*	10 736 136–*13 373 168*	3–9	1.46+03	9.43−02	3.53−02	−0.548	A	1
				37.918	10 736 136–13 373 378	3–5	1.46+03	5.24−02	1.96−02	−0.804	A	LS
				37.925	10 736 136–13 372 934	3–3	1.46+03	3.14−02	1.18−02	−1.026	A	LS
				37.926	10 736 136–13 372 822	3–1	1.46+03	1.05−02	3.93−03	−1.502	A	LS

TABLE 78. Transition probabilities of allowed lines for Mg XI (references for this table are as follows: 1=Fernley *et al.*[26] and 2=Khan *et al.*[50])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
15		$^{1}\mathrm{S}-{}^{1}\mathrm{P}^{\circ}$		39.332	10 838 778–13 381 265	1–3	1.40+03	9.71−02	1.26−02	−1.013	A	1
16	$1s2s-1s5p$	$^{3}\mathrm{S}-{}^{3}\mathrm{P}^{\circ}$		*34.02*	10 736 136–*13 675 269*	3–9	7.50+02	3.90−02	1.31−02	−0.932	A	1
				34.022	10 736 136–13 675 377	3–5	7.50+02	2.17−02	7.29−03	−1.186	A	LS
				34.025	10 736 136–13 675 149	3–3	7.49+02	1.30−02	4.37−03	−1.409	A	LS
				34.026	10 736 136–13 675 091	3–1	7.50+02	4.34−03	1.46−03	−1.885	A	LS
17		$^{1}\mathrm{S}-{}^{1}\mathrm{P}^{\circ}$		35.204	10 838 778–13 679 363	1–3	7.19+02	4.01−02	4.65−03	−1.397	A	1
18	$1s2s-1s6p$	$^{1}\mathrm{S}-{}^{1}\mathrm{P}^{\circ}$		33.304	10 838 778–13 841 392	1–3	4.17+02	2.08−02	2.28−03	−1.682	A	1
19	$1s2s-1s7p$	$^{1}\mathrm{S}-{}^{1}\mathrm{P}^{\circ}$		32.254	10 838 778–13 939 122	1–3	2.63+02	1.23−02	1.31−03	−1.910	A	1
20	$1s2s-1s8p$	$^{1}\mathrm{S}-{}^{1}\mathrm{P}^{\circ}$		31.608	10 838 778–13 002 566	1–3	1.76+02	7.91−03	8.23−04	−2.102	A	1
21	$1s2s-1s9p$	$^{1}\mathrm{S}-{}^{1}\mathrm{P}^{\circ}$		31.179	10 838 778–14 046 070	1–3	1.24+02	5.40−03	5.54−04	−2.268	A	1
22	$1s2s-1s10p$	$^{1}\mathrm{S}-{}^{1}\mathrm{P}^{\circ}$		30.879	10 838 778–14 077 192	1–3	9.02+01	3.87−03	3.93−04	−2.412	A	1
23	$1s2p-1s3s$	$^{3}\mathrm{P}^{\circ}-{}^{3}\mathrm{S}$		*53.87*	*10 834 709*–12 691 170	9–3	1.20+03	1.74−02	2.78−02	−0.805	A	1
				53.915	10 836 388–12 691 170	5–3	6.65+02	1.74−02	1.54−02	−1.060	A	LS
				53.811	10 832 818–12 691 170	3–3	4.03+02	1.75−02	9.30−03	−1.280	A	LS
				53.787	10 831 989–12 691 170	1–3	1.34+02	1.75−02	3.10−03	−1.757	A	LS
24		$^{1}\mathrm{P}^{\circ}-{}^{1}\mathrm{S}$		55.197	10 906 612–12 718 304	3–1	1.12+03	1.70−02	9.27−03	−1.292	A	1
25	$1s2p-1s3d$	$^{3}\mathrm{P}^{\circ}-{}^{3}\mathrm{D}$		*52.67*	*10 834 709–12 733 392*	9–15	9.76+03	6.76−01	1.06+00	0.784	A	1
				52.709	10 836 388–12 733 603	5–7	9.74+03	5.68−01	4.93−01	0.453	A	LS
				52.620	10 832 818–12 733 223	3–5	7.34+03	5.08−01	2.64−01	0.183	A	LS
				52.599	10 831 989–12 733 183	1–3	5.44+03	6.77−01	1.17−01	−0.169	A	LS
