Microwave Spectral Tables
II. Triatomic Molecules

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All of the rotational spectral lines observed and reported in the open literature for 54 triatomic molecules have been tabulated. The isotopic molecular species, assigned quantum numbers, observed frequency, estimated measurement uncertainty and reference are given for each transition reported. In addition to correcting a number of misprints and errors in the literature cited, the spectral lines for approximately 15 molecules have been refit to produce a comprehensive and consistent analysis of all the data extracted from various literature sources. Both measured and predicted transition frequencies are listed for several isotopic forms of HCN, H_2O, H_2S, OCS, SO_2, and O_3. The derived molecular properties, such as rotational and centrifugal distortion constants, hyperfine structure constants, electric dipole moments, and rotational g-factors are listed with one standard deviation uncertainty for all values.

Key words: Dipole moments; hyperfine structure; internuclear distance; microwave spectra; rotational constants; rotational spectral lines; triatomic molecules.

Contents

List of Tables

List of Tables—Continued

List of Tables—Continued

1. Introduction

These tables represent the second part of a series of critical reviews on molecular rotational spectra in the microwave frequency region. The present review on triatomic molecules is a partial revision of the previous tabulation on polyatomic species, NBS Monograph 70, Vol. IV (1968) [1][1]. The primary aim of the present critical review is directed at detecting errors, misprints and incomplete analyses in the literature. The coverage includes microwave rotational spectra and molecular properties derived therefrom for all the triatomic species observed in the centimeter and millimeter wavelength region of the spectrum. There are two objectives which this review hopes to achieve: first, to provide an up-to-date and complete tabulation of the microwave spectra for triatomic molecules, and second, to provide the best set of molecular properties which can be derived from the observed spectra. Although the spectral line frequencies are limited to the radio and microwave frequency region, derived molecular constants are included from a variety of sources, e.g., molecular beam electric resonance, electron paramagnetic resonance and infrared spectroscopy, in order to provide the most complete set of properties presently available. All unpublished data communicated privately have been included, and the open literature has been searched through June 1976.

1.1. General Description of the Tables

Two types of tables are presented for each molecular species. The first tables contain the derived molecular constants for each isotopic form which has been studied, and the table following these constant tables contains the observed microwave spectral transition frequencies for all isotopic forms and vibrational states for which data are available. The ordering of the tables follows an alphabetic sequence in empirical molecular formulas. The sequence of the tables is indicated in the List of Tables shown in the Contents.

The molecular spectral data tables of section 2 are followed in section 3 with the references to these data. The appendix found in section 4 contains molecular structure information taken directly from the literature, and a discussion of the analysis of the F_2O spectrum. Literature references are labeled with 5-digit numerals. This system has been formulated such that the first two digits refer to the year of publication of the work while the remaining three digits correspond to a chronological ordering within the year as required for referencing purposes here. Since this system was introduced in the first part of this series [2], these reference numbers follow the sequence established in the earlier work.

a. Molecular Constant Tables

Since a uniform format could not be readily constructed for these tables, they were composed in variable format depending on the type and amount of information available. In general, the rotational constants are listed first, followed by the centrifugal distortion parameters, hyperfine structure data, electric dipole moments and rotational g-factors. In cases where extensive data are available, several individual tables are used to present the molecular constants. A more detailed description of the molecular constants and their symbols is given in section 1.2. In order to reduce the occurrence of misprints, these tables were photographically reproduced from the original final typewritten copy.

b. Spectral Line Tables

The spectral tables contain all of the data intrinsic to an assigned molecular transition. The first column of these tables contains the isotopic molecular species to which the data pertain. The next columns contain the assigned quantum numbers for the transition in the sequence: rotational and the hyperfine for the upper state, rotational and hyperfine for the lower state, and vibrational state designation. Since the vibrational state remains unchanged for nearly all transitions, a single set of quantum numbers, (v_1,v_2^{ℓ},v_3), is sufficient. The next columns contain the observed transition frequency, its estimated uncertainty, and finally the reference to the original source of the data. Since the maximum number of significant figures beyond the decimal point was fixed at three for the transition frequency and two for uncertainties, in a few cases it was

[1] Figures in brackets indicate literature references.

necessary to round off the measured data. This situation occurs primarily in the reproduction of molecular beam measurements. When the uncertainty in the measurement is less than 0.01 MHz, the exponential notation is employed. Thus, an uncertainty of 0.005 MHz appears as 5E-3, which represents 5×10^{-3} MHz. When uncertainties were not given in the original source, an uncertainty was assigned on the basis of the internal consistency of all the data available for the molecule in question. Predicted transition frequencies have been given for several isotopic forms of HCN, H_2O, H_2S, OCS, SO_2, and O_3. In order to distinguish these from measured transitions, an asterisk (*) was placed in front of the estimated uncertainty, which is twice the standard deviation from the fit.

An effort was made to locate all of the essential references through mid-1976. In situations where multiple measurements have been reported, the sources not directly cited here are included as additional references at the end of the molecular constant tables. These additional references also include publications which are indirectly related to the frequency measurements and which contain intensity measurements.

1.2. Molecular Parameters and Energy Level Formulation

The treatment of the rotational energy levels and transition frequencies for polyatomic molecules is more complicated than the formulations applied to diatomic molecules [2]. However, since triatomic molecules are the simplest class of polyatomic species, they demonstrate the simplest spectra and interactions that non-rigid polyatomic species are capable of exhibiting. The triatomic molecules can be readily divided into three types as characterized by their spectral properties. These three classes, linear molecules, non-linear molecules and molecules having doublet (or multiplet) ground electronic states, will be described separately and in that order, since each successive type shows increasingly complex interactions through their rotational spectra.

In spite of the fact that triatomic molecules are the simplest polyatomic species, a thorough discussion of the theoretical background of their rotational spectra and energy level interactions would entail an extensive text in itself, and would require repetition of many excellent treatments readily available. Thus, the discussion which follows deals with the most common cases which will provide the user with the essential definition of quantum numbers, molecular parameters and basic relations employed in the analysis of rotational spectra. For the reader interested in a more detailed description of polyatomic rotational spectral measurements and analysis, we refer to texts on this subject by Townes and Schawlow [3], Gordy and Cook [4], Wollrab [5] and Kroto [6] which have both detailed and excellent discussions of all facets of rotational spectra. The spectroscopic notation employed follows, as closely as possible, the recommendations of the Joint Commission for Spectroscopy of the International Astronomical Union and the International Union of Pure and Applied Physics [7].

a. Linear Triatomic Molecules

The principal moments of inertia of a linear rigid rotor are along the molecular bond or a-axis for which the inertial moment is zero, and perpendicular to the bond axis in two orthogonal planes through the center-of-mass of the molecule. These are called the b- and c-axis whereby $I_c>I_b>I_a$ determines the labeling of the principal axes. For linear molecules $I_b=I_c$ and $I_a=0$, and the rotational constant, B, is related to the moment of the inertia as

$$B = \frac{h^2}{8\pi^2 I_b} \quad .$$

The selection rules for rotational transitions of a linear polyatomic molecule are $\Delta J=0, \pm1$, and $\Delta\ell=0, \pm1$ where J is the total angular momentum quantum number excluding nuclear spin and ℓ is the vibrational angular momentum quantum number which arises in degenerate bending vibrational states.

Since molecules are not rigid, the effects of molecular vibrations and centrifugal distortion must be included in the model in order to accurately fit the observed rotational spectra. The rotational energy levels are represented as:

$$F(J) = B_v[J(J+1)-\ell^2]-D_v[J(J+1)-\ell^2]^2 + H_v[J(J+1)-\ell^2]^3,$$

where B_v is the rotational constant for the vth vibrational state, and D_v and H_v are the centrifugal distortion constants. The rotational constant can be expressed in terms of its equilibrium value, B_e, and rotation-vibration interaction constants, α_i, as:

$$B_v = B_{v_1,v_2,v_3} = B_e - \sum_{i=1,2,3} \alpha_i\left(v_i+\frac{d_i}{2}\right)+ \cdots ,$$

neglecting higher order terms. Within this level of approximation rotational transitions from lower state J'' to upper state J' are expressed:

$$\nu_{J'\leftarrow J''} = 2B_vJ'-4D_v[(J')^3-J'\ell^2]+6J'H_v[(J')^4-2(J')^2\ell^2+\ell^4].$$

The treatment of rotational transitions in excited vibrational states requires additional terms to account for the rotation-vibration interactions. The symmetry species of excited vibrational states are designated as Σ, Π, Δ, etc., when $\ell=0$, ±1, ±2, etc., respectively. One of the most common rotation-vibration interactions is ℓ-type doubling in Π states. In this case each $J\rightarrow J+1$ transition has two components which are indicated as L (lower) and U (upper) components in the tables which follow. The doublet separation is represented as: $q_v(v+1)(J+1)$. In addition $\Delta J=0$ transitions are observable with the frequency expressed as: $\nu=(q_v/2)(v+1)J(J+1)$. These transitions are also included in the spectral tables. Other rotation-vibration interactions, such as Fermi resonance, often must be included for particular measurements. Since the level of approximation and method of analysis is dependent on the extent and quality of the spectral measurements available, the user should refer to the literature references cited in the tables for details concerning the analysis. For more general treatments of ℓ-type doubling and resonance interactions see the texts mentioned earlier [3-6] or the recent review by D. R. Lide [8].

Hyperfine structure is observable in a majority of the linear molecules tabulated here. Hyperfine structure stems from nuclear electric quadrupole interaction with the electric field gradient at the nucleus, magnetic interaction of nuclear spin with the field produced by molecular rotation, and interaction between the two nuclear spins. Basically, only the nuclear quadrupole and spin-rotation effects have been observed in microwave rotational spectra, while all of the hyperfine structure interactions of a number of triatomics have been determined from molecular beam electric resonance studies. Since the treatment of these effects can become quite complex and often handled individually for each case, the reader is referred to the literature cited for particular formulations. Rather detailed general treatments of hyperfine structure in molecular spectra can be found in references [3-6] as well as in references to laboratory studies of individual species.

The most common case observed is that for triatomic molecules which contain one nucleus with nuclear spin, $I \geqslant 1$. In this case, the nuclear electric quadrupole and spin-rotation interactions from first order perturbation theory add to the rotational energy via:

$$W_{\mathrm{hfs}} = eq_vQ\left[\frac{3\ell^2}{J(J+1)}-1\right] f(I,J,F)$$

$$+ (c/2)[F(F+1) - I(I+1) - J(J=1)],$$

where $f(I,J,F)$ is Casimir's function which is tabulated in Appendix I of reference [3] and Appendix IV of reference [4]. Here F is the total angular momentum quantum number, where $F=J+I, J+I-1, \ldots |J=I|$. The additional selection rule for transitions between rotational levels split by hyperfine structure is $\Delta F=0, \pm 1$.

When the molecule exhibits hyperfine splittings from more than one nucleus, an exact matrix diagonalization of the Hamiltonian is usually required. Although the vector coupling model to be employed varies according to the magnitude of the interaction between J, I_1 and I_2, the typical case is to label the nucleus causing the largest interaction as I_1, thus

$$F_1 = J+I_1,\ J+I_1-1, \text{ etc.}$$

and

$$F = F_1+I_2,\ F_1+I_2-1, \text{ etc.}$$

For detailed discussions of the coupling schemes and matrix elements for multiple nuclear electric quadrupole interactions see [4] and [5].

b. Non-Linear Triatomic Molecules

The majority of polyatomic molecules fall in the asymmetric-top category. When the three principal moments of inertia of a molecule differ, the molecule is classified as an asymmetric top. The energy level formulation for a rigid asymmetric top is considerably more complex than that for symmetric-tops or linear molecules. With the exception of low rotational levels, the rotational energy and transitions cannot be conveniently expressed in simple algebraic terms. Since references [3-6] provide excellent discussions of the usual methods employed in solving the basic rigid asymmetric rotor Hamiltonian: $\mathscr{H}_2=A\ \mathbf{P}_a^2+B\ \mathbf{P}_b^2+C\ \mathbf{P}_c^2$ as well as the more complex Hamiltonian which includes centrifugal distortion $\mathscr{H}=\mathscr{H}_2+\mathscr{H}_4+\mathscr{H}_6+\ldots$, we will not delve into any details of the quantum mechanical formulation, but concentrate on describing the quantum number designations employed in the tables to follow, and provide the basic relationships between the different molecular constant notations used by various authors.

The rotational energy levels are characterized by the three quantum numbers $J_{K_{-1},K_{+1}}$ in the King-Hainer-Cross notation. Here, since $S=0$, J is used rather than N for the rotational angular momentum. When $S\neq 0$ we will use $N_{K_{-1},K_{+1}}$ to designate the rotational state and J for rotation plus electron spin and orbital angular momenta. The K_{-1} subscript is the K value in the limiting case of prolate symmetric-top and K_{+1} corresponds to the limiting case for an oblate symmetric-top. Ray's asymmetry parameter, κ, is often used to characterize the degree of asymmetry:

$$\kappa = \frac{2B-A-C}{A-C}.$$

When $A\approx B$, κ approaches $+1$ for the oblate case and when $B\approx C$ κ approaches -1 for the prolate case.

1) Selection Rules

In general an asymmetric rotor can exhibit three types of pure rotational transitions if the molecule has non-zero components of the electric dipole moment in the direction of the a, b, and c principal axes. Since triatomic molecules are planar, the dipole moment components can only occur in the a- and b-axis directions. For an asymmetric rotor the selection rules for a-type transitions are:

$$\Delta J=0,\ \pm 1;\ \Delta K_{-1}=0,\ \pm 2,\ \ldots;\ \Delta K_{+1}=\pm 1,\ \pm 3,\ \ldots$$

and b-type transitions follow the selection rules

$$\Delta J=0,\ \pm 1;\ \Delta K_{-1}=\pm 1,\ \pm 3;\ \Delta K_{+1}=\mp 1,\ \mp 3,\ \ldots .$$

When a triatomic molecule has a symmetry axis, for example in the XY_2 molecules, only b-type transitions can occur. In these cases one must also examine the nuclear spin statistics which influence both the selection rules and population of the rotational levels.

2) Rotational and Centrifugal Distortion Constants

Until approximately 1970 the Kivelson and Wilson [9] formulation of the Hamiltonian for a non-rigid asymmetric rotor was widely employed in analyzing rotational spectra. With the parameter notation employed by Kirchhoff [10] the Kivelson-Wilson Hamiltonian is:

$$\mathscr{H} = A'P_a^2+B'P_b^2+C'P_c^2+1/4 \sum_{\alpha,\beta} \tau'_{\alpha\alpha\beta\beta}P_\alpha^2P_\beta^2 \quad ,$$

where $\alpha,\beta = a,b$, or c. For a planar molecule the following planarity relations reduce the six linear combinations of distortion constants to four and provide the determinable parameters shown in column 1 of table 1.2.1:

$$\tau_{acac} = \tau_{bcbc} = 0,$$

$$\tau_{aacc} = \frac{C^2}{A^2} \tau_{aaaa} + \frac{C^2}{B^2} \tau_{aabb} ,$$

$$\tau_{bbcc} = \frac{C^2}{B^2} \tau_{bbbb} + \frac{C^2}{A^2} \tau_{aabb} ,$$

$$\tau_{cccc} = \frac{C^2}{A^2} \tau_{aacc} + \frac{C^2}{B^2} \tau_{bbcc} .$$

For non-planar molecules Dreizler et al. [11,12] found the Kivelson-Wilson distortion constants were indeterminant. Watson [13,14] introduced a new relationship which allows the Kivelson-Wilson Hamiltonian to be expressed in terms of five independent centrifugal distortion coefficients, or linear combination of taus, which eliminates the indeterminancy noted by Dreizler et al. Much of the recent analysis of rotational spectra follow Watson's reformulation [15,16] in the form of a reduced Hamiltonian which simplified the computation of the energy levels.