				52.719	10 836 388–12 733 223	5–5	2.42+03	1.01−01	8.76−02	−0.297	A	LS
				52.621	10 832 818–12 733 183	3–3	4.07+03	1.69−01	8.78−02	−0.295	A	LS
				52.721	10 836 388–12 733 183	5–3	2.70+02	6.76−03	5.87−03	−1.471	A	LS
26		$^{1}\mathrm{P}^{\circ}-{}^{1}\mathrm{D}$		54.714	10 906 612–12 734 298	3–5	9.37+03	7.01−01	3.79−01	0.323	A	1
27	$1s2p-1s4s$	$^{3}\mathrm{P}^{\circ}-{}^{3}\mathrm{S}$		*39.57*	*10 834 709*–13 361 991	9–3	4.81+02	3.76−03	4.41−03	−1.471	A	1
				39.595	10 836 388–13 361 991	5–3	2.67+02	3.76−03	2.45−03	−1.726	A	LS
				39.539	10 832 818–13 361 991	3–3	1.60+02	3.76−03	1.47−03	−1.948	A	LS
				39.526	10 831 989–13 361 991	1–3	5.35+01	3.76−03	4.89−04	−2.425	A	LS
28		$^{1}\mathrm{P}^{\circ}-{}^{1}\mathrm{S}$		40.545	10 906 612–13 372 977	3–1	4.55+02	3.74−03	1.50−03	−1.950	A	1
29	$1s2p-1s4d$	$^{3}\mathrm{P}^{\circ}-{}^{3}\mathrm{D}$		*39.30*	*10 834 709*–13 379 473	9–15	3.17+03	1.22−01	1.43−01	0.041	A	1
				39.321	10 836 388–13 379 562	5–7	3.17+03	1.03−01	6.67−02	−0.288	A	LS
				39.268	10 832 818–13 379 400	3–5	2.38+03	9.18−02	3.56−02	−0.560	A	LS
				39.256	10 831 989–13 379 385	1–3	1.76+03	1.22−01	1.58−02	−0.914	A	LS
				39.323	10 836 388–13 379 400	5–5	7.89+02	1.83−02	1.18−02	−1.039	A	LS
				39.269	10 832 818–13 379 385	3–3	1.32+03	3.06−02	1.19−02	−1.037	A	LS
				39.324	10 836 388–13 379 385	5–3	8.77+01	1.22−03	7.90−04	−2.215	A	LS
30		$^{1}\mathrm{P}^{\circ}-{}^{1}\mathrm{D}$		40.433	10 906 612–13 379 830	3–5	2.96+03	1.21−01	4.83−02	−0.440	A	1
31	$1s2p-1s5s$	$^{3}\mathrm{P}^{\circ}-{}^{3}\mathrm{S}$		*35.27*	*10 834 709*–13 669 618	9–3	2.38+02	1.48−03	1.55−03	−1.875	A	1
				35.295	10 836 388–13 669 618	5–3	1.32+02	1.48−03	8.60−04	−2.131	A	LS
				35.251	10 832 818–13 669 618	3–3	7.94+01	1.48−03	5.15−04	−2.353	A	LS
				35.241	10 831 989–13 669 618	1–3	2.65+01	1.48−03	1.72−04	−2.830	A	LS
32		$^{1}\mathrm{P}^{\circ}-{}^{1}\mathrm{S}$		36.120	10 906 612–13 675 137	3–1	2.27+02	1.48−03	5.28−04	−2.353	A	1

TABLE 78. Transition probabilities of allowed lines for Mg XI (references for this table are as follows: 1=Fernley *et al.*[26] and 2=Khan *et al.*[50])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})$^{\mathrm{a}}$	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
33	$1s2p-1s5d$	$^3\mathrm{P}^\circ-^3\mathrm{D}$		*35.16*	*10 834 709–13 678 467*	9–15	1.47+03	4.53−02	4.72−02	−0.390	A	1
				35.185	10 836 388–13 678 513	5–7	1.46+03	3.80−02	2.20−02	−0.721	A	LS
				35.142	10 832 818–13 678 430	3–5	1.10+03	3.40−02	1.18−02	−0.991	A	LS
				35.132	10 831 989–13 678 422	1–3	8.16+02	4.53−02	5.24−03	−1.344	A	LS
				35.186	10 836 388–13 678 430	5–5	3.66+02	6.79−03	3.93−03	−1.469	A	LS
				35.142	10 832 818–13 678 422	3–3	6.10+02	1.13−02	3.92−03	−1.470	A	LS
				35.186	10 836 388–13 678 422	5–3	4.06+01	4.52−04	2.62−04	−2.646	A	LS
34		$^1\mathrm{P}^\circ-^1\mathrm{D}$		36.074	10 906 612–13 678 680	3–5	1.34+03	4.37−02	1.56−02	−0.882	A	1
35	$1s3s-1s3p$	$^3\mathrm{S}-^3\mathrm{P}^\circ$	*3 687*	*3 688*	12 691 170–*12 718 287*	3–9	1.76−01	1.08−01	3.93+00	−0.489	A	1
			3 620.1	3 621.1	12 691 170–12 718 786	3–5	1.86−01	6.10−02	2.18+00	−0.738	A	LS
			3 764.1	3 765.2	12 691 170–12 717 729	3–3	1.66−01	3.52−02	1.31+00	−0.976	A	LS
			3 801.9	3 803.0	12 691 170–12 717 465	3–1	1.60−01	1.16−02	4.36−01	−1.458	A	LS
36		$^1\mathrm{S}-^1\mathrm{P}^\circ$	5 074.2	5 075.6	12 718 304–12 738 006	1–3	6.94−02	8.04−02	1.34+00	−1.095	A	1
37	$1s3s-1s4p$	$^3\mathrm{S}-^3\mathrm{P}^\circ$		*146.63*	12 691 170–*13 373 168*	3–9	4.28+02	4.14−01	6.00−01	0.094	A	1
				146.583	12 691 170–13 373 378	3–5	4.28+02	2.30−01	3.33−01	−0.161	A	LS
				146.678	12 691 170–13 372 934	3–3	4.28+02	1.38−01	2.00−01	−0.383	A	LS
				146.702	12 691 170–13 372 822	3–1	4.29+02	4.61−02	6.68−02	−0.859	A	LS
38		$^1\mathrm{S}-^1\mathrm{P}^\circ$		150.838	12 718 304–13 381 265	1–3	4.25+02	4.35−01	2.16−01	−0.362	A	1
39	$1s3s-1s5p$	$^3\mathrm{S}-^3\mathrm{P}^\circ$		*101.62*	12 691 170–*13 675 269*	3–9	2.35+02	1.09−01	1.10−01	−0.485	A	1
				101.605	12 691 170–13 675 377	3–5	2.35+02	6.07−02	6.09−02	−0.740	A	LS
				101.628	12 691 170–13 675 149	3–3	2.35+02	3.64−02	3.65−02	−0.962	A	LS
				101.634	12 691 170–13 675 091	3–1	2.34+02	1.21−02	1.21−02	−1.440	A	LS
40		$^1\mathrm{S}-^1\mathrm{P}^\circ$		104.052	12 718 304–13 679 363	1–3	2.32+02	1.13−01	3.87−02	−0.947	A	1
41	$1s3s-1s6p$	$^1\mathrm{S}-^1\mathrm{P}^\circ$		89.040	12 718 304–13 841 392	1–3	1.36+02	4.86−02	1.42−02	−1.313	A	1
42	$1s3s-1s7p$	$^1\mathrm{S}-^1\mathrm{P}^\circ$		81.912	12 718 304–13 939 122	1–3	8.65+01	2.61−02	7.04−03	−1.583	A	1
43	$1s3s-1s8p$	$^1\mathrm{S}-^1\mathrm{P}^\circ$		77.866	12 718 304–13 002 566	1–3	5.79+01	1.58−02	4.05−03	−1.801	A	1
44	$1s3s-1s9p$	$^1\mathrm{S}-^1\mathrm{P}^\circ$		75.314	12 718 304–14 046 070	1–3	4.08+01	1.04−02	2.58−03	−1.983	A	1
45	$1s3s-1s10p$	$^1\mathrm{S}-^1\mathrm{P}^\circ$		73.590	12 718 304–14 077 192	1–3	2.97+01	7.24−03	1.75−03	−2.140	A	1
46	$1s3p-1s3d$	$^3\mathrm{P}^\circ-^3\mathrm{D}$	*6 620*	*6 620*	*12 718 287–12 733 392*	9–15	2.35−02	2.57−02	5.05+00	−0.636	A	1