Since there is not a unique unitary transformation which allows the nine Kivelson-Wilson parameters to be reduced to eight determinable parameters, several variations of the Watson reduced Hamiltonians are commonly employed in practice. The two most often employed result in the determinable parameters listed in columns 2 and 3 of table 1.2.1. In reanalyzing the microwave spectra of triatomic molecules, Kirchhoff's [10] formulation has been used and the planarity conditions have been invoked in the spectral fitting process to fix τ_3. See reference [10] for additional details. The second commonly used formulation is described in detail by Gordy and Cook [4]. Yamada and Winnewisser [17] have examined the effects of employing different reductions for the three King, Hainer and Cross axis representations I^r, II^r, and III^r [18]. They provide a useful set of relations between the spectroscopic constants determined in the various reduction procedures and discuss the implications of the τ defect when employing the planarity conditions. When the spectral data requires a higher order Hamiltonian, such as inclusion of P^6 terms, generally the first-order perturbation treatment suggested by Watson [16] has been used. For some light molecules such as H_2O and H_2S even higher order terms were needed. See Gordy and Cook [4] or the sources of the spectroscopic constants quoted in the tables on these species.

c. Molecules with Doublet Electronic Ground States

The spectra and spectral analysis for molecules with one or more unpaired electrons are substantially more complex, particularly for non-linear free radicals, than for molecules with zero resultant electronic spin. The triatomic species which have doublet, $S=1/2$, ground states are HCO, NCO, HC_2, ClO_2, HO_2, NF_2, NH_2, and NO_2. In addition to the molecular rotational angular momentum, N, the interactions from electronic spin, S, and nuclear spin, I, must be included in the Hamiltonian. Depending on the magnitude of the various interactions, one of the following three coupling schemes are used in limiting cases:

TABLE 1.2.1. Determinable rotational and centrifugal distortion constants (P^4) employed by various workers[a]

Kivelson-Wilson parameters for planar molecules	Kirchhoff parameters (following Watson [15])	Watson parameters [16]
A'	$A''=A'-1/2\tau'_{bbcc}$	$\mathscr{A}$
B'	$B''=B'-1/2\tau'_{aacc}$	$\mathscr{B}$
C'	$C''=C'-1/2\tau'_{aabb}$	$\mathscr{C}$
τ_{aaaa}	τ_{aaaa}	Δ_J
τ_{bbbb}	τ_{bbbb}	Δ_{JK}
τ_{abab}	τ_{cccc}	Δ_K
τ_{aabb}	$\tau_1=\tau'_{aabb}+\tau'_{bbcc}+\tau'_{ccaa}$	δ_J
	$\tau_2=(A'/S)\tau'_{bbcc}+(B'/S)\tau'_{aacc}+(C'/S)\tau'_{aabb}$	δ_K
	$\tau_3=[S/(B'-A')]\tau'_{aabb}+[S/(A'-C')]\tau'_{aacc}+[S/(C'-B')]\tau'_{bbcc}$ where $S=A'+B'+C'$	

[a] For conversion between the various sets of parameters see references [4], [9], [10], and [17].

a) $N + S = J$; $J + I = F$
b) $S + I = G$; $G + N = F$
c) $N + I = E$; $E + S = F$

These interactions and the Hamiltonian for such molecules are discussed by Lin [19], Van Vleck [20], Curl and Kinsey [21] and others. Curl and Kinsey [21] have summarized the spectroscopic constant notation employed in the various formulations and developed an alternate method which can be applied to the triatomic species. Since none of these species have been reanalyzed in the present work, the notation employed in the publications cited is followed in the present tables of spectroscopic constants.

1.3. Evaluation of the Spectral Data

The evaluation has a two-fold purpose, first, the selection of the best set of measured transition frequencies and, second, selection or calculation of consistent and reliable spectroscopic constants. Since measured or calculated uncertainties are the best indicators of the quality of the data, a substantial portion of the critical evaluation effort has gone into determining these uncertainties.

a. General Procedure

Generally, the selection of the most reliable transition frequencies posed few problems since there were relatively few cases where duplicate measurements have been reported for the same transition. In cases where this did occur, the selection was based on both the overall consistency of the measurement in question with the other spectral data available, and on the reported uncertainty in the measurements. In nearly all cases the measurements with the smallest uncertainties reported by the authors were found to be the most reliable.

The determination of the most reliable molecular constants posed more severe difficulties. Occasionally inconsistencies arose in cases where data were reported by several independent workers who studied quite different regions of the spectrum, e.g., molecular beam measurements vs. microwave measurements or centimeter vs. millimeter-wave measurements. If all of the available data had not been analyzed simultaneously in these instances, a complete reanalysis was carried out to eliminate the discrepancies. These calculations also resulted in the detection of a number of misprints in the literature which were not obvious through simple inspection of the reported assignments and transition frequencies. Since a question might arise concerning the correct value when a difference is noted between the present compilation and the reference cited, the following section summarizes the typographical errors, changes in notation and other errors rectified in the present work.

b. Discussion of Specific Corrections and Reanalysis of the Data

The discussion of corrections and reanalysis follows the order of the spectral data tables of section 2. For molecular species which are not mentioned here, no corrections or reanalysis were necessary and the data reported should be identical to that given in the original work. Note that for all linear molecules the lower frequency stretching vibration is labeled ν_3.

1) ArClF

The transition reported at 5328.445 in table III of reference [74009] should read 5428.445.

2) HBS

Several errors have been corrected in table IV of reference [73027]. The rotational quantum numbers (J) for $H^{10}B^{32}S$ have been changed to J=6–5 from J=5–4 for the transitions near 241 GHz. The misprint in the $D^{11}B^{32}S$ J=8–7 transition shown as 225 827.68 MHz has been corrected to read 255 827.68 MHz. These did not affect the derived spectral constants reported in reference [73027].

3) BrCN

The most complete rotational analysis is that reported by Tetenbaum [52000] for the J=6–5 lines, Burrus and Gordy [56003] for the millimeter transitions and Oka and Hirakawa [57002] for the J=1–0 and J=2–1 transitions. Although the small differences in the rotational and hyperfine constants reported in these independent studies might be eliminated by refitting the entire data set, the magnitude of such an effort could not be justified in light of the slight improvements foreseen. Note that the frequency for the upper ℓ-doublet of ^{79}BrCN in table IX of Burrus and Gordy [56005] should read 223 150.44. Also the present tables have labeled the vibrational state for the Br–C stretch as ν_3 rather than ν_1 which was used in the references cited.

4) ClCN

The frequency for the ν_2=1, J=2–1, F=7/2–5/2 transition of $^{35}Cl^{12}C^{14}N$ given by Townes et al. [48002] should read 23938.6 MHz and not 23928.6 MHz. In table IV of reference [51003] the column headings should be reversed for the observed transitions. In table IX of reference [56005] the J=18–17 transitions for ^{37}ClCN are not consistent with the other observations. These are not included in the present work. The Cl–C stretching vibration is labeled ν_3 here rather than ν_1 as given in the literature.

5) HCN and OCS

The substance of the present HCN and OCS tables was taken from the excellent review by A. Maki [74001]. This has been supplemented with new data from several recent publications. It should be noted that the calculated hypothetical transition frequency for the J=2–1 of $H^{13}C^{14}N$ given in table 16 of [74011] is erroneous. The correct measured frequency is given in table 10.2 here. The asterisks shown in the uncertainty columns of the spectral line table for HCN and OCS indicate that the transition frequency is a calculated rather than a measured value.

6) OCSe

In calculating B_v the centrifugal distortion term was included for all cases. Several errors in the original work have been corrected. In [49000] the J=3–2 transition of

$OC^{74}Se$ (00^00) should read 24574.67 MHz, in [50012] the $J=3$–2 transition of $OC^{77}Se$ (00^00) should read 24331.38 MHz and in [67010] the $J=4$–3 transition of $^{18}O^{12}C^{80}Se$ (00^00) should read 29781.5 MHz. This last line has been remeasured in [76015]. The value of $eqQ(^{79}Se)$ and $c(^{79}Se)$ given in [55005] should be positive rather than negative as shown.

7) ClNO

In the reanalysis of $^{35}ClNO$, two measured lines were excluded from the fit since they show significant deviations. The $10_{9,2}$–$9_{9,1}$ transition reported in [66012] at 111213.25 MHz is calculated 1.48 MHz higher in frequency with an uncertainty of 0.14 MHz and the $18_{0,18}$–$17_{0,17}$ line reported in [66012] at 198798.54 MHz is calculated 15.62 MHz lower in frequency with an uncertainty of 0.18 MHz. The error in the $4_{1,3}$–$4_{0,4}$ transition frequency reported in [75010] has been corrected to read 83635.88 MHz. Very poor agreement was obtained in the centrifugal distortion fit to the $2_{0,2}$–$1_{0,1}$ transition and hyperfine splittings for $^{37}ClNO$. The strongest components, the unresolved pair $F=7/2$–$5/2$ and $F=5/2$–$3/2$, are calculated 0.80 MHz higher than observed and the $F=3/2$–$3/2$ transition is calculated 1.32 MHz higher than observed. The hyperfine analysis included the three components of the $1_{0,1}$–$0_{0,0}$ transition and the three unblended components of the $2_{1,2}$–$1_{1,1}$ and $2_{1,1}$–$1_{1,0}$ transitions. The discrepancy could arise from ignoring the ^{14}N hyperfine splitting, although this appears unlikely since these splittings were apparently unresolved.

8) NSCl

The $12_{2,10}$–$13_{1,13}$ frequency in reference [72045] has been corrected to read 31601.97 MHz.

9) Cl_2O

Three isotopic forms of Cl_2O have been refit. For $^{35}Cl_2O$ four of the measured transitions were not included in the centrifugal distortion fit since they showed poor agreement with the calculated values. The transitions excluded were the following:

	ν_{obs}(MHz)	$\Delta\nu$(0bs–calc)
$12_{2,11}$–$13_{1,12}$	10 358.5	−2.16
$17_{1,16}$–$16_{2,15}$	26 581.0	−0.75
$32_{4,28}$–$33_{3,31}$	36 359.5	0.72
$32_{4,29}$–$33_{3,30}$	24 543.6	−0.52

For $^{35}ClO^{37}Cl$ all observed lines were refit. Although the fit was relatively poor as can be seen from the standard deviation of the fit (table 26), none of the transitions could be excluded based on the analysis. However, for $^{37}Cl_2O$ one measurement clearly was not consistent with the rest of the data. When excluded from the centrifugal distortion analysis, the $16_{2,14}$–$17_{1,17}$ transition with reported center frequency of 26895.0 MHz was calculated as 26883.9±1.0 MHz. The other lines agreed rather well.

10) HOF

In reanalyzing HOF and DOF, one transition of each species was excluded. In each case the statistical deviations noted were sufficiently small; thus, the decision to remove these from the analysis was borderline. For HOF the $7_{1,7}$–$6_{1,6}$ at 361349.55 was not fit and calculated at 361350.22±0.12. For DOF the line excluded was the $5_{3,2}$–$4_{3,1}$ measured at 245734.60 and calculated at 245735.11±0.03. Several typographical errors in reference [72030] were corrected. In table I of [72030] the quantum numbers for the 365648.94 transition should read $6_{0,6}$–$7_{0,7}$. In table IV the decimal point in the τ_{aaaa} value of DOF is misplaced and should read −106.53.

11) FNO

One transition was not included in the P^6 centrifugal distortion analysis since it shows a large deviation from the calculated value. In particular, the $14_{2,12}$–$15_{1,15}$ transition is calculated at 27632.73(30) MHz but is reported 2.15 MHz higher in frequency. Several other transitions listed below show fairly large $\Delta\nu$(obs-calc):

Transition	$\Delta\nu$(obs–calc) MHz
$18_{2,16}$–$17_{3,15}$	0.486
$12_{2,10}$–$13_{1,13}$	0.481
$8_{0,8}$ – $7_{1,7}$	−0.449
$8_{5,4}$ – $7_{5,3}$	0.640
$7_{3,5}$ – $6_{3,4}$	0.696
$7_{1,6}$ – $6_{1,5}$	0.436
$7_{5,3}$ – $6_{5,2}$	−0.430
$5_{0,5}$ – $4_{1,4}$	−0.606

Based on the students t test, which ranged from 2 to 3 for these lines they could not be excluded but the measurement accuracy is questionable in these cases.

12) NSF

Three transitions fit poorly and were excluded from the final analysis. Their calculated frequencies are shown below along with $\Delta\nu$ which is ν_{obs}–ν_{calc}:

$1_{1,0}$ – $1_{0,1}$	42324.390(14) MHz	$\Delta\nu=0.400$ MHz
$15_{2,13}$–$16_{1,16}$	20474.989(22) MHz	$\Delta\nu=0.229$ MHz
$15_{4,12}$–$16_{3,13}$	20649.868(19) MHz	$\Delta\nu=0.218$ MHz

The centrifugal distortion results given are identical to those reported by Kirchhoff [72031], however, the molecular constants are quoted with more significant figures. An improved analysis of the nuclear quadrupole interaction of ^{14}N was obtained from a fit to 33 hyperfine components with a standard deviation of 0.047 MHz.

13) GeF_2

Three isotopic forms of GeF_2 were reanalyzed. All the transitions reported for $^{70}GeF_2$ were fit. The $3_{0,3}$–$2_{1,2}$ transition of $^{72}GeF_2$ showed substantial deviation, calculated 0.76 MHz higher than observed, and was excluded.

Similarly, two lines of $^{74}GeF_2$ had large t test values. The lines excluded were the $7_{3,4}$–$7_{2,5}$ reported at 33146.39 and calculated at 33147.87(18) and the $7_{4,3}$–$6_{5,2}$ line measured at 17098.86 and calculated at 17099.64(6).

14) NF_2

All but one transition reported by Brown et al. [74003] was employed in the present centrifugal distortion analysis. The $14_{2,12}$–$15_{1,15}$ transition, which was excluded, was calculated at 16510.07±8.80 MHz which is 174 MHz higher in frequency than reported. Brown et al. indicated that the reported center frequency is uncertain since the observed multiplet pattern was incomplete.

15) F_2O

The spectrum analysis of F_2O by Kirchhoff has been reexamined in the present work. Details of the present centrifugal distortion fit and comparison with Kirchhoff's results are given in the Appendix (sec. A.2). Although some improvement resulted from this analysis, it should be noted that in both cases all the sextic centrifugal distortion constants are not well determined but necessary to obtain a fit which is consistent with the measurement accuracy. New measurements have allowed further improvement in the constants given in table 34.

16) SF_2 and SiF_2

For SF_2 the centrifugal distortion analysis reported by Kirchhoff, Johnson, and Powell [73035] is given in table 35. For SiF_2 the results Kirchhoff [72031] reported are given, however, the values of the determinable parameters are quoted to the number of significant figures required to reproduce the calculated transition frequencies.

17) H_2O and H_2S

The microwave spectrum of both H_2O and H_2S were recently critically reviewed by DeLucia et al. [74005] and Helminger et al. [73040]. Due to the importance of these molecules in atmospheric, interstellar, and laboratory studies, the measured and calculated spectral lines reported in these reviews for HDO, H_2S, and HDS are included in the spectral tables. Also the measured spectral lines reported for isotopic forms of these molecules, which were not included in the earlier reviews, are included in the present tables. An asterisk in the uncertainty column indicates that the frequency given is calculated rather than measured.

18) H_2Se

A misprint in table III of [50011] was corrected. The quantum number heading for the first column should read $1_{0,1}$–$1_{1,0}$.

19) S_2O

Some of the rotational lines of S_2O were measured independently by Tiemann et al. [74006] and Cook et al. [73041]. These measurements were examined to obtain the best data set. The $^{32}S_2O$ transitions given in table 50.2 were selected as the best set based both on the reported measurement uncertainty and their agreement in the analysis reported in [74006]. The centrifugal distortion analysis of this set of transitions provided the slightly improved rotational and distortion constants shown in table 50.