			6 747	6 749	12 718 786–12 733 603	5–7	2.22−02	2.12−02	2.36+00	−0.975	A	LS
			6 452	6 454	12 717 729–12 733 223	3–5	1.90−02	1.98−02	1.26+00	−1.226	A	LS
			6 360	6 362	12 717 465–12 733 183	1–3	1.47−02	2.68−02	5.61−01	−1.572	A	LS
			6 925	6 927	12 718 786–12 733 223	5–5	5.13−03	3.69−03	4.21−01	−1.734	A	LS
			6 469	6 471	12 717 729–12 733 183	3–3	1.05−02	6.58−03	4.21−01	−1.705	A	LS
			6 944	6 946	12 718 786–12 733 183	5–3	5.65−04	2.45−04	2.80−02	−2.912	A	LS
47	$1s3p-1s4s$	$^3\mathrm{P}^\circ-^3\mathrm{S}$		*155.35*	*12 718 287*–13 361 991	9–3	3.36+02	4.05−02	1.87−01	−0.438	A	1
				155.471	12 718 786–13 361 991	5–3	1.86+02	4.05−02	1.04−01	−0.694	A	LS
				155.216	12 717 729–13 361 991	3–3	1.12+02	4.06−02	6.22−02	−0.914	A	LS
				155.153	12 717 465–13 361 991	1–3	3.75+01	4.06−02	2.07−02	−1.391	A	LS
48		$^1\mathrm{P}^\circ-^1\mathrm{S}$		157.488	12 738 006–13 372 977	3–1	3.15+02	3.90−02	6.07−02	−0.932	A	1
49	$1s3p-1s4d$	$^3\mathrm{P}^\circ-^3\mathrm{D}$		*151.24*	*12 718 287–13 379 473*	9–15	1.03+03	5.87−01	2.63+00	0.723	A	1
				151.337	12 718 786–13 379 562	5–7	1.03+03	4.93−01	1.23+00	0.392	A	LS

TABLE 78. Transition probabilities of allowed lines for Mg XI (references for this table are as follows: 1=Fernley *et al.*[26] and 2=Khan *et al.*[50])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i-E_k (cm^{-1})	g_i-g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
				151.133	12 717 729–13 379 400	3–5	7.73+02	4.41−01	6.58−01	0.122	A	LS
				151.076	12 717 465–13 379 385	1–3	5.73+02	5.88−01	2.92−01	−0.231	A	LS
				151.374	12 718 786–13 379 400	5–5	2.56+02	8.81−02	2.20−01	−0.356	A	LS
				151.136	12 717 729–13 379 385	3–3	4.29+02	1.47−01	2.19−01	−0.356	A	LS
				151.378	12 718 786–13 379 385	5–3	2.85+01	5.87−03	1.46−02	−1.532	A	LS
50		$^{1}\mathrm{P}^{\circ}-{}^{1}\mathrm{D}$		155.806	12 738 006–13 379 830	3–5	1.04+03	6.31−01	9.71−01	0.277	A	1
51	$1s3p-1s5s$	$^{3}\mathrm{P}^{\circ}-{}^{3}\mathrm{S}$		*105.12*	*12 718 287*–13 669 618	9–3	1.63+02	8.99−03	2.80−02	−1.092	A	1
				105.171	12 718 786–13 669 618	5–3	9.04+01	8.99−03	1.56−02	−1.347	A	LS
				105.054	12 717 729–13 669 618	3–3	5.44+01	9.00−03	9.34−03	−1.569	A	LS
				105.025	12 717 465–13 669 618	1–3	1.81+01	9.00−03	3.11−03	−2.046	A	LS
52		$^{1}\mathrm{P}^{\circ}-{}^{1}\mathrm{S}$		106.709	12 738 006–13 675 137	3–1	1.54+02	8.74−03	9.21−03	−1.581	A	1
53	$1s3p-1s5d$	$^{3}\mathrm{P}^{\circ}-{}^{3}\mathrm{D}$		*104.15*	*12 718 287–13 678 467*	9–15	5.05+02	1.37−01	4.23−01	0.091	A	1
				104.196	12 718 786–13 678 513	5–7	5.05+02	1.15−01	1.97−01	−0.240	A	LS