20) SO_2

The number of rotational transitions of the 19 isotopic forms of SO_2 which have been reported exceeds 3000. Unfortunately, in the majority of the papers published on SO_2 no measurement uncertainties are given, and in spite of detailed centrifugal distortion analyses no standard deviations of the molecular constants are reported. For this reason and the importance of SO_2 in laboratory and astronomical studies, reanalysis of the most abundant isotopic forms of SO_2 was carried out. For $^{32}S^{16}O_2$ the spectrum of the ground vibrational state, ν_1, ν_2, $2\nu_2$, and ν_3 were refit. Due to limitations in the computer program employed, all calculations were restricted to $J \leqslant 60$. For the ground state of $^{32}S^{16}O_2$ 198 transitions were least-squares fit to the P^6 Hamiltonian. The SO_2 spectral line table lists all the measured transitions and the predicted transition frequencies of lines not measured up to 360 GHz $J \leqslant 60$. Both the observed and predicted frequencies are given for transitions which were not included due to limited program size. Comparison of the observed and predicted frequencies of these lines indicated that little improvement in the fit would be obtained in an extended analysis. It should be noted that the unpublished data communicated privately by Schonk was assigned to the ground and ν_2 states of $^{32}SO_2$ from preliminary calculations, and was included in the final fit.

The data base for the remaining vibrational states and isotopic species of SO_2 was the limiting factor in the reanalysis. The number of transitions, maximum J and frequency range of the calculations are summarized in table 1.3.1. Due to the wide range in the data available, the predicted transitions, given in table 51.7, were restricted to a maximum standard deviation in frequency as shown in the last line of table 1.3.1 here. No predicted frequencies are provided for $^{33}SO_2$, since the hyperfine split lines would make the table quite voluminous. If these are of interest, the predicted values may be obtained from the author. The factor which determined which vibrational states and isotopic forms to be reanalyzed was the estimated population at room temperature was ~0.3 percent or greater. In all cases the predicted transitions are indicated with an asterisk in the uncertainty column.

In Vol. IV of NBS Monograph 70 [1] the SO_2 dipole moment was erroneously listed as μ_a rather than μ_b. Unfortunately this error has led to several radio-astronomical searches for non-existent a-type transitions of SO_2. B. E. Turner, M. A. Gordon and G. T. Wrixon (Astrophys. J. **177**, 609 (1972)) reported a negative result from a search for the 2_{02}–1_{01} transition and T. Cato, J. Ellder, B. Höglund, O. E. H. Rydbeck, B. Rönnäng and A. Sume (Onsala Space Observatory, Chalmers University of Technology, Research Report No. 109 (1972)) report a search for the 1_{10}–1_{11} transition. Since SO_2 was subsequently detected in interstellar sources (L. E. Snyder, J. M. Hollis, B. L. Ulich, F. J. Lovas, D. R. Johnson, and D. Buhl, Astrophys. J. (Letters) **198**, L81 (1975)), the

TABLE 1.3.1. Limits employed in the analysis of SO_2 and transition frequency predictions

Molecular species	Number of transitions fit	J_{max}	Maximum frequency	Maximum standard deviation (employed in limiting the predicted transitions)
$^{32}SO_2$ gnd.	198	60	360 GHz	no limit
$^{32}SO_2$ ν_1	41	46	360 GHz	2 MHz
$^{32}SO_2$ ν_2	90	60	360 GHz	5 MHz
$^{32}SO_2$ ν_3	33	42	360 GHz	2 MHz
$^{32}SO_2$ $2\nu_2$	52	53	360 GHz	2 MHz
$^{33}SO_2$ gnd.	40	40	130 GHz	no predictions
$^{34}SO_2$ gnd.	59	50	350 GHz	5 MHz
$^{34}SO_2$ ν_2	24	38	50 GHz	no limit

detailed listing of the measured and calculated rotational spectrum of SO_2 presented in table 51.7 should provide guidance for further astronomical observations. Also, this complete list of the SO_2 spectral lines should benefit laboratory studies. Sulfur dioxide is often formed as a gas-phase by-product from the decomposition of sulfate impurities in many refractory compounds employed in high temperature microwave studies. The SO_2 spectrum may also serve for calibration of sub-millimeter spectrometers where a reference spectrum is often required to determine the frequency scale. The SO_2 data in table 51.7 were limited to a frequency of 360 GHz, however, calculations on the $^{32}S^{16}O_2$ ground state have been extended to 1500 GHz for transitions up to $J=60$. These results are available from the author upon request.

21) O_3

Due to the importance of ozone in both laboratory and atmospheric studies, several of the more abundant isotopic forms were reanalyzed in order to provide predicted transition frequencies where no measurements are available. Only $^{16}O_3$, $^{16}O^{16}O^{18}O$, and $^{16}O^{18}O^{16}O$ were included. For $^{16}O_3$ eight of the measured lines were not fit due to large statistical deviations. For $^{16}O^{18}O^{16}O$ two transitions were not fit and three of the $^{16}O^{16}O^{18}O$ transitions were excluded. These are listed in table 1.3.2 along with the $\Delta\nu$(obs–calc) and $t(\Delta\nu)$ values. Predictions were carried to $J=42$ for $^{16}O_3$, to $J=43$ for $^{16}O^{16}O^{18}O$, and to $J=38$ for $^{16}O^{18}O^{16}O$. The calculated values ranged up to 400 GHz. No predicted lines were eliminated from inclusion in table 53.4 due to large predicted uncertainties since the largest encountered was ~ 0.7 MHz. The molecular constants resulting from this analysis are shown in table 53. The spectra from $^{18}O^{16}O^{18}O$, $^{16}O^{18}O^{18}O$, and $^{18}O_3$ were also refit, but predicted transitions for these rarer forms were not included in the spectral tables. All measurements reported for these species were included in the analysis which resulted in the parameters given in table 53.1.

TABLE 1.3.2. Transitions excluded in analysis of ozone

Molecule	Transition	Measured frequency (MHz)	$\Delta\nu$ (MHz)	$t(\Delta\nu)^a$
$^{16}O_3$	$8_{3,5}-9_{2,8}$	244 158.04	0.39	6.6
	$10_{1,9}-9_{2,8}$	10 226.00	0.27	4.7
	$9_{3,7}-10_{2,8}$	210 803.80	-0.58	-10.1
	$21_{2,20}-20_{3,17}$	9 201.00	0.71	12.2
	$23_{4,20}-24_{3,21}$	14 866.00	0.62	10.5
	$27_{3,25}-26_{4,22}$	16 163.00	0.61	10.4
	$38_{6,32}-39_{5,35}$	25 511.00	-0.83	12.2
	$41_{5,37}-40_{6,34}$	27 862.00	-0.57	- 7.5
$^{16}O^{18}O^{16}O$	$9_{2,8}-9_{1,9}$	295 318.60	0.10	3.5
	$26_{6,20}-27_{5,23}$	258 336.50	-0.13	- 4.2
$^{16}O^{16}O^{18}O$	$26_{2,24}-26_{1,25}$	295 432.72	-0.14	- 3.9
	$26_{6,21}-27_{5,22}$	367 444.09	0.15	3.8
	$35_{3,32}-35_{2,33}$	368 074.31	-0.30	- 3.8

[a] $t(\Delta\nu)=\Delta\nu/\sigma(\Delta\nu)$ where $\sigma(\Delta\nu)=\{\sigma^2+\sigma^2(\nu_{calc})\}^{\frac{1}{2}}$ and σ is the standard deviation of the fit.

1.4. List of Symbols

a. Quantum Numbers

J	Resultant total angular momentum quantum number, excluding nuclear spins.
N	Rotational angular momentum quantum number, excluding electron and nuclear spins, in the case where electron spin is present.
K	Projection of J (or N) on the symmetry axis in the limiting prolate or oblate symmetric top.
F_1	Resultant angular momentum quantum number including nuclear spin for one nucleus.
F	Resultant total angular momentum quantum number.
λ or ϵ	Quantum number employed when F_1 is not a good quantum number. This value simply numbers the levels from lowest to highest energy for the same F quantum number.
ν_1,ν_2,ν_3 v_1,v_2,v_3	Vibrational modes (ν) and quantum numbers (v). ν_1 is the highest energy symmetric stretching mode, ν_2 is the bending mode, and ν_3 is the asymmetric stretch for XY_2 molecules or lowest energy stretch for XYZ molecules.
U or L	Upper or lower energy level or transition frequency.
′ or ″	Prime or double prime is used to distinguish the upper (′) and lower (″) levels in a transition. They occur as superscripts on the quantum numbers.
ℓ	Quantum number for vibrational angular momentum.
I (or I_i)	Angular momentum quantum number of nuclear spin for one (or ith) nucleus.
S	Resultant angular momentum number of electron spins. Σ is the projection of S on the molecular axis.
Λ	Absolute values of the projection of the resultant orbital angular momentum on the molecular axis.
Ω	Absolute value of the projection of the total electronic angular momentum on the molecular axis.
Σ, Π, Δ	Electronic state designation for which $\Lambda=0,1,2$, respectively.

b. Molecular Constants

A,B,C $\mathscr{A},\mathscr{B},\mathscr{C}$	Rotational constants (MHz). These are related to the principal moments of inertia: $A=h/8\pi^2 I_a$, etc.
$\bar{B}$	B-bar equals $(B+C)/2$.
τ, Δ, δ, D	Quartic centrifugal distortion constants (MHz or kHz).
H, h	Sextic centrifugal distortion constants (MHz or kHz).
L, ℓ, G, g	Octic centrifugal distortion constants (MHz).
P, p, F	Dectic centrifugal distortion constants (MHz).
eqQ_{aa}(X),... χ_{aa}(X),...	Nuclear electric quadrupole coupling constant along principal axis indicated for nucleus X (MHz).
$eqQ\eta$	Product of the nuclear quadrupole coupling constant and the asymmetry parameter for the bending vibrational state.
$\mu_{a,b}$	Components of the electric dipole moment along the a- or b-principal axes.
α_v, γ_{vv}	Rotation-vibration coefficients in the power series representing B_v (see text).
q_v	ℓ-doubling constant (MHz).
$\sigma_{\parallel},\sigma_{\perp}$	Components of the magnetic shielding tensor which are parallel and perpendicular to the molecular axis, respectively.
Q	Molecular quadrupole moment relative to the center of mass (esu·cm^2).
$\alpha_{\parallel}-\alpha_{\perp}$	Electric polarizability anisotropy (cm^3).
$\chi_{\perp},\chi_{\parallel}$	Components of the magnetic susceptibility tensor which are respectively perpendicular and parallel to the molecular axis (erg/G^2·mol).
$\chi_{xx}-\chi_{yy}$	Magnetic susceptibility anisotropy.
$g_{\perp},g_{\parallel}$	Components of the molecular **G** tensor which are respectively perpendicular and parallel to the molecular axis. $g_{\perp}$ is sometimes denoted g or g_J for linear molecules in the ground state (μ_N).
$g_{xx}-g_{yy}$	Anisotropy of the molecular **G** tensor perpendicular to the molecular axis (μ_N).
c_X or M	Spin rotation constant related to nucleus X (kHz).
S_{XY}	Spin-spin interaction constant between nucleus X and nucleus Y (kHz).

α_p, β_p — Ω-type doubling parameters,

$$\alpha_p = 4\Sigma(-1)^S \times \frac{\langle \Pi | (A+2B)L_y | \Sigma \rangle \langle \Sigma | BL_y | \Pi \rangle}{E_\Sigma - E_\Pi}$$

$$\beta_p = 4\Sigma(-1)^S \times \frac{| \langle \Pi | BL_y | \Sigma \rangle |^2}{E_\Sigma - E_\Pi}$$

p_{eff} — Λ-type doubling constant in the $^2\Pi_{1/2}$ state (MHz).

a,b,c,d — Magnetic hyperfine coupling constants (MHz) where,

$$a = 2\mu_B g_N \mu_N \langle 1/r^3 \rangle,$$

$$b = -\mu_B g_N \mu_N \left\langle \frac{3\cos^2\chi - 1}{r^3} \right\rangle + \frac{16}{3}\pi \mu_B g_N \mu_N \Psi^2(0),$$

$$c = 3\mu_B g_N \mu_N \left\langle \frac{3\cos^2\chi - 1}{r^3} \right\rangle,$$

$$d = 3\mu_B g_N \mu_N \left\langle \frac{\sin^2\chi}{r^3} \right\rangle.$$

Here μ_B is the Bohr magneton, μ_N is the nuclear magneton, and g_N is the nuclear g-value.

A — Spin-orbit coupling constants defined by the power series expansion, $A = A_e + A_{(1)}\xi + A_{(2)}\xi^2 + \ldots$.

$(O)_S$ — Spin-rotation interaction constant (ref. [21]). Coefficient in the Hamiltonian term $(O)_S\ N{\cdot}S$. This is related to ϵ_{ii}'s in Lin's notation [19] as $(O)_S = 1/3(\epsilon_{xx}+\epsilon_{yy}+\epsilon_{zz})$.

$(ij)_S, T_{ij}$ — Spin-rotation interaction constants where i and j are a, b, or c and the Hamiltonian term is $\Sigma(ij)_S N_i S_j$. See Curl and Kinsey [21] and Bowater et al. [22] (for T_{ij} notation) for correspondence to the notation of other workers.

$(O)_I, a_I$ — Fermi interaction constant and coefficient of the $I{\cdot}S$ operator. $(O)_I = (16\pi/3)g_I\mu_B\mu_N [\Psi(O)]^2$.

$(ij)_I$ — Magnetic dipole-dipole interaction constant in the Hamiltonian term $(ij)_I S_i I_j$ where i and j are a, b, or c. $(ij)_S = g_S g_I \mu_B \mu_N [\delta_{ij} - 3r_i r_j / r^3]_{Av}$.

$(ij)_Q$ — Nuclear electric quadrupole interaction constant in the term $(ij)_Q I_i I_j$ where i and j are a, b, or c and $(ij)_Q = [eQ/2I(2I-1)](\partial^2 V/\partial i \partial j)$.

A_S, B_S, C_S — Combination of spin-rotation constants where $A_S = (aa)_S + (O)_I$, $B_S = (bb)_S + (O)_I$ and $C_S = (cc)_S + (O)_I$.

c. Other

X — Refers to unknown uncertainty when appearing in the uncertainty column.

* — Asterisks in the uncertainty column indicate that the transition frequency is calculated rather than measured.

(...) — Parentheses in the numerical listings contain measured or estimated uncertainties. For example, the value 1.407(83) should be interpreted as 1.407 ± 0.083. Thus the value in parentheses refers to the last significant digits given.

a,b,c — Designate principal axes corresponding to A, B, and C, respectively.

r(X–Y) — Distance between centers of mass of atoms X and Y (Å).

∠XYZ — Angle formed by atoms X, Y, and Z (degrees).

1.5. Special Units, Fundamental Constants, and Useful Conversion Factors

a. Special Units

D — Abbreviation for Debye units (1 D$=10^{-18}$ electrostatic units of charge $\times$ centimeters, or 1 D$=3.33564\times10^{-30}$ coulomb-meter).

cm^{-1} — Reciprocal wavelength (wave number) employed as a unit proportional to energy.

Å — Angstrom abbreviation for the unit of length in bond distances (1 Å$=10^{-10}$ m).

b. Fundamental Constants and Conversion Factors [23]

$A{\cdot}I_a$	$= 5.0537905(85)\times10^5$ MHz·u·Å^2,
h	$= 6.626176(36)\times10^{-34}$ J·s,
c	$= 2.99792458(1)\times10^8$ m·s^{-1}
1 cm^{-1}	$= 1.986478(11)\times10^{-23}$ J,
	$= 11.96266$ J mol^{-1},
	$= 29\ 979.2458$ MHz,
1 u	$= 1.6605655(86)\times10^{-27}$ kg.