				104.091	12 717 729–13 678 430	3–5	3.80+02	1.03−01	1.06−01	−0.510	A	LS
				104.063	12 717 465–13 678 422	1–3	2.81+02	1.37−01	4.69−02	−0.863	A	LS
				104.205	12 718 786–13 678 430	5–5	1.26+02	2.05−02	3.52−02	−0.989	A	LS
				104.092	12 717 729–13 678 422	3–3	2.11+02	3.42−02	3.52−02	−0.989	A	LS
				104.206	12 718 786–13 678 422	5–3	1.40+01	1.37−03	2.35−03	−2.164	A	LS
54		$^{1}\mathrm{P}^{\circ}-{}^{1}\mathrm{D}$		106.307	12 738 006–13 678 680	3–5	4.96+02	1.40−01	1.47−01	−0.377	A	1
55	$1s3d-1s3p$	$^{1}\mathrm{D}-{}^{1}\mathrm{P}^{\circ}$		3 708 cm^{-1}	12 734 298–12 738 006	5–3	5.75−04	3.76−03	1.67+00	−1.726	A	1
56	$1s3d-1s4p$	$^{3}\mathrm{D}-{}^{3}\mathrm{P}^{\circ}$		*156.30*	*12 733 392–13 373 168*	15–9	5.95+01	1.31−02	1.01−01	−0.707	A	1
				156.305	12 733 603–13 373 378	7–5	5.01+01	1.31−02	4.72−02	−1.038	A	LS
				156.321	12 733 223–13 372 934	5–3	4.46+01	9.80−03	2.52−02	−1.310	A	LS
				156.338	12 733 183–13 372 822	3–1	5.94+01	7.26−03	1.12−02	−1.662	A	LS
				156.212	12 733 223–13 373 378	5–5	8.94+00	3.27−03	8.41−03	−1.786	A	LS
				156.311	12 733 183–13 372 934	3–3	1.49+01	5.44−03	8.40−03	−1.787	A	LS
				156.202	12 733 183–13 373 378	3–5	5.95−01	3.63−04	5.60−04	−2.963	A	LS
57		$^{1}\mathrm{D}-{}^{1}\mathrm{P}^{\circ}$		154.567	12 734 298–13 381 265	5–3	4.84+01	1.04−02	2.65−02	−1.284	A	1
58	$1s3d-1s5p$	$^{3}\mathrm{D}-{}^{3}\mathrm{P}^{\circ}$		*106.17*	*12 733 392–13 675 269*	15–9	2.55+01	2.59−03	1.36−02	−1.411	A	1
				106.183	12 733 603–13 675 377	7–5	2.15+01	2.59−03	6.34−03	−1.742	A	LS
				106.165	12 733 223–13 675 149	5–3	1.91+01	1.94−03	3.39−03	−2.013	A	LS
				106.167	12 733 183–13 675 091	3–1	2.56+01	1.44−03	1.51−03	−2.365	A	LS
				106.140	12 733 223–13 675 377	5–5	3.83+00	6.47−04	1.13−03	−2.490	A	LS
				106.161	12 733 183–13 675 149	3–3	6.39+00	1.08−03	1.13−03	−2.489	A	LS
				106.135	12 733 183–13 675 377	3–5	2.55−01	7.19−05	7.54−05	−3.666	A	LS
59		$^{1}\mathrm{D}-{}^{1}\mathrm{P}^{\circ}$		105.813	12 734 298–13 679 363	5–3	2.09+01	2.10−03	3.66−03	−1.979	A	1
60	$1s3d-1s6p$	$^{1}\mathrm{D}-{}^{1}\mathrm{P}^{\circ}$		90.327	12 734 298–13 841 392	5–3	1.09+01	8.00−04	1.19−03	−2.398	A	1
61	$1s3d-1s7p$	$^{1}\mathrm{D}-{}^{1}\mathrm{P}^{\circ}$		83.000	12 734 298–13 939 122	5–3	6.46+00	4.00−04	5.46−04	−2.699	A	1
62	$1s3d-1s8p$	$^{1}\mathrm{D}-{}^{1}\mathrm{P}^{\circ}$		78.848	12 734 298–13 002 566	5–3	4.15+00	2.32−04	3.01−04	−2.936	A	1
63	$1s3d-1s9p$	$^{1}\mathrm{D}-{}^{1}\mathrm{P}^{\circ}$		76.233	12 734 298–14 046 070	5–3	2.85+00	1.49−04	1.87−04	−3.128	A	1