1.6. Acknowledgments

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1.7. References to the Introduction

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2. Molecular Constants and Spectral Line Tables

As described in section 1.1, the data tables for each molecule consist of a table of derived molecular constants followed by the spectral line table. These are ordered alphabetically by the empirical formula.

The molecular constants are presented for each isotopic species in the order: rotational constants, hyperfine structure constants, electric and magnetic dipole moments and, when appropriate, additional references which were not utilized in the tabulation.

The spectral line tables are organized first by isotopic species. For each species the transitions are listed by increasing frequency. The references to all data can be found in section 3.

Table 1. Molecular parameters for ArClF [74009].

Parameter	$Ar^{35}ClF$ Value	$Ar^{37}ClF$ Value
$\bar{B}$ (MHz)	1327.113(5)	1319.650(5)
D_J (kHz)	4.66(20)	4.72(20)
eqQ (MHz)	-140.869(15)	-111.053(15)
S_{ClF} (kHz)	2.556[a]	
c_{Cl} (kHz)	1.85[a]	
c_F (kHz)	-1.943[a]	
μ_a (D)	1.053(3)	

[a] Obtained from the parameters for ClF.

TABLE 1.1. The microwave spectrum of ArClF

Isotopic species	$J',K' - J'',K''$	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{40}Ar^{35}Cl^{19}F$	2, 0 - 1, 0		1/2		1/2	$(0,0^0,0)$	5308.305	(5E-3)	[74009]
	2, 0 - 1, 0		1/2		3/2	$(0,0^0,0)$	5371.730	(5E-3)	[74009]
	3, 0 - 2, 0		3/2		1/2	$(0,0^0,0)$	7955.168	(5E-3)	[74009]
	3, 0 - 2, 0		9/2		7/2	$(0,0^0,0)$	7963.868	(5E-3)	[74009]
$^{40}Ar^{37}Cl^{19}F$	2, 0 - 1, 0		1/2		1/2	$(0,0^0,0)$	5378.450	(5E-3)	[74009]
	2, 0 - 1, 0		1/2		3/2	$(0,0^0,0)$	5428.445	(5E-3)	[74009]
	3, 0 - 2, 0		3/2		1/2	$(0,0^0,0)$	7911.860	(5E-3)	[74009]

Table 2. Molecular parameters for ArClH [73026]

Parameter	$Ar^{35}ClH$ Value	$Ar^{37}ClH$ Value	$Ar^{35}ClD$ Value	$Ar^{37}ClD$ Value
$\bar{B}$ (MHz)	1678.511(5)	1631.604	1657.627[a]	1611.904[a]
D_J (kHz)[a]	20.0(4)	19.0(4)	17.1(4)	16.4(4)
eqQ_{Cl} (J=1) (MHz)	-23.027(10)	-18.173[b]	-36.250(20)	-28.587[a]
eqQ_{Cl} (J=2) (MHz)	-23.025(20)		-36.262(30)	
eqQ_D (J=2) (kHz)			102.3(50)	
μ_a (J=1) (D)	0.81144(10)			
μ_a (J=2) (D)	0.81121(10)		1.00355(70)	

[a] From reference [76029].

[b] Derived from eqQ for the ^{35}Cl species and $Q_{^{35}Cl}/Q_{^{37}Cl}$ = 1.2688.

TABLE 2.1. The microwave spectrum of ArClH

Isotopic species	$J',K' - J'',K''$	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{40}Ar^{35}ClH$	1, 0 - 0, 0		5/2		3/2	$(0,0^0,0)$	3358.090	(0.01)	[73026]
	1, 0 - 0, 0		1/2		3/2	$(0,0^0,0)$	3362.698	(0.01)	[73026]
	2, 0 - 1, 0		1/2		1/2	$(0,0^0,0)$	6713.394	(0.01)	[73026]
	2, 0 - 1, 0		1/2		3/2	$(0,0^0,0)$	6723.756	(0.01)	[73026]
	3, 0 - 2, 0		3/2		1/2	$(0,0^0,0)$	10067.732	(0.01)	[76029]
	4, 0 - 3, 0					$(0,0^0,0)$	13417.	(X)	[73026]
	4, 0 - 3, 0					$(0,0^0,0)$	13418.	(X)	[73026]
	4, 0 - 3, 0					$(0,0^0,0)$	13422.	(X)	[73026]
	4, 0 - 3, 0					$(0,0^0,0)$	13424.	(X)	[73026]
	5, 0 - 4, 0					$(0,0^0,0)$	16769.	(X)	[73026]
	5, 0 - 4, 0					$(0,0^0,0)$	16775.	(X)	[73026]
$^{40}Ar^{37}ClH$	1, 0 - 0, 0		5/2		3/2	$(0,0^0,0)$	3264.	(X)	[73026]
	1, 0 - 0, 0		1/2		3/2	$(0,0^0,0)$	3267.670	(0.01)	[73026]
	2, 0 - 1, 0					$(0,0^0,0)$	6522.	(X)	[73026]
	2, 0 - 1, 0					$(0,0^0,0)$	6526.	(X)	[73026]
	2, 0 - 1, 0		1/2		3/2	$(0,0^0,0)$	6533.973	(0.01)	[76029]
$^{40}Ar^{35}ClD$	1, 0 - 0, 0		5/2		3/2	$(0,0^0,0)$	3317.002	(0.01)	[73026]
	1, 0 - 0, 0		1/2		1/2	$(0,0^0,0)$	3324.255	(0.01)	[73026]
	2, 0 - 1, 0					$(0,0^0,0)$	6630.	(X)	[73026]
	2, 0 - 1, 0		1/2		3/2	$(0,0^0,0)$	6646.273	(0.01)	[76029]
$^{40}Ar^{37}ClD$	1, 0 - 0, 0		1/2		1/2	$(0,0^0,0)$	3230.895	(0.01)	[73026]
	2, 0 - 1, 0		1/2		1/2	$(0,0^0,0)$	6447.092	(0.01)	[76029]
	2, 0 - 1, 0		1/2		3/2	$(0,0^0,0)$	6459.957	(0.01)	[76029]

Table 3. Molecular parameters for ArFH [74021].

Parameter	Value
$\bar{B}$ (MHz)	3065.719(2)
D_J (kHz)	72.1(2)
S_{HF} (kHz)	29.2(15)
μ_a (D)	1.332(2)

TABLE 3.1. The microwave spectrum of ArFH

Isotopic species	J',K' - J",K"	F'	F_1'	F"	$F_1"$	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{40}Ar^{19}FH$	1, 0 - 0, 0	1		1		$(0,0^0,0)$	6131.134	(2E-3)	[74021]
	1, 0 - 0, 0	1		1		$(0,0^0,0)$	6131.153	(2E-3)	[74021]
	1, 0 - 0, 0	2		1		$(0,0^0,0)$	6131.153	(2E-3)	[74021]
	1, 0 - 0, 0	0		1		$(0,0^0,0)$	6131.178	(2E-3)	[74021]
	2, 0 - 1, 0	2		0		$(0,0^0,0)$	12260.525	(4E-3)	[74021]
	2, 0 - 1, 0	1		0		$(0,0^0,0)$	12260.555	(4E-3)	[74021]
	2, 0 - 1, 0	2		1		$(0,0^0,0)$	12260.555	(4E-3)	[74021]
	2, 0 - 1, 0	1		1		$(0,0^0,0)$	12260.581	(4E-3)	[74021]
	2, 0 - 1, 0	2		1		$(0,0^0,0)$	12260.581	(4E-3)	[74021]

Table 4. Rotational constants for HBS [73027].

Isotopic Species	Vib. State $v_1\ v_2^{\ell}\ v_3$	B_v (MHz)	D_v (MHz)	q_v (MHz)
$H^{11}B^{32}S$	0 0^0 0	19083.006(4)	0.02189(4)	
	1 0^0 0	18994.33(42)[a]	---	
	0 1^1 0	19106.472(20)	0.0219[b]	46.45(1)
$H^{10}B^{32}S$	0 0^0 0	20080.234(9)	0.02422(9)	
	1 0^0 0	19979.0(12)[a]	---	
	0 1^1 0	20108.482(30)	0.0240[b]	50.80(5)
$H^{11}B^{34}S$	0 0^0 0	18791.623(10)	0.02125(10)	
	1 0^0 0	18704.4(12)[a]	---	
$H^{10}B^{34}S$	0 0^0 0	19793.168(15)	0.02318(25)	
	1 0^0 0	19693.5(18)[a]	---	
$D^{11}B^{32}S$	0 0^0 0	15937.934(7)	0.01425(4)	
	0 1^1 0	15970.719(20)	0.0143[b]	40.65(6)
$D^{10}B^{32}S$	0 0^0 0	16563.378(11)	0.01561(6)	
	0 1^1 0	16600.733(30)	0.0156[b]	43.16(2)
$D^{11}B^{34}S$	0 0^0 0	15686.936(12)	0.01402(8)	
$D^{10}B^{34}S$	0 0^0 0	16317.465(18)	0.01497(14)	

[a] Calculated from $\Delta B = B' - B''$ given by Sams and Maki [75013].

[b] The ground state value of D_v was assumed to derive B_v from the data in Ref. [73027]. The B_v values given may not represent the true value due to a lack of information on the possible Fermi resonance between the $(0,2^0,0)$ and $(0,0^0,1)$ excited states.

Table 4.1. Hyperfine and Zeeman constants and electric dipole moment for HBS [74039].

Parameter	Value	Zeeman Constants	$H^{11}B^{32}S$ Value	$D^{11}B^{32}S$ Value
eqQ (^{11}B)	-3.72 (3) MHz	$g_\perp$ (μ_N)	-0.0414(2)	-0.0356(2)
eqQ (^{10}B)	-7.91 (3) MHz	$\chi_\perp - \chi_\parallel$ (erg/G^2.mole)	$7.2(5)\times10^{-6}$	$9.8(21)\times10^{-6}$
$M_\perp$ (^{11}B)	-7.2 (30) kHz	$Q_\parallel$ (esu·cm^2)	$2.7(6)\times10^{-26}$	
$M_\perp$ (^{10}B)	-2.6 (10) kHz			
μ_0	1.298(5) D			

TABLE 4.2. The microwave spectrum of HBS

Isotopic species	J′ – J″	F′	F_1'	F″	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$H^{11}B^{32}S$	1 – 0		3/2		3/2	$(0,0^0,0)$	38165.250	(0.05)	[74039]
	1 – 0		5/2		3/2	$(0,0^0,0)$	38166.198	(0.05)	[74039]
	1 – 0		1/2		3/2	$(0,0^0,0)$	38166.907	(0.05)	[74039]
	3 – 2					$(0,0^0,0)$	114495.62	(0.10)	[73027]
	4 – 3					$(0,0^0,0)$	152658.42	(0.10)	[73027]
	4 – 3					$(0,1^{L1},0)$	152660.72	(0.10)	[73027]
	4 – 3					$(0,1^{U1},0)$	153032.27	(0.10)	[73027]
	5 – 4					$(0,0^0,0)$	190819.16	(0.10)	[73027]
	5 – 4					$(0,1^{L1},0)$	190821.95	(0.10)	[73027]
	5 – 4					$(0,1^{U1},0)$	191286.54	(0.10)	[73027]
	6 – 5					$(0,0^0,0)$	228977.17	(0.10)	[73027]
	7 – 6					$(0,0^0,0)$	267132.04	(0.10)	[73027]
	8 – 7					$(0,0^0,0)$	305283.24	(0.10)	[73027]
$H^{10}B^{32}S$	3 – 2					$(0,0^0,0)$	120478.83	(0.10)	[73027]
	4 – 3					$(0,0^0,0)$	160635.60	(0.10)	[73027]
	4 – 3					$(0,1^{L1},0)$	160658.99	(0.10)	[73027]
	4 – 3					$(0,1^{U1},0)$	161065.00	(0.10)	[73027]
	5 – 4					$(0,0^0,0)$	200790.34	(0.10)	[73027]
	6 – 5					$(0,0^0,0)$	240942.09	(0.10)	[73027]
	6 – 5					$(0,1^{L1},0)$	240976.72	(0.10)	[73027]
	6 – 5					$(0,1^{U1},0)$	241586.84	(0.10)	[73027]
	7 – 6					$(0,0^0,0)$	281090.43	(0.10)	[73027]
	8 – 7					$(0,0^0,0)$	321234.47	(0.10)	[73027]
$H^{11}B^{34}S$	4 – 3					$(0,0^0,0)$	150327.46	(0.10)	[73027]
	5 – 4					$(0,0^0,0)$	187905.55	(0.10)	[73027]
	6 – 5					$(0,0^0,0)$	225481.26	(0.10)	[73027]
	7 – 6					$(0,0^0,0)$	263053.63	(0.10)	[73027]
	8 – 7					$(0,0^0,0)$	300622.37	(0.10)	[73027]
$H^{10}B^{34}S$	4 – 3					$(0,0^0,0)$	158339.37	(0.10)	[73027]
	5 – 4					$(0,0^0,0)$	197920.14	(0.10)	[73027]
	6 – 5					$(0,0^0,0)$	237497.97	(0.10)	[73027]
$D^{11}B^{32}S$	1 – 0		3/2		3/2	$(0,0^0,0)$	31875.045	(0.05)	[74039]
	1 – 0		5/2		3/2	$(0,0^0,0)$	31875.997	(0.05)	[74039]
	1 – 0		1/2		3/2	$(0,0^0,0)$	31876.720	(0.05)	[74039]
	6 – 5					$(0,0^0,0)$	191242.95	(0.10)	[73027]
	6 – 5					$(0,1^{L1},0)$	191392.80	(0.10)	[73027]
	6 – 5					$(0,1^{U1},0)$	191880.68	(0.10)	[73027]
	7 – 6					$(0,0^0,0)$	223111.60	(0.10)	[73027]
	7 – 6					$(0,1^{L1},0)$	223286.28	(0.10)	[73027]
	7 – 6					$(0,1^{U1},0)$	223855.38	(0.10)	[73027]
	8 – 7					$(0,0^0,0)$	254977.61	(0.10)	[73027]
	8 – 7					$(0,1^{L1},0)$	255177.36	(0.10)	[73027]
	8 – 7					$(0,1^{U1},0)$	255827.68	(0.10)	[73027]
	9 – 8					$(0,0^0,0)$	286841.17	(0.10)	[73027]
	10 – 9					$(0,0^0,0)$	318701.70	(0.10)	[73027]
	11 – 10					$(0,0^0,0)$	350558.67	(0.10)	[73027]
$D^{10}B^{32}S$	1 – 0		3		3	$(0,0^0,0)$	33125.526	(0.05)	[74039]
	1 – 0		4		3	$(0,0^0,0)$	33127.098	(0.05)	[74039]
	1 – 0		2		3	$(0,0^0,0)$	33127.627	(0.05)	[74039]
	6 – 5					$(0,0^0,0)$	198746.91	(0.10)	[73027]
	6 – 5					$(0,1^{L1},0)$	198936.73	(0.10)	[73027]
	6 – 5					$(0,1^{U1},0)$	199454.76	(0.10)	[73027]
	7 – 6					$(0,0^0,0)$	231865.83	(0.10)	[73027]
	7 – 6					$(0,1^{L1},0)$	232087.24	(0.10)	[73027]
	7 – 6					$(0,1^{U1},0)$	232691.23	(0.10)	[73027]
	8 – 7					$(0,0^0,0)$	264982.11	(0.10)	[73027]
	9 – 8					$(0,0^0,0)$	298095.49	(0.10)	[73027]
	10 – 9					$(0,0^0,0)$	331205.11	(0.10)	[73027]
	11 – 10					$(0,0^0,0)$	364311.10	(0.10)	[73027]
$D^{11}B^{34}S$	6 – 5					$(0,0^0,0)$	188231.04	(0.10)	[73027]
	7 – 6					$(0,0^0,0)$	219598.05	(0.10)	[73027]
	8 – 7					$(0,0^0,0)$	250962.16	(0.10)	[73027]
	9 – 8					$(0,0^0,0)$	282323.97	(0.10)	[73027]
	10 – 9					$(0,0^0,0)$	313682.67	(0.10)	[73027]

TABLE 4.2. The microwave spectrum of HBS—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$D^{10}B^{34}S$	6 - 5					$(0,0^0,0)$	195796.56	(0.10)	[73027]
	7 - 6					$(0,0^0,0)$	228424.12	(0.10)	[73027]
	8 - 7					$(0,0^0,0)$	261048.69	(0.10)	[73027]
	9 - 8					$(0,0^0,0)$	293670.72	(0.10)	[73027]

Table 5. Molecular parameters for BrNO.

Parameter	$^{79}Br^{14}N^{16}O$	$^{81}Br^{14}N^{16}O$	$^{79}Br^{15}N^{16}O$	$^{81}Br^{15}N^{16}O$	Reference
A^a (MHz)	83560.	83550.	79820.	79810.	[70018]
B (MHz)	3747.12(10)	3722.25(10)	3694.67(10)	3669.75(10)	[70018]
C (MHz)	3586.09(10)	3563.49(10)	3531.21(10)	3508.42(10)	[70018]
D_J (kHz)	3.05(10)	---	---	---	[66012]
D_{JK} (kHz)	-54.8(20)	---	---	---	[66012]
eqQ_{aa}(Br) (MHz)	388.9(7)	324.5(7)	390.8(10)	325.8(10)	[65007],[70018]
eqQ_{bb}(Br) (MHz)	-239.7(10)	-199.0(10)	-238.3(10)	-199.6(10)	[65007],[70018]
eqQ_{aa}(N) (MHz)	0.4(3)	0.6(5)	---	---	[65007]
eqQ_{bb}(N) (MHz)	-4.4(3)	-4.4(3)	---	---	[65007]
μ_a (D)	1.8	---	---	---	[66011]

[a] Calculated from B and C assuming a rigid planar structure.

Additional references: [56004], [59000], and [75014].

TABLE 5.1. The microwave spectrum of BrNO

Isotopic species	$J'(K_-',K_+') - J''(K_-'',K_+'')$	F'	F_1'	F''	F_1''	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{79}Br^{14}N^{16}O$	1(0, 1) - 0(0, 0)		1/2		3/2	(0,0,0)	7236.12	(0.10)	[70018]
	1(0, 1) - 0(0, 0)		5/2		3/2	(0,0,0)	7313.78	(0.10)	[70018]
	1(0, 1) - 0(0, 0)		3/2		3/2	(0,0,0)	7410.90	(0.10)	[70018]
	2(1, 2) - 1(1, 1)	7/2	5/2	7/2	5/2	(0,0,0)	14520.40	(0.01)	[65007]
	2(1, 2) - 1(1, 1)	5/2	5/2	5/2	5/2	(0,0,0)	14520.92	(0.01)	[65007]
	2(1, 2) - 1(1, 1)	3/2	3/2	3/2	3/2	(0,0,0)	14552.57	(0.01)	[65007]
	2(1, 2) - 1(1, 1)	5/2	3/2	5/2	3/2	(0,0,0)	14553.47	(0.01)	[65007]
	2(1, 2) - 1(1, 1)	3/2	3/2	1/2	3/2	(0,0,0)	14554.10	(0.10)	[65007]
	2(1, 2) - 1(1, 1)	5/2	5/2	3/2	3/2	(0,0,0)	14578.99	(0.01)	[65007]
	2(1, 2) - 1(1, 1)	7/2	5/2	5/2	3/2	(0,0,0)	14580.33	(0.01)	[65007]
	2(1, 2) - 1(1, 1)	3/2	5/2	1/2	3/2	(0,0,0)	14581.20	(0.01)	[65007]
	2(1, 1) - 1(1, 0)	9/2	7/2	7/2	5/2	(0,0,0)	14802.79	(0.01)	[65007]
	2(1, 1) - 1(1, 0)	7/2	7/2	5/2	5/2	(0,0,0)	14803.08	(0.10)	[65007]
	2(1, 1) - 1(1, 0)	5/2	3/2	5/2	3/2	(0,0,0)	14857.58	(0.01)	[65007]
	2(1, 1) - 1(1, 0)	3/2	3/2	3/2	3/2	(0,0,0)	14858.38	(0.01)	[65007]
	2(1, 1) - 1(1, 0)	7/2	5/2	7/2	5/2	(0,0,0)	14862.16	(0.01)	[65007]
	2(1, 1) - 1(1, 0)	3/2	5/2	1/2	3/2	(0,0,0)	14899.00	(0.01)	[65007]
	2(1, 1) - 1(1, 0)	7/2	5/2	5/2	3/2	(0,0,0)	14899.82	(0.01)	[65007]
	2(1, 1) - 1(1, 0)	5/2	5/2	3/2	3/2	(0,0,0)	14901.11	(0.01)	[65007]
	3(1, 3) - 2(1, 2)		3/2		3/2	(0,0,0)	21708.47	(0.10)	[70018]
	3(1, 3) - 2(1, 2)		5/2		5/2	(0,0,0)	21743.00	(0.10)	[70018]
	3(1, 3) - 2(1, 2)		3/2		1/2	(0,0,0)	21744.99	(0.10)	[70018]
	3(1, 3) - 2(1, 2)		9/2		7/2	(0,0,0)	21747.76	(0.10)	[70018]
	3(1, 3) - 2(1, 2)		5/2		3/2	(0,0,0)	21769.92	(0.10)	[70018]
	3(1, 3) - 2(1, 2)		7/2		5/2	(0,0,0)	21771.76	(0.10)	[70018]
	3(1, 3) - 2(1, 2)		7/2		7/2	(0,0,0)	21809.50	(0.10)	[70018]
	3(2, 2) - 2(2, 1)		9/2		7/2	(0,0,0)	21972.29	(0.50)	[56004]
	3(2, 1) - 2(2, 0)		9/2		7/2	(0,0,0)	21972.29	(0.50)	[56004]
	3(0, 3) - 2(0, 2)		9/2		7/2	(0,0,0)	21993.86	(0.50)	[56004]

TABLE 5.1. The microwave spectrum of BrNO—Continued

Isotopic species	$J'(K'_-,K'_+)$ – $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{79}Br^{14}N^{16}O$	3(2, 2) – 2(2, 1)		5/2		3/2	(0,0,0)	22001.07	(0.50)	[56004]
	3(2, 1) – 2(2, 0)		5/2		3/2	(0,0,0)	22001.07	(0.50)	[56004]
	3(0, 3) – 2(0, 2)		5/2		3/2	(0,0,0)	22016.97	(0.50)	[56004]
	3(2, 2) – 2(2, 1)		7/2		5/2	(0,0,0)	22069.77	(0.50)	[56004]
	3(2, 1) – 2(2, 0)		7/2		5/2	(0,0,0)	22069.77	(0.50)	[56004]
	3(1, 2) – 2(1, 1)		3/2		3/2	(0,0,0)	22173.58	(0.10)	[70018]
	3(1, 2) – 2(1, 1)		5/2		5/2	(0,0,0)	22214.92	(0.10)	[70018]
	3(1, 2) – 2(1, 1)		9/2		7/2	(0,0,0)	22229.87	(0.10)	[70018]
	3(1, 2) – 2(1, 1)		7/2		5/2	(0,0,0)	22254.14	(0.10)	[70018]
	3(1, 2) – 2(1, 1)		7/2		7/2	(0,0,0)	22313.90	(0.10)	[70018]
	12(1,12) – 11(1,11)					(0,0,0)	86996.99	(X)	[66012]
	12(0,12) – 11(0,11)					(0,0,0)	87909.16	(X)	[66012]
	12(5, 8) – 11(5, 7)					(0,0,0)	88013.99	(X)	[66012]
	12(5, 7) – 11(5, 6)					(0,0,0)	88013.99	(X)	[66012]
	12(6, 7) – 11(6, 6)					(0,0,0)	88027.63	(X)	[66012]
	12(6, 6) – 11(6, 5)					(0,0,0)	88027.63	(X)	[66012]
	12(2,10) – 11(2, 9)					(0,0,0)	88039.45	(X)	[66012]
	12(7, 6) – 11(7, 5)					(0,0,0)	88044.15	(X)	[66012]
	12(7, 5) – 11(7, 4)					(0,0,0)	88044.15	(X)	[66012]
	13(1,13) – 12(1,12)					(0,0,0)	94240.11	(X)	[66012]
	13(0,13) – 12(0,12)					(0,0,0)	95218.47	(X)	[66012]
	13(3,10) – 12(3, 9)					(0,0,0)	95329.59	(X)	[66012]
	13(5, 9) – 12(5, 8)					(0,0,0)	95345.31	(X)	[66012]
	13(5, 8) – 12(5, 7)					(0,0,0)	95345.31	(X)	[66012]
	13(6, 8) – 12(6, 7)					(0,0,0)	95359.95	(X)	[66012]
	13(6, 7) – 12(6, 6)					(0,0,0)	95359.95	(X)	[66012]
	13(7, 7) – 12(7, 6)					(0,0,0)	95377.65	(X)	[66012]
	13(7, 6) – 12(7, 5)					(0,0,0)	95377.65	(X)	[66012]
	13(2,11) – 12(2,10)					(0,0,0)	95382.99	(X)	[66012]
	13(8, 6) – 12(8, 5)					(0,0,0)	95398.16	(X)	[66012]
	13(8, 5) – 12(8, 4)					(0,0,0)	95398.16	(X)	[66012]
	13(9, 5) – 12(9, 4)					(0,0,0)	95421.11	(X)	[66012]
	13(9, 4) – 12(9, 3)					(0,0,0)	95421.11	(X)	[66012]
	13(1,12) – 12(1,11)					(0,0,0)	96329.69	(X)	[66012]
	14(1,14) – 13(1,13)					(0,0,0)	101481.72	(X)	[66012]
	14(2,12) – 13(2,11)					(0,0,0)	102620.70	(X)	[66012]
	14(3,12) – 13(3,11)					(0,0,0)	102659.42	(X)	[66012]
	14(6, 9) – 13(6, 8)					(0,0,0)	102691.46	(X)	[66012]
	14(6, 8) – 13(6, 7)					(0,0,0)	102691.46	(X)	[66012]
	14(7, 8) – 13(7, 7)					(0,0,0)	102710.43	(X)	[66012]
	14(7, 7) – 13(7, 6)					(0,0,0)	102710.43	(X)	[66012]
	14(2,13) – 13(2,12)					(0,0,0)	102728.20	(X)	[66012]
	14(8, 7) – 13(8, 6)					(0,0,0)	102732.41	(X)	[66012]
	14(8, 6) – 13(8, 5)					(0,0,0)	102732.41	(X)	[66012]
	14(9, 6) – 13(9, 5)					(0,0,0)	102757.19	(X)	[66012]
	14(9, 5) – 13(9, 4)					(0,0,0)	102757.19	(X)	[66012]
	14(1,13) – 13(1,12)					(0,0,0)	103731.39	(X)	[66012]
$^{81}Br^{14}N^{16}O$	1(0, 1) – 0(0, 0)		1/2		3/2	(0,0,0)	7204.64	(0.10)	[70018]
	1(0, 1) – 0(0, 0)		5/2		3/2	(0,0,0)	7269.50	(0.10)	[70018]
	1(0, 1) – 0(0, 0)		3/2		3/2	(0,0,0)	7350.65	(0.10)	[70018]
	2(1, 2) – 1(1, 1)	7/2	5/2	7/2	5/2	(0,0,0)	14425.01	(0.01)	[65007]
	2(1, 2) – 1(1, 1)	5/2	5/2	5/2	5/2	(0,0,0)	14425.55	(0.01)	[65007]
	2(1, 2) – 1(1, 1)	3/2	3/2	3/2	3/2	(0,0,0)	14451.86	(0.01)	[65007]
	2(1, 2) – 1(1, 1)	5/2	3/2	5/2	3/2	(0,0,0)	14452.66	(0.01)	[65007]
	2(1, 2) – 1(1, 1)	5/2	5/2	3/2	3/2	(0,0,0)	14473.91	(0.01)	[65007]
	2(1, 2) – 1(1, 1)	7/2	5/2	5/2	3/2	(0,0,0)	14475.18	(0.01)	[65007]
	2(1, 2) – 1(1, 1)	3/2	5/2	1/2	3/2	(0,0,0)	14476.13	(0.01)	[65007]
	2(1, 1) – 1(1, 0)	9/2	7/2	7/2	5/2	(0,0,0)	14709.97	(0.01)	[65007]
	2(1, 1) – 1(1, 0)	3/2	5/2	1/2	3/2	(0,0,0)	14790.24	(0.10)	[65007]
	2(1, 1) – 1(1, 0)	7/2	5/2	5/2	3/2	(0,0,0)	14790.90	(0.10)	[65007]
	2(1, 1) – 1(1, 0)	5/2	5/2	3/2	3/2	(0,0,0)	14792.25	(0.01)	[65007]
	3(1, 3) – 2(1, 2)		3/2		3/2	(0,0,0)	21577.52	(0.10)	[70018]
	3(1, 3) – 2(1, 2)		5/2		5/2	(0,0,0)	21606.75	(0.10)	[70018]
	3(1, 3) – 2(1, 2)		3/2		1/2	(0,0,0)	21608.49	(0.50)	[56004]
	3(1, 3) – 2(1, 2)		9/2		7/2	(0,0,0)	21610.46	(0.10)	[70018]
	3(1, 3) – 2(1, 2)		5/2		3/2	(0,0,0)	21629.30	(0.10)	[70018]