64	$1s3d-1s10p$	$^{1}\mathrm{D}-{}^{1}\mathrm{P}^{\circ}$		74.466	12 734 298–14 077 192	5–3	2.04+00	1.02−04	1.25−04	−3.292	A	1
65	$1s4s-1s4p$	$^{3}\mathrm{S}-{}^{3}\mathrm{P}^{\circ}$	*8 940*	*8 947*	13 361 991–*13 373 168*	3–9	4.14−02	1.49−01	1.32+01	−0.350	A	1
			8 780	8 782	13 361 991–13 373 378	3–5	4.37−02	8.43−02	7.31+00	−0.597	A	LS
			9 136	9 138	13 361 991–13 372 934	3–3	3.88−02	4.86−02	4.39+00	−0.836	A	LS

TABLE 78. Transition probabilities of allowed lines for Mg XI (references for this table are as follows: 1=Fernley *et al.*[26] and 2=Khan *et al.*[50])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})^a	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
			9 230	9 233	13 361 991–13 372 822	3–1	3.76−02	1.60−02	1.46+00	−1.319	A	LS
66		^{1}S–^{1}P°	12 062	12 066	13 372 977–13 381 265	1–3	1.73−02	1.13−01	4.49+00	−0.947	A	1
67	1s4s–1s5p	^{3}S–^{3}P°		*319.21*	13 361 991–*13 675 269*	3–9	1.01+02	4.61−01	1.45+00	0.141	A	1
				319.095	13 361 991–13 675 377	3–5	1.01+02	2.56−01	8.07−01	−0.115	A	LS
				319.328	13 361 991–13 675 149	3–3	1.01+02	1.54−01	4.86−01	−0.335	A	LS
				319.387	13 361 991–13 675 091	3–1	1.00+02	5.12−02	1.62−01	−0.814	A	LS
68		^{1}S–^{1}P°		326.386	13 372 977–13 679 363	1–3	1.01+02	4.84−01	5.20−01	−0.315	A	1
69	1s4s–1s6p	^{1}S–^{1}P°		213.486	13 372 977–13 841 392	1–3	6.20+01	1.27−01	8.93−02	−0.896	A	1
70	1s4s–1s7p	^{1}S–^{1}P°		176.633	13 372 977–13 939 122	1–3	3.98+01	5.59−02	3.25−02	−1.253	A	1
71	1s4s–1s8p	^{1}S–^{1}P°		158.834	13 372 977–13 002 566	1–3	2.69+01	3.05−02	1.59−02	−1.516	A	1
72	1s4s–1s9p	^{1}S–^{1}P°		148.568	13 372 977–14 046 070	1–3	1.88+01	1.87−02	9.15−03	−1.728	A	1
73	1s4s–1s10p	^{1}S–^{1}P°		142.002	13 372 977–14 077 192	1–3	1.38+01	1.25−02	5.84−03	−1.903	A	1
74	1s4p–1s4d	^{3}P°–^{3}D	*15 860*	*15 860*	*13 373 168–13 379 473*	9–15	7.32−03	4.60−02	2.16+01	−0.383	A	1
			16 166	16 171	13 373 378–13 379 562	5–7	6.91−03	3.79−02	1.01+01	−0.722	A	LS
			15 461	15 466	13 372 934–13 379 400	3–5	5.92−03	3.54−02	5.41+00	−0.974	A	LS
			15 233	15 237	13 372 822–13 379 385	1–3	4.59−03	4.79−02	2.40+00	−1.320	A	LS
			16 601	16 606	13 373 378–13 379 400	5–5	1.59−03	6.59−03	1.80+00	−1.482	A	LS
			15 497	15 501	13 372 934–13 379 385	3–3	3.28−03	1.18−02	1.81+00	−1.451	A	LS
			16 643	16 647	13 373 378–13 379 385	5–3	1.76−04	4.38−04	1.20−01	−2.660	A	LS
75	1s4p–1s5s	^{3}P°–^{3}S		*337.33*	*13 373 168*–13 669 618	9–3	1.16+02	6.59−02	6.58−01	−0.227	A	1
				337.564	13 373 378–13 669 618	5–3	6.42+01	6.58−02	3.66−01	−0.483	A	LS