TABLE 5.1. The microwave spectrum of BrNO—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{81}Br^{14}N^{16}O$	3(1, 3) - 2(1, 2)		7/2		5/2	(0,0,0)	21630.47	(0.10)	[70018]
	3(1, 3) - 2(1, 2)		7/2		7/2	(0,0,0)	21662.02	(0.10)	[70018]
	3(2, 2) - 2(2, 1)		9/2		7/2	(0,0,0)	21835.19	(0.50)	[56004]
	3(2, 1) - 2(2, 0)		9/2		7/2	(0,0,0)	21835.19	(0.50)	[56004]
	3(0, 3) - 2(0, 2)		9/2		7/2	(0,0,0)	21852.23	(0.50)	[56004]
	3(2, 2) - 2(2, 1)		5/2		3/2	(0,0,0)	21858.69	(0.50)	[56004]
	3(2, 1) - 2(2, 0)		5/2		3/2	(0,0,0)	21858.69	(0.50)	[56004]
	3(0, 3) - 2(0, 2)		5/2		3/2	(0,0,0)	21871.10	(0.50)	[56004]
	3(2, 2) - 2(2, 1)		7/2		5/2	(0,0,0)	21916.77	(0.50)	[56004]
	3(2, 1) - 2(2, 0)		7/2		5/2	(0,0,0)	21916.77	(0.50)	[56004]
	3(1, 2) - 2(1, 1)		5/2		5/2	(0,0,0)	22073.50	(0.10)	[70018]
	3(1, 2) - 2(1, 1)		9/2		7/2	(0,0,0)	22085.98	(0.10)	[70018]
	3(1, 2) - 2(1, 1)		7/2		5/2	(0,0,0)	22106.20	(0.10)	[70018]
	3(1, 2) - 2(1, 1)		5/2		3/2	(0,0,0)	22108.88	(0.10)	[70018]
	3(1, 2) - 2(1, 1)		7/2		7/2	(0,0,0)	22155.70	(0.10)	[70018]
$^{79}Br^{15}N^{16}O$	1(0, 1) - 0(0, 0)		5/2		3/2	(0,0,0)	7206.34	(0.10)	[70018]
	1(0, 1) - 0(0, 0)		3/2		3/2	(0,0,0)	7304.03	(0.10)	[70018]
	3(1, 3) - 2(1, 2)		3/2		3/2	(0,0,0)	21381.88	(0.10)	[70018]
	3(1, 3) - 2(1, 2)		9/2		7/2	(0,0,0)	21421.99	(0.10)	[70018]
	3(1, 3) - 2(1, 2)		5/2		3/2	(0,0,0)	21444.06	(0.10)	[70018]
	3(1, 3) - 2(1, 2)		7/2		5/2	(0,0,0)	21446.16	(0.10)	[70018]
	3(1, 3) - 2(1, 2)		7/2		7/2	(0,0,0)	21483.92	(0.10)	[70018]
	3(1, 2) - 2(1, 1)		3/2		3/2	(0,0,0)	21854.67	(0.10)	[70018]
	3(1, 2) - 2(1, 1)		5/2		5/2	(0,0,0)	21895.96	(0.10)	[70018]
	3(1, 2) - 2(1, 1)		9/2		7/2	(0,0,0)	21911.11	(0.10)	[70018]
	3(1, 2) - 2(1, 1)		3/2		1/2	(0,0,0)	21914.16	(0.10)	[70018]
	3(1, 2) - 2(1, 1)		7/2		5/2	(0,0,0)	21935.38	(0.10)	[70018]
	3(1, 2) - 2(1, 1)		5/2		3/2	(0,0,0)	21938.81	(0.10)	[70018]
	3(1, 2) - 2(1, 1)		7/2		7/2	(0,0,0)	21994.89	(0.10)	[70018]
	1(0, 1) - 0(0, 0)		5/2		3/2	(0,0,0)	7161.89	(0.10)	[70018]
	1(0, 1) - 0(0, 0)		3/2		3/2	(0,0,0)	7243.34	(0.10)	[70018]
	3(1, 3) - 2(1, 2)		3/2		3/2	(0,0,0)	21250.13	(0.10)	[70018]
	3(1, 3) - 2(1, 2)		5/2		5/2	(0,0,0)	21279.36	(0.10)	[70018]
	3(1, 3) - 2(1, 2)		3/2		1/2	(0,0,0)	21281.45	(0.10)	[70018]
	3(1, 3) - 2(1, 2)		9/2		7/2	(0,0,0)	21283.50	(0.10)	[70018]
	3(1, 3) - 2(1, 2)		5/2		3/2	(0,0,0)	21301.92	(0.10)	[70018]
	3(1, 3) - 2(1, 2)		7/2		5/2	(0,0,0)	21303.68	(0.10)	[70018]
	3(1, 3) - 2(1, 2)		7/2		7/2	(0,0,0)	21335.30	(0.10)	[70018]
	3(1, 2) - 2(1, 1)		3/2		3/2	(0,0,0)	21719.40	(0.10)	[70018]
	3(1, 2) - 2(1, 1)		5/2		5/2	(0,0,0)	21753.78	(0.10)	[70018]
	3(1, 2) - 2(1, 1)		9/2		7/2	(0,0,0)	21766.25	(0.10)	[70018]
	3(1, 2) - 2(1, 1)		3/2		1/2	(0,0,0)	21769.14	(0.10)	[70018]
	3(1, 2) - 2(1, 1)		7/2		5/2	(0,0,0)	21786.76	(0.10)	[70018]
	3(1, 2) - 2(1, 1)		5/2		3/2	(0,0,0)	21789.60	(0.10)	[70018]
	3(1, 2) - 2(1, 1)		7/2		7/2	(0,0,0)	21836.59	(0.10)	[70018]

Table 6. Molecular parameters for $^{79}Br^{12}C^{14}N$ and $^{81}Br^{12}C^{14}N$.

Parameter	Vib. State v_1 v_2^ℓ v_3	$^{79}Br^{12}C^{14}N$ Value	$^{81}Br^{12}C^{14}N$ Value	Reference
B_v (MHz)	0 0^0 0	4120.198(9)	4096.788(7)	[52008]
B_v (MHz)	0 1^1 0	4131.762(7)	4108.264(6)	[52008]
B_v (MHz)	0 2^0 0	4139.132(7)[a]	4115.697(7)[a]	[52008]
B_v (MHz)	0 2^2 0	4143.254(8)	4119.701(6)	[52008]
B_v (MHz)	0 0^0 1	4108.807(7)[a]	4085.339(7)[a]	[52008]
B_v (MHz)	0 1^1 1	4122.67(2)[b]	---	[52008]
eqQ(N)(MHz)	all	-3.89	-3.89	[57002]
eqQ(Br)(MHz)	0 0^0 0	685.6(4)	572.8(2)	[57002]
eqQ(Br)(MHz)	0 1^1 0	682.84(21)	570.44(17)	[52008]
eqQ(Br)(MHz)	0 2^0 0	681.6(7)	568.9(15)	[57002]
eqQ(Br)(MHz)	0 0^0 1	687.9(6)	576.1(9)	[57002]
q_v (MHz)	0 1^1 0	3.918	3.874	[52008]
D_v (kHz)	0 0^0 0	0.8844	0.8716	[56005]

[a] A correction of +49.75 MHz and -49.75 MHz due to Fermi resonance was applied to the J = 6-5 transition frequencies of ^{79}BrCN for the $(0,0^0,1)$ and $(0,2^0,0)$ states respectively. A value of ±48.37 was employed for ^{81}BrCN.

[b] The J = 6-5 transition of ^{79}BrCN for the $(0,1^1,1)$ state was corrected by +77.00 MHz to account for the Fermi resonance interaction with the $(0,3^1,0)$ state.

Table 6.1. Rotational constants for ^{13}C and ^{15}N species of BrCN.

Isotopic Species	Vib. State v_1 v_2^ℓ v_3	B_v (MHz)	Reference
$^{79}Br^{13}C^{14}N$	0 0^0 0	4073.373(7)	[52008]
$^{79}Br^{12}C^{15}N$	0 0^0 0	3944.846(9)	[52008]
$^{81}Br^{13}C^{14}N$	0 0^0 0	4049.608(7)	[52008]
$^{81}Br^{12}C^{15}N$	0 0^0 0	3921.787(10)	[52008]

Table 6.2. Molecular Zeeman parameters for BrCN.

Parameters	$^{79}Br^{12}C^{14}N$	$^{81}Br^{12}C^{14}N$	$^{79}Br^{12}C^{15}N$	$^{81}Br^{12}C^{15}N$
$g_I(1-\sigma)$ (μ_N)	1.3978(30)	1.5080(30)	1.4004(15)	1.5098(30)
$g_\perp$ (μ_N)	-0.0325(2)	-0.0320(3)	-0.03165(50)	-0.02981(75)
$\chi_\perp - \chi_\parallel$ (10^{-6}erg/G^2·mole)	11.8(5)	12.7(5)	11.37(150)	10.47(300)
Q (10^{-26}esu·cm^2)	-6.02(110)	-5.29(110)	-6.46(175)	-6.48(400)
$\langle a^2\rangle - \langle c^2\rangle$ (10^{-16} cm^2)	-60.2(2)	-60.3(2)	-60.9(4)	-61.0(3)
Reference	[72011]	[72011]	[73028]	[73028]

Additional references: [47001], [47002], [47003], [47004], [47005], [55000], [55001], [65008], [73048].

TABLE 6.3. The microwave spectrum of BrCN

Isotopic species	J' - J''	F'	F'_1	F''	F''_1	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{79}Br^{12}C^{14}N$	1 - 0		1/2		3/2	$(0,0^0,1)$	8047.08	(0.10)	[57002]
	1 - 0		1/2		3/2	$(0,0^0,0)$	8070.43	(0.10)	[57002]
	1 - 0		1/2		3/2	$(0,2^0,0)$	8109.78	(0.10)	[57002]
	1 - 0		5/2		3/2	$(0,0^0,1)$	8183.87	(0.10)	[57002]
	1 - 0	5/2	5/2	5/2	3/2	$(0,0^0,0)$	8206.18	(0.10)	[57002]
	1 - 0	7/2	5/2	5/2	3/2	$(0,0^0,0)$	8206.92	(0.10)	[57002]
	1 - 0	3/2	5/2	5/2	3/2	$(0,0^0,0)$	8207.39	(0.10)	[57002]
	1 - 0		5/2		3/2	$(0,2^0,0)$	8245.29	(0.10)	[57002]
	1 - 0		3/2		3/2	$(0,0^0,1)$	8356.48	(0.10)	[57002]
	1 - 0	5/2	3/2	3/2	3/2	$(0,0^0,0)$	8377.95	(0.10)	[57002]
	1 - 0	3/2	3/2	3/2	3/2	$(0,0^0,0)$	8378.58	(0.10)	[57002]
	1 - 0	1/2	3/2	3/2	3/2	$(0,0^0,0)$	8379.38	(0.10)	[57002]
	1 - 0		3/2		3/2	$(0,2^0,0)$	8416.30	(0.10)	[57002]
	2 - 1	3/2	1/2	3/2	3/2	$(0,0^0,0)$	16172.30	(0.10)	[57002]
	2 - 1	3/2	1/2	5/2	3/2	$(0,0^0,0)$	16172.90	(0.10)	[57002]
	2 - 1	3/2	1/2	1/2	3/2	$(0,0^0,0)$	16173.40	(0.10)	[57002]
	2 - 1		3/2		3/2	$(0,0^0,1)$	16299.07	(0.10)	[57002]
	2 - 1	5/2	3/2	5/2	3/2	$(0,0^0,0)$	16345.38	(0.10)	[57002]
	2 - 1	3/2	3/2	3/2	3/2	$(0,0^0,0)$	16346.17	(0.10)	[57002]
	2 - 1		7/2		5/2	$(0,0^0,1)$	16420.97	(0.10)	[57002]
	2 - 1		5/2		3/2	$(0,0^0,1)$	16420.97	(0.10)	[57002]
	2 - 1		1/2		1/2	$(0,0^0,1)$	16435.3	(0.10)	[57002]
	2 - 1		7/2		5/2	$(0,0^0,0)$	16466.35	(0.10)	[57002]
	2 - 1		5/2		3/2	$(0,0^0,0)$	16466.35	(0.10)	[57002]
	2 - 1		1/2		1/2	$(0,0^0,0)$	16480.92	(0.10)	[57002]
	2 - 1		3/2		5/2	$(0,0^0,0)$	16517.8	(0.10)	[57002]
	2 - 1		7/2		5/2	$(0,2^0,0)$	16542.45	(0.10)	[57002]
	2 - 1		5/2		3/2	$(0,2^0,0)$	16542.45	(0.10)	[57002]
	2 - 1		1/2		1/2	$(0,2^0,0)$	16556.67	(0.10)	[57002]
	2 - 1		5/2		5/2	$(0,0^0,1)$	16593.38	(0.10)	[57002]
	2 - 1		3/2		1/2	$(0,0^0,1)$	16608.6	(0.10)	[57002]
	2 - 1		5/2		5/2	$(0,0^0,0)$	16638.40	(0.10)	[57002]
	2 - 1		3/2		1/2	$(0,0^0,0)$	16653.58	(0.10)	[57002]
	2 - 1		5/2		5/2	$(0,2^0,0)$	16712.9	(0.10)	[57002]
	2 - 1		3/2		1/2	$(0,2^0,0)$	16727.97	(0.10)	[57002]
	3 - 2		3/2		3/2	$(0,0^0,0)$	24583.00	(0.20)	[48002]
	3 - 2		5/2		5/2	$(0,0^0,0)$	24633.71	(0.20)	[48002]
	3 - 2		3/2		1/2	$(0,0^0,1)$	24687.11	(0.20)	[48002]
	3 - 2		5/2		3/2	$(0,0^0,1)$	24687.11	(0.20)	[48002]
	3 - 2		7/2		5/2	$(0,0^0,0)$	24713.05	(0.20)	[48002]
	3 - 2		9/2		7/2	$(0,0^0,0)$	24713.05	(0.20)	[48002]
	3 - 2		3/2		1/2	$(0,0^0,0)$	24755.22	(0.20)	[48002]
	3 - 2		5/2		3/2	$(0,0^0,0)$	24755.22	(0.20)	[48002]
	3 - 2		3/2		1/2	$(0,1^{L1},0)$	24760.76	(0.20)	[48002]
	3 - 2		9/2		7/2	$(0,1^{L1},0)$	24760.76	(0.20)	[48002]
	3 - 2		3/2		1/2	$(0,1^{U1},0)$	24784.02	(0.20)	[48002]
	3 - 2		9/2		7/2	$(0,1^{U1},0)$	24784.02	(0.20)	[48002]
	3 - 2		5/2		3/2	$(0,1^{L1},0)$	24803.00	(0.20)	[48002]
	3 - 2		7/2		5/2	$(0,1^{L1},0)$	24803.00	(0.20)	[48002]
	3 - 2		5/2		3/2	$(0,1^{U1},0)$	24826.70	(0.20)	[48002]
	3 - 2		7/2		5/2	$(0,1^{U1},0)$	24826.70	(0.20)	[48002]
	3 - 2		7/2		7/2	$(0,0^0,0)$	24884.57	(0.20)	[48002]
	4 - 3		5/2		5/2	$(0,0^0,0)$	32804.56	(0.10)	[48003]
	4 - 3		11/2		9/2	$(0,0^0,0)$	32956.68	(0.10)	[48003]
	4 - 3		9/2		7/2	$(0,0^0,0)$	32956.68	(0.10)	[48003]
	4 - 3		7/2		5/2	$(0,0^0,0)$	32976.40	(0.10)	[48003]
	4 - 3		5/2		3/2	$(0,0^0,0)$	32976.40	(0.10)	[48003]
	6 - 5		9/2		9/2	$(0,0^0,0)$	49274.99	(0.10)	[52008]
	6 - 5		13/2		11/2	$(0,0^0,1)$	49302.27	(0.10)	[52008]
	6 - 5		15/2		13/2	$(0,0^0,1)$	49302.27	(0.10)	[52008]
	6 - 5		9/2		7/2	$(0,0^0,1)$	49310.06	(0.10)	[52008]
	6 - 5		11/2		9/2	$(0,0^0,1)$	49310.06	(0.10)	[52008]
	6 - 5		11/2		11/2	$(0,0^0,0)$	49398.90	(0.10)	[52008]
	6 - 5		9/2		9/2	$(0,1^{L1},0)$	49403.74	(0.15)	[52008]
	6 - 5	13/2	13/2	13/2	11/2	$(0,0^0,0)$	49438.01	(0.15)	[52008]

TABLE 6.3. The microwave spectrum of BrCN—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{79}Br^{12}C^{14}N$	6 - 5	15/2	15/2	15/2	13/2	$(0,0^0,0)$	49438.01	(0.15)	[52008]
	6 - 5		13/2		11/2	$(0,0^0,0)$	49439.12	(0.10)	[52008]
	6 - 5		15/2		13/2	$(0,0^0,0)$	49439.12	(0.10)	[52008]
	6 - 5	11/2	13/2	11/2	11/2	$(0,0^0,0)$	49440.40	(0.15)	[52008]
	6 - 5	13/2	15/2	13/2	13/2	$(0,0^0,0)$	49440.40	(0.15)	[52008]
	6 - 5		15/2		13/2	$(0,1^{L1},1)$	49443.83	(0.20)	[52008]
	6 - 5	9/2	9/2	9/2	7/2	$(0,0^0,0)$	49445.65	(0.15)	[52008]
	6 - 5	11/2	11/2	11/2	9/2	$(0,0^0,0)$	49445.65	(0.15)	[52008]
	6 - 5		11/2		9/2	$(0,0^0,0)$	49446.90	(0.10)	[52008]
	6 - 5	7/2	9/2	7/2	7/2	$(0,0^0,0)$	49448.31	(0.15)	[52008]
	6 - 5		13/2		11/2	$(0,1^{L1},1)$	49448.31	(0.20)	[52008]
	6 - 5	9/2	11/2	9/2	9/2	$(0,0^0,0)$	49448.31	(0.15)	[52008]
	6 - 5		9/2		9/2	$(0,1^{U1},0)$	49452.59	(0.15)	[52008]
	6 - 5		9/2		7/2	$(0,1^{U1},1)$	49496.11	(0.20)	[52008]
	6 - 5		11/2		9/2	$(0,1^{U1},1)$	49501.09	(0.20)	[52008]
	6 - 5		11/2		11/2	$(0,1^{L1},0)$	49520.03	(0.15)	[52008]
	6 - 5		15/2		13/2	$(0,1^{L1},0)$	49552.62	(0.10)	[52008]
	6 - 5		13/2		11/2	$(0,1^{L1},0)$	49557.49	(0.10)	[52008]
	6 - 5		9/2		7/2	$(0,1^{L1},0)$	49558.32	(0.10)	[52008]
	6 - 5		11/2		9/2	$(0,1^{L1},0)$	49563.28	(0.10)	[52008]
	6 - 5		11/2		11/2	$(0,1^{U1},0)$	49567.45	(0.15)	[52008]
	6 - 5		15/2		13/2	$(0,1^{U1},0)$	49599.57	(0.10)	[52008]
	6 - 5		13/2		11/2	$(0,1^{U1},0)$	49604.35	(0.10)	[52008]
	6 - 5		9/2		7/2	$(0,1^{U1},0)$	49605.29	(0.10)	[52008]
	6 - 5		13/2		13/2	$(0,0^0,0)$	49610.43	(0.15)	[52008]
	6 - 5		11/2		9/2	$(0,1^{U1},0)$	49610.43	(0.15)	[52008]
	6 - 5		13/2		11/2	$(0,2^0,0)$	49666.19	(0.10)	[52008]
	6 - 5		15/2		13/2	$(0,2^0,0)$	49666.19	(0.10)	[52008]
	6 - 5		9/2		7/2	$(0,2^0,0)$	49673.93	(0.10)	[52008]
	6 - 5		11/2		7/2	$(0,2^0,0)$	49673.93	(0.10)	[52008]
	6 - 5		9/2		7/2	$(0,2^2,0)$	49709.00	(0.10)	[52008]
	6 - 5		15/2		13/2	$(0,2^2,0)$	49709.00	(0.10)	[52008]
	6 - 5		13/2		13/2	$(0,1^{L1},0)$	49712.00	(0.15)	[52008]
	6 - 5		13/2		11/2	$(0,2^2,0)$	49728.46	(0.10)	[52008]
	6 - 5		11/2		9/2	$(0,2^2,0)$	49728.46	(0.10)	[52008]
	6 - 5		13/2		13/2	$(0,1^{U1},0)$	49757.39	(0.15)	[52008]
	9 - 8		15/2		13/2	$(0,0^0,0)$	74159.48	(0.18)	[50005]
	9 - 8		17/2		15/2	$(0,0^0,0)$	74159.48	(0.18)	[50005]
	9 - 8		19/2		17/2	$(0,0^0,0)$	74162.76	(0.18)	[50005]
	9 - 8		21/2		19/2	$(0,0^0,0)$	74162.76	(0.18)	[50005]
	10 - 9					$(0,0^0,0)$	82405.	(2.)	[49001]
	12 - 11					$(0,0^0,0)$	98879.19	(0.20)	[56005]
	12 - 11					$(0,1^{L1},0)$	99108.45	(0.20)	[56005]
	12 - 11					$(0,1^{L1},0)$	99109.06	(0.20)	[56005]
	12 - 11					$(0,1^{L1},0)$	99110.12	(0.20)	[56005]
	12 - 11					$(0,1^{L1},0)$	99110.75	(0.20)	[56005]
	12 - 11					$(0,1^{U1},0)$	99203.06	(0.20)	[56005]
	12 - 11					$(0,1^{U1},0)$	99204.09	(0.20)	[56005]
	12 - 11					$(0,1^{U1},0)$	99204.70	(0.20)	[56005]
	15 - 14					$(0,0^0,0)$	123594.73	(0.25)	[56005]
	15 - 14					$(0,1^{L1},0)$	123881.78	(0.25)	[56005]
	15 - 14					$(0,1^{L1},0)$	123882.90	(0.25)	[56005]
	15 - 14					$(0,1^{U1},0)$	123999.22	(0.25)	[56005]
	15 - 14					$(0,1^{U1},0)$	124000.30	(0.25)	[56005]
	18 - 17					$(0,0^0,0)$	148307.36	(0.30)	[56005]
	18 - 17					$(0,1^{L1},0)$	148652.01	(0.30)	[56005]
	18 - 17					$(0,1^{L1},0)$	148652.83	(0.30)	[56005]
	18 - 17					$(0,1^{U1},0)$	148792.99	(0.30)	[56005]
	18 - 17					$(0,1^{U1},0)$	148793.79	(0.30)	[56005]
	21 - 20					$(0,0^0,0)$	173016.45	(0.35)	[56005]
	21 - 20					$(0,1^{L1},0)$	173418.77	(0.35)	[56005]
	21 - 20					$(0,1^{U1},0)$	173583.26	(0.35)	[56005]
	24 - 23					$(0,0^0,0)$	197721.69	(0.40)	[56005]
	24 - 23					$(0,1^{L1},0)$	198181.25	(0.40)	[56005]
	24 - 23					$(0,1^{U1},0)$	198368.79	(0.40)	[56005]

TABLE 6.3. The microwave spectrum of BrCN—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{79}Br^{12}C^{14}N$	27 - 26					$(0,0^0,0)$	222422.34	(0.45)	[56005]
	27 - 26					$(0,1^{L1},0)$	222939.11	(0.45)	[56005]
	27 - 26					$(0,1^{U1},0)$	223150.44	(0.45)	[56005]
	30 - 29					$(0,0^0,0)$	247117.75	(0.50)	[56005]
	30 - 29					$(0,1^{L1},0)$	247691.48	(0.50)	[56005]
	30 - 29					$(0,1^{U1},0)$	247925.95	(0.50)	[56005]
	33 - 32					$(0,0^0,0)$	271807.59	(0.55)	[56005]
	36 - 35					$(0,0^0,0)$	296490.86	(0.60)	[56005]
	39 - 38					$(0,0^0,0)$	321167.1	(0.7)	[56005]
	42 - 41					$(0,0^0,0)$	345837.0	(1.0)	[56005]
$^{81}Br^{12}C^{14}N$	1 - 0		1/2		3/2	$(0,0^0,1)$	8028.04	(0.10)	[57002]
	1 - 0		1/2		3/2	$(0,0^0,0)$	8051.48	(0.10)	[57002]
	1 - 0		1/2		3/2	$(0,2^0,0)$	8090.25	(0.10)	[57002]
	1 - 0		5/2		3/2	$(0,0^0,1)$	8142.89	(0.10)	[57002]
	1 - 0	5/2	5/2	5/2	3/2	$(0,0^0,0)$	8164.96	(0.10)	[57002]
	1 - 0	7/2	5/2	5/2	3/2	$(0,0^0,0)$	8165.68	(0.10)	[57002]
	1 - 0		3/2		3/2	$(0,0^0,1)$	8286.87	(0.10)	[57002]
	1 - 0	5/2	3/2	3/2	3/2	$(0,0^0,0)$	8308.27	(0.10)	[57002]
	1 - 0	3/2	3/2	3/2	3/2	$(0,0^0,0)$	8308.89	(0.10)	[57002]
	1 - 0	1/2	3/2	3/2	3/2	$(0,0^0,0)$	8309.67	(0.10)	[57002]
	1 - 0		3/2		3/2	$(0,2^0,0)$	8346.07	(0.10)	[57002]
	2 - 1		1/2		3/2	$(0,0^0,0)$	16129.96	(0.10)	[57002]
	2 - 1		3/2		3/2	$(0,0^0,1)$	16227.73	(0.10)	[57002]
	2 - 1	5/2	3/2	5/2	3/2	$(0,0^0,0)$	16273.00	(0.10)	[57002]
	2 - 1	5/2	3/2	5/2	3/2	$(0,0^0,0)$	16273.62	(0.10)	[57002]
	2 - 1	3/2	3/2	1/2	3/2	$(0,0^0,0)$	16274.38	(0.10)	[57002]
	2 - 1		7/2		5/2	$(0,0^0,1)$	16329.72	(0.10)	[57002]
	2 - 1		5/2		3/2	$(0,0^0,1)$	16329.72	(0.10)	[57002]
	2 - 1		7/2		5/2	$(0,0^0,0)$	16375.43	(0.10)	[57002]
	2 - 1		5/2		3/2	$(0,0^0,0)$	16375.43	(0.10)	[57002]
	2 - 1		1/2		1/2	$(0,0^0,0)$	16387.20	(0.10)	[57002]
	2 - 1		3/2		5/2	$(0,0^0,0)$	16417.0	(0.10)	[57002]
	2 - 1		7/2		5/2	$(0,2^0,0)$	16451.27	(0.10)	[57002]
	2 - 1		5/2		3/2	$(0,2^0,0)$	16451.27	(0.10)	[57002]
	2 - 1		5/2		5/2	$(0,0^0,1)$	16473.20	(0.10)	[57002]
	2 - 1		3/2		1/2	$(0,0^0,1)$	16486.04	(0.10)	[57002]
	2 - 1		5/2		5/2	$(0,0^0,0)$	16518.62	(0.10)	[57002]
	2 - 1		3/2		1/2	$(0,0^0,0)$	16531.31	(0.10)	[57002]
	2 - 1		3/2		1/2	$(0,2^0,0)$	16605.92	(0.10)	[57002]
	3 - 2		3/2		3/2	$(0,0^0,0)$	24465.33	(0.20)	[48002]
	3 - 2		7/2		5/2	$(0,0^0,1)$	24506.75	(0.20)	[48002]
	3 - 2		9/2		7/2	$(0,0^0,1)$	24506.75	(0.20)	[48002]
	3 - 2		5/2		5/2	$(0,0^0,0)$	24507.38	(0.20)	[48002]
	3 - 2		3/2		1/2	$(0,0^0,1)$	24541.18	(0.20)	[48002]
	3 - 2		5/2		3/2	$(0,0^0,1)$	24541.18	(0.20)	[48002]
	3 - 2		7/2		5/2	$(0,0^0,0)$	24573.86	(0.20)	[48002]
	3 - 2		9/2		7/2	$(0,0^0,0)$	24573.86	(0.20)	[48002]
	3 - 2		3/2		1/2	$(0,0^0,0)$	24608.92	(0.20)	[48002]
	3 - 2		5/2		3/2	$(0,0^0,0)$	24608.92	(0.20)	[48002]
	3 - 2		3/2		1/2	$(0,1^{L1},0)$	24622.93	(0.20)	[48002]
	3 - 2		9/2		7/2	$(0,1^{L1},0)$	24622.93	(0.20)	[48002]
	3 - 2		3/2		1/2	$(0,1^{U1},0)$	24645.82	(0.20)	[48002]
	3 - 2		9/2		7/2	$(0,1^{U1},0)$	24645.82	(0.20)	[48002]
	3 - 2		3/2		3/2	$(0,1^{L1},0)$	24658.89	(0.20)	[48002]
	3 - 2		7/2		5/2	$(0,1^{L1},0)$	24658.89	(0.20)	[48002]
	3 - 2		5/2		3/2	$(0,1^{U1},0)$	24682.13	(0.20)	[48002]
	3 - 2		7/2		5/2	$(0,1^{U1},0)$	24682.13	(0.20)	[48002]
	3 - 2		7/2		7/2	$(0,0^0,0)$	24717.19	(0.20)	[48002]
	4 - 3		5/2		5/2	$(0,0^0,0)$	32643.13	(0.10)	[48003]
	4 - 3		7/2		7/2	$(0,0^0,0)$	32720.28	(0.10)	[48003]
	4 - 3		11/2		9/2	$(0,0^0,0)$	32770.13	(0.10)	[48003]
	4 - 3		9/2		7/2	$(0,0^0,0)$	32770.13	(0.10)	[48003]
	4 - 3		7/2		5/2	$(0,0^0,0)$	32786.65	(0.10)	[48003]
	4 - 3		5/2		3/2	$(0,0^0,0)$	32786.65	(0.10)	[48003]
	4 - 3		9/2		9/2	$(0,0^0,0)$	32913.24	(0.10)	[48003]