				337.059	13 372 934–13 669 618	3–3	3.87+01	6.59−02	2.19−01	−0.704	A	LS
				336.932	13 372 822–13 669 618	1–3	1.29+01	6.60−02	7.32−02	−1.180	A	LS
76		^{1}P°–^{1}S		340.284	13 381 265–13 675 137	3–1	1.09+02	6.30−02	2.12−01	−0.724	A	1
77	1s4p–1s5d	^{3}P°–^{3}D		*327.55*	*13 373 168–13 678 467*	9–15	2.13+02	5.72−01	5.55+00	0.712	A	1
				327.724	13 373 378–13 678 513	5–7	2.13+02	4.80−01	2.59+00	0.380	A	LS
				327.337	13 372 934–13 678 430	3–5	1.60+02	4.29−01	1.39+00	0.110	A	LS
				327.225	13 372 822–13 678 422	1–3	1.19+02	5.73−01	6.17−01	−0.242	A	LS
				327.813	13 373 378–13 678 430	5–5	5.32+01	8.57−02	4.62−01	−0.368	A	LS
				327.345	13 372 934–13 678 422	3–3	8.90+01	1.43−01	4.62−01	−0.368	A	LS
				327.822	13 373 378–13 678 422	5–3	5.92+00	5.72−03	3.09−02	−1.544	A	LS
78		^{1}P°–^{1}D		336.231	13 381 265–13 678 680	3–5	2.20+02	6.21−01	2.06+00	0.270	A	1
79	1s4d–1s4p	^{1}D–^{1}P°		1 435 cm^{-1}	13 379 830–13 381 265	5–3	1.42−04	6.21−03	7.12+00	−1.508	A	1
80	1s4d–1s5p	^{3}D–^{3}P°		*338.07*	*13 379 473–13 675 269*	15–9	3.16+01	3.25−02	5.43−01	−0.312	A	1
				338.049	13 379 562–13 675 377	7–5	2.66+01	3.25−02	2.53−01	−0.643	A	LS
				338.125	13 379 400–13 675 149	5–3	2.37+01	2.44−02	1.36−01	−0.914	A	LS
				338.174	13 379 385–13 675 091	3–1	3.17+01	1.81−02	6.05−02	−1.265	A	LS
				337.864	13 379 400–13 675 377	5–5	4.75+00	8.13−03	4.52−02	−1.391	A	LS
				338.107	13 379 385–13 675 149	3–3	7.88+00	1.35−02	4.51−02	−1.393	A	LS
				337.847	13 379 385–13 675 377	3–5	3.17−01	9.04−04	3.02−03	−2.567	A	LS
81		^{1}D–^{1}P°		333.853	13 379 830–13 679 363	5–3	2.63+01	2.64−02	1.45−01	−0.879	A	1
82	1s4d–1s6p	^{1}D–^{1}P°		216.656	13 379 830–13 841 392	5–3	1.32+01	5.58−03	1.99−02	−1.554	A	1

TABLE 78. Transition probabilities of allowed lines for Mg XI (references for this table are as follows: 1=Fernley *et al.*[26] and 2=Khan *et al.*[50])—Continued

No.	Transition array	Mult.	λ_{air} (Å)	λ_{vac} (Å) or σ (cm^{-1})[a]	E_i–E_k (cm^{-1})	g_i–g_k	A_{ki} (10^8 s^{-1})	f_{ik}	S (a.u.)	log gf	Acc.	Source
83	$1s4d-1s7p$	$^1\mathrm{D}-{}^1\mathrm{P}^\circ$		178.797	13 379 830–13 939 122	5–3	7.58+00	2.18−03	6.42−03	−1.963	A	1
84	$1s4d-1s8p$	$^1\mathrm{D}-{}^1\mathrm{P}^\circ$		160.582	13 379 830–13 002 566	5–3	4.79+00	1.11−03	2.93−03	−2.256	A	1
85	$1s4d-1s9p$	$^1\mathrm{D}-{}^1\mathrm{P}^\circ$		150.096	13 379 830–14 046 070	5–3	3.22+00	6.52−04	1.61−03	−2.487	A	1
86	$1s4d-1s10p$	$^1\mathrm{D}-{}^1\mathrm{P}^\circ$		143.398	13 379 830–14 077 192	5–3	2.28+00	4.22−04	9.96−04	−2.676	A	1
87	$1s5s-1s5p$	$^3\mathrm{S}-{}^3\mathrm{P}^\circ$	*17 690*	*17 696*	13 669 618–*13 675 269*	3–9	1.34−02	1.89−01	3.30+01	−0.246	A	1
			17 359	17 364	13 669 618–13 675 377	3–5	1.42−02	1.07−01	1.83+01	−0.493	A	LS
			18 075	18 080	13 669 618–13 675 149	3–3	1.25−02	6.15−02	1.10+01	−0.734	A	LS
			18 267	18 272	13 669 618–13 675 091	3–1	1.22−02	2.03−02	3.66+00	−1.215	A	LS
88		$^1\mathrm{S}-{}^1\mathrm{P}^\circ$		4 226 cm^{-1}	13 675 137–13 679 363	1–3	5.72−03	1.44−01	1.12+01	−0.842	A	1
89	$1s5s-1s6p$	$^1\mathrm{S}-{}^1\mathrm{P}^\circ$		601.49	13 675 137–13 841 392	1–3	3.30+01	5.37−01	1.06+00	−0.270	A	1
90	$1s5s-1s7p$	$^1\mathrm{S}-{}^1\mathrm{P}^\circ$		378.809	13 675 137–13 939 122	1–3	2.20+01	1.42−01	1.77−01	−0.848	A	1
91	$1s5s-1s8p$	$^1\mathrm{S}-{}^1\mathrm{P}^\circ$		305.410	13 675 137–13 002 566	1–3	1.50+01	6.28−02	6.31−02	−1.202	A	1
92	$1s5s-1s9p$	$^1\mathrm{S}-{}^1\mathrm{P}^\circ$		269.590	13 675 137–14 046 070	1–3	1.06+01	3.45−02	3.06−02	−1.462	A	1
93	$1s5s-1s10p$	$^1\mathrm{S}-{}^1\mathrm{P}^\circ$		248.722	13 675 137–14 077 192	1–3	7.69+00	2.14−02	1.75−02	−1.670	A	1
94	$1s5p-1s5d$	$^3\mathrm{P}^\circ-{}^3\mathrm{D}$		*3 198 cm^{-1}*	*13 675 269–13 678 467*	9–15	2.59−03	6.33−02	5.87+01	−0.244	A	1
				3 136 cm^{-1}	13 675 377–13 678 513	5–7	2.45−03	5.22−02	2.74+01	−0.583	A	LS
				3 281 cm^{-1}	13 675 149–13 678 430	3–5	2.10−03	4.87−02	1.47+01	−0.835	A	LS
				3 331 cm^{-1}	13 675 091–13 678 422	1–3	1.63−03	6.60−02	6.52+00	−1.180	A	LS
				3 053 cm^{-1}	13 675 377–13 678 430	5–5	5.64−04	9.07−03	4.89+00	−1.343	A	LS
				3 273 cm^{-1}	13 675 149–13 678 422	3–3	1.16−03	1.62−02	4.89+00	−1.313	A	LS
				3 045 cm^{-1}	13 675 377–13 678 422	5–3	6.22−05	6.03−04	3.26−01	−2.521	A	LS
95	$1s5d-1s5p$	$^1\mathrm{D}-{}^1\mathrm{P}^\circ$		683 cm^{-1}	13 678 680–13 679 363	5–3	4.20−05	8.10−03	1.95+01	−1.393	A	1
96	$1s5d-1s6p$	$^1\mathrm{D}-{}^1\mathrm{P}^\circ$		614.58	13 678 680–13 841 392	5–3	1.35+01	4.58−02	4.63−01	−0.640	A	1
97	$1s5d-1s7p$	$^1\mathrm{D}-{}^1\mathrm{P}^\circ$		383.963	13 678 680–13 939 122	5–3	7.50+00	9.94−03	6.28−02	−1.304	A	1
98	$1s5d-1s8p$	$^1\mathrm{D}-{}^1\mathrm{P}^\circ$		308.751	13 678 680–13 002 566	5–3	4.59+00	3.94−03	2.00−02	−1.706	A	1
99	$1s5d-1s9p$	$^1\mathrm{D}-{}^1\mathrm{P}^\circ$		272.190	13 678 680–14 046 070	5–3	3.03+00	2.02−03	9.05−03	−1.996	A	1
100	$1s5d-1s10p$	$^1\mathrm{D}-{}^1\mathrm{P}^\circ$		250.933	13 678 680–14 077 192	5–3	2.12+00	1.20−03	4.96−03	−2.222	A	1

[a] Wavelengths (Å) are always given unless cm^{-1} is indicated.

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