TABLE 6.3. The microwave spectrum of BrCN—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{81}Br^{12}C^{14}N$	6 - 5		15/2		13/2	$(0,0^0,1)$	49021.91	(0.10)	[52008]
	6 - 5		13/2		11/2	$(0,0^0,1)$	49021.91	(0.10)	[52008]
	6 - 5		9/2		9/2	$(0,0^0,0)$	49021.91	(0.10)	[52008]
	6 - 5		9/2		7/2	$(0,0^0,1)$	49028.32	(0.10)	[52008]
	6 - 5		11/2		9/2	$(0,0^0,1)$	49028.32	(0.10)	[52008]
	6 - 5		11/2		11/2	$(0,0^0,0)$	49125.04	(0.10)	[52008]
	6 - 5		9/2		9/2	$(0,1^{L1},0)$	49147.47	(0.15)	[52008]
	6 - 5	15/2	15/2	15/2	13/2	$(0,0^0,0)$	49157.27	(0.15)	[52008]
	6 - 5	13/2	13/2	13/2	11/2	$(0,0^0,0)$	49157.27	(0.15)	[52008]
	6 - 5		15/2		13/2	$(0,0^0,0)$	49158.64	(0.10)	[52008]
	6 - 5		13/2		11/2	$(0,0^0,0)$	49158.64	(0.10)	[52008]
	6 - 5	13/2	15/2	13/2	13/2	$(0,0^0,0)$	49159.85	(0.15)	[52008]
	6 - 5	11/2	13/2	11/2	11/2	$(0,0^0,0)$	49159.85	(0.15)	[52008]
	6 - 5	11/2	11/2	11/2	9/2	$(0,0^0,0)$	49163.82	(0.15)	[52008]
	6 - 5	9/2	9/2	9/2	7/2	$(0,0^0,0)$	49163.82	(0.15)	[52008]
	6 - 5		11/2		9/2	$(0,0^0,0)$	49165.10	(0.10)	[52008]
	6 - 5		9/2		7/2	$(0,0^0,0)$	49165.10	(0.10)	[52008]
	6 - 5	9/2	11/2	9/2	9/2	$(0,0^0,0)$	49166.56	(0.15)	[52008]
	6 - 5	7/2	9/2	7/2	7/2	$(0,0^0,0)$	49166.56	(0.15)	[52008]
	6 - 5		9/2		9/2	$(0,1^{U1},0)$	49195.39	(0.15)	[52008]
	6 - 5		11/2		11/2	$(0,1^{L1},0)$	49244.47	(0.15)	[52008]
	6 - 5		15/2		13/2	$(0,1^{L1},0)$	49271.73	(0.10)	[52008]
	6 - 5		13/2		11/2	$(0,1^{L1},0)$	49275.67	(0.10)	[52008]
	6 - 5		9/2		7/2	$(0,1^{L1},0)$	49276.54	(0.10)	[52008]
	6 - 5		11/2		9/2	$(0,1^{L1},0)$	49280.69	(0.10)	[52008]
	6 - 5		11/2		11/2	$(0,1^{U1},0)$	49291.25	(0.15)	[52008]
	6 - 5		13/2		13/2	$(0,0^0,0)$	49301.67	(0.10)	[52008]
	6 - 5		15/2		13/2	$(0,1^{U1},0)$	49318.15	(0.10)	[52008]
	6 - 5		13/2		11/2	$(0,1^{U1},0)$	49322.08	(0.10)	[52008]
	6 - 5		9/2		7/2	$(0,1^{U1},0)$	49323.03	(0.10)	[52008]
	6 - 5		11/2		9/2	$(0,1^{U1},0)$	49327.08	(0.10)	[52008]
	6 - 5		13/2		11/2	$(0,2^0,0)$	49385.48	(0.10)	[52008]
	6 - 5		15/2		13/2	$(0,2^0,0)$	49385.48	(0.10)	[52008]
	6 - 5		9/2		7/2	$(0,2^0,0)$	49391.95	(0.10)	[52008]
	6 - 5		11/2		9/2	$(0,2^0,0)$	49391.95	(0.10)	[52008]
	6 - 5		13/2		13/2	$(0,1^{L1},0)$	49404.69	(0.15)	[52008]
	6 - 5		9/2		7/2	$(0,2^2,0)$	49427.87	(0.10)	[52008]
	6 - 5		15/2		13/2	$(0,2^2,0)$	49427.87	(0.10)	[52008]
	6 - 5		11/2		9/2	$(0,2^2,0)$	49444.30	(0.10)	[52008]
	6 - 5		13/2		11/2	$(0,2^2,0)$	49444.30	(0.10)	[52008]
	6 - 5		13/2		13/2	$(0,1^{U1},0)$	49449.98	(0.15)	[52008]
	9 - 8		15/2		13/2	$(0,0^0,0)$	73738.42	(0.18)	[50005]
	9 - 8		17/2		15/2	$(0,0^0,0)$	73738.42	(0.18)	[50005]
	9 - 8		19/2		17/2	$(0,0^0,0)$	73741.20	(0.18)	[50005]
	9 - 8		21/2		19/2	$(0,0^0,0)$	73741.20	(0.18)	[50005]
	10 - 9					$(0,0^0,0)$	81936.	(2.)	[49001]
	12 - 11					$(0,0^0,0)$	98317.37	(0.20)	[56005]
	12 - 11					$(0,1^{L1},0)$	98545.65	(0.20)	[56005]
	12 - 11					$(0,1^{L1},0)$	98546.18	(0.20)	[56005]
	12 - 11					$(0,1^{L1},0)$	98547.08	(0.20)	[56005]
	12 - 11					$(0,1^{L1},0)$	98547.63	(0.20)	[56005]
	12 - 11					$(0,1^{U1},0)$	98638.49	(0.20)	[56005]
	12 - 11					$(0,1^{U1},0)$	98639.01	(0.20)	[56005]
	12 - 11					$(0,1^{U1},0)$	98639.95	(0.20)	[56005]
	12 - 11					$(0,1^{U1},0)$	98640.42	(0.20)	[56005]
	15 - 14					$(0,0^0,0)$	122892.50	(0.25)	[56005]
	15 - 14					$(0,1^{L1},0)$	123178.33	(0.25)	[56005]
	15 - 14					$(0,1^{L1},0)$	123179.40	(0.25)	[56005]
	15 - 14					$(0,1^{U1},0)$	123294.38	(0.25)	[56005]
	15 - 14					$(0,1^{U1},0)$	123295.31	(0.25)	[56005]
	18 - 17					$(0,0^0,0)$	147464.71	(0.30)	[56005]
	18 - 17					$(0,1^{L1},0)$	147807.77	(0.30)	[56005]
	18 - 17					$(0,1^{L1},0)$	147808.49	(0.30)	[56005]
	18 - 17					$(0,1^{U1},0)$	147947.11	(0.30)	[56005]
	18 - 17					$(0,1^{U1},0)$	147947.85	(0.30)	[56005]

TABLE 6.3. The microwave spectrum of BrCN—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{81}Br^{12}C^{14}N$	21 - 20					$(0,0^0,0)$	172033.53	(0.35)	[56005]
	21 - 20					$(0,1^{L1},0)$	172434.07	(0.35)	[56005]
	21 - 20					$(0,1^{U1},0)$	172596.70	(0.35)	[56005]
	24 - 23					$(0,0^0,0)$	196598.50	(0.40)	[56005]
	24 - 23					$(0,1^{L1},0)$	197055.84	(0.40)	[56005]
	24 - 23					$(0,1^{U1},0)$	197241.70	(0.40)	[56005]
	27 - 26					$(0,0^0,0)$	221158.86	(0.45)	[56005]
	27 - 26					$(0,1^{L1},0)$	221693.17	(0.45)	[56005]
	27 - 26					$(0,1^{U1},0)$	221881.84	(0.45)	[56005]
	30 - 29					$(0,0^0,0)$	245714.32	(0.50)	[56005]
	33 - 32					$(0,0^0,0)$	270263.95	(0.55)	[56005]
	36 - 35					$(0,0^0,0)$	294807.52	(0.60)	[56005]
	39 - 38					$(0,0^0,0)$	319345.52	(1.0)	[56005]
	42 - 41					$(0,0^0,0)$	343873.0	(1.5)	[56005]
	48 - 47					$(0,0^0,0)$	392907.0	(0.9)	[60005]
	52 - 51					$(0,0^0,0)$	425575.9	(0.9)	[60005]
	56 - 55					$(0,0^0,0)$	458226.2	(0.9)	[60005]
$^{79}Br^{13}C^{14}N$	3 - 2		11/2		9/2	$(0,0^0,0)$	32581.73	(0.10)	[48003]
	3 - 2		9/2		7/2	$(0,0^0,0)$	32581.73	(0.10)	[48003]
	3 - 2		7/2		5/2	$(0,0^0,0)$	32601.46	(0.10)	[48003]
	3 - 2		5/2		3/2	$(0,0^0,0)$	32601.46	(0.10)	[48003]
	6 - 5		13/2		11/2	$(0,0^0,0)$	48877.11	(0.10)	[52008]
	6 - 5		15/2		13/2	$(0,0^0,0)$	48877.11	(0.10)	[52008]
	6 - 5		9/2		7/2	$(0,0^0,0)$	48884.82	(0.10)	[52008]
	6 - 5		11/2		9/2	$(0,0^0,0)$	48884.82	(0.10)	[52008]
$^{81}Br^{13}C^{14}N$	3 - 2		11/2		9/2	$(0,0^0,0)$	32392.59	(0.10)	[48003]
	3 - 2		9/2		7/2	$(0,0^0,0)$	32392.59	(0.10)	[48003]
	3 - 2		7/2		5/2	$(0,0^0,0)$	32409.06	(0.10)	[48003]
	3 - 2		5/2		3/2	$(0,0^0,0)$	32409.06	(0.10)	[48003]
	6 - 5		15/2		13/2	$(0,0^0,0)$	48592.37	(0.10)	[52008]
	6 - 5		13/2		11/2	$(0,0^0,0)$	48592.37	(0.10)	[52008]
	6 - 5		9/2		7/2	$(0,0^0,0)$	48598.93	(0.10)	[52008]
	6 - 5		11/2		9/2	$(0,0^0,0)$	48598.93	(0.10)	[52008]
$^{79}Br^{12}C^{15}N$	1 - 0		5/2		3/2	$(0,0^0,0)$	7855.959	(0.05)	[73028]
	2 - 1		7/2		5/2	$(0,0^0,0)$	15764.89	(0.05)	[73028]
	6 - 5		13/2		11/2	$(0,0^0,0)$	47334.84	(0.10)	[52008]
	6 - 5		15/2		13/2	$(0,0^0,0)$	47334.84	(0.10)	[52008]
	6 - 5		9/2		7/2	$(0,0^0,0)$	47342.44	(0.10)	[52008]
	6 - 5		11/2		9/2	$(0,0^0,0)$	47342.44	(0.10)	[52008]
$^{81}Br^{12}C^{15}N$	1 - 0		5/2		3/2	$(0,0^0,0)$	7815.292	(0.05)	[73028]
	2 - 1		7/2		5/2	$(0,0^0,0)$	15674.89	(0.05)	[73028]
	6 - 5		13/2		11/2	$(0,0^0,0)$	47058.19	(0.10)	[52008]
	6 - 5		15/2		13/2	$(0,0^0,0)$	47058.19	(0.10)	[52008]
	6 - 5		9/2		7/2	$(0,0^0,0)$	47064.86	(0.15)	[52008]
	6 - 5		11/2		9/2	$(0,0^0,0)$	47064.86	(0.15)	[52008]

Table 7. Rotational constants for ClCN.

Isotopic Species	Vib. state $v_1\ v_2^{\ell}\ v_3$	B_v(MHz)	D_v(kHz)	Reference
$^{35}Cl^{12}C^{14}N$	0 0^0 0	5970.840(16)	1.663	[65009,56005]
	0 1^1 0 c	5983.442	1.680	[65009]
	0 1^1 0 d	5990.903	1.687	[65009]
	0 0^0 1	5970.84(5)	---	[65009]
	0 2^0 0	5978.76	---	[65009]
	0 2^2 0	6003.38	---	[65009]
$^{37}Cl^{12}C^{14}N$	0 0^0 0	5847.258(14)	1.608	[65009,56005]
	0 1^1 0 c	5859.655	1.618	[65009]
	0 1^1 0 d	5866.831	1.652	[65009]
	0 0^0 1	5844.65	---	[65009]
	0 2^0 0	5857.95	---	[65009]
	0 2^2 0	5879.15	---	[65009]
$^{35}Cl^{13}C^{14}N$	0 0^0 0	5939.775(30)	---	[48002]
$^{37}Cl^{13}C^{14}N$	0 0^0 0	5814.705(30)	---	[48002]
$^{35}Cl^{12}C^{15}N$	0 0^0 0	5748.061(30)	---	[63005]
$^{37}Cl^{12}C^{15}N$	0 0^0 0	5626.425(30)	---	[63005]

	$^{35}Cl^{12}C^{14}N$	$^{37}Cl^{12}C^{14}N$	
B_e(MHz)	5982.96(8)	5859.02(12)	[65009]
q_v(MHz)	7.467532(16)[a]	7.17_6	[76035,56005]
α_1(MHz)	32.15(6)	31.60(11)	[65009]
α_2(MHz)	-16.33(2)	-15.99(2)	[56005]
α_3(MHz)	24.74(5)	23.90(2)	[65009]

[a] In reference [76035] the rotational dependence of q_v is given as -0.0183(15) J(J+1) kHz.

Table 7.1. Ground state hyperfine constants and dipole moment for ClCN.

Parameter	$^{35}Cl^{12}C^{14}N$ Value	$^{37}Cl^{12}C^{14}N$ Value	$^{35}Cl^{12}C^{15}N$,gnd. Value	$^{35}Cl^{12}C^{15}N,v_2=1$ Value
eqQ(Cl)(MHz)	-83.27519(40)	-65.82(16)	-83.280(20)	-82.825(15)
c(Cl)(kHz)	1.706(45)	---	3.5(6)	3.5(6)
eqQ(N)(MHz)	-3.62277(90)	-3.35(22)	---	---
c(N)(kHz)	1.32(18)	---	---	---
μ(D)	2.83312(15)	---	---	---
Reference	[76035]	[65009]	[55005]	[55005]

Table 7.2. Hyperfine constants and dipole moment for V_2=1 of ^{35}ClCN [76035].

Parameter		$^{35}Cl^{12}C^{14}N$
$eqQ(^{35}Cl)$	(MHz)	-82.81554(55)
$eqQ\eta(^{35}Cl)$	(MHz)	-0.92784(49)
$c_\perp(^{35}Cl)$	(kHz)	1.695(48)
$c_\parallel - c_\perp(^{35}Cl)$	(kHz)	7.38(35)
$eqQ(^{14}N)$	(MHz)	-3.70219(40)
$eqQ\eta(^{14}N)$	(MHz)	0.25600(41)
$c_\perp(^{14}N)$	(kHz)	1.243(67)
$c_\parallel - c_\perp(^{14}N)$	(kHz)	2.20(53)
$\mu(0,1,0)$	(D)	2.804(3)

Table 7.3. Zeeman parameters for ClCN [72011].

Parameter	$^{35}Cl^{12}C^{15}N$ Value	$^{37}Cl^{12}C^{15}N$ Value	$^{35}Cl^{12}C^{14}N$ Value
$g_I(1-\sigma)(\mu_N)$	0.5476(10)	0.4549(10)	
$g_\perp(\mu_N)$	-0.0385(2)	-0.0379(2)	-0.04121(13)[a]
$\chi_\perp - \chi_\parallel$ (10^{-6}erg$\cdot$G$^{-2}\cdot$mole)	10.8(5)	10.8(5)	11.10(12)[a]
$Q_\parallel$(10^{26}esu$\cdot$cm^2)	-3.87(100)	-4.01(100)	
$\langle a^2\rangle - \langle c^2\rangle$ (10^{-16} cm^2)	-42.7(2)	-42.3(2)	

[a] Reference [76035].

Additional references: [47003], [47004], [47005], [51002].

TABLE 7.4. The microwave spectrum of ClCN

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	(ν_1,ν_2^ℓ,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{35}Cl^{12}C^{14}N$	2 - 2	5/2		5/2		$(0,1^{L1},0)$	41.533	(3E-4)	[76035]
	2 - 2	5/2		3/2		$(0,1^{L1},0)$	41.552	(3E-4)	[76035]
	2 - 2	7/2		5/2		$(0,1^{L1},0)$	42.156	(3E-4)	[76035]
	2 - 2	5/2		7/2		$(0,1^{L1},0)$	44.064	(3E-4)	[76035]
	2 - 2	9/2		7/2		$(0,1^{L1},0)$	44.212	(3E-4)	[76035]
	2 - 2	7/2		7/2		$(0,1^{L1},0)$	44.687	(3E-4)	[76035]
	2 - 2	9/2		9/2		$(0,1^{L1},0)$	44.756	(3E-4)	[76035]
	2 - 2	3/2		1/2		$(0,1^{L1},0)$	44.764	(3E-4)	[76035]
	2 - 2	5/2		5/2		$(0,1^{L1},0)$	44.782	(3E-4)	[76035]
	2 - 2	3/2		5/2		$(0,1^{L1},0)$	44.790	(3E-4)	[76035]
	2 - 2	5/2		5/2		$(0,1^{L1},0)$	44.804	(3E-4)	[76035]
	2 - 2	3/2		3/2		$(0,1^{L1},0)$	44.809	(3E-4)	[76035]
	2 - 2	5/2		3/2		$(0,1^{L1},0)$	44.824	(3E-4)	[76035]
	2 - 2	7/2		9/2		$(0,1^{L1},0)$	45.231	(3E-4)	[76035]
	2 - 2	5/2		3/2		$(0,1^{L1},0)$	45.238	(3E-4)	[76035]
	2 - 2	7/2		5/2		$(0,1^{L1},0)$	45.405	(3E-4)	[76035]
	2 - 2	5/2		7/2		$(0,1^{L1},0)$	47.335	(3E-4)	[76035]
	2 - 2	3/2		5/2		$(0,1^{L1},0)$	48.039	(3E-4)	[76035]
	2 - 2	5/2		5/2		$(0,1^{L1},0)$	48.053	(3E-4)	[76035]
	2 - 2	3/2		1/2		$(0,1^{U1},0)$	52.149	(3E-4)	[76035]
	2 - 2	3/2		5/2		$(0,1^{U1},0)$	52.175	(3E-4)	[76035]
	2 - 2	3/2		3/2		$(0,1^{U1},0)$	52.195	(3E-4)	[76035]
	2 - 2	7/2		5/2		$(0,1^{U1},0)$	52.234	(3E-4)	[76035]
	2 - 2	5/2		5/2		$(0,1^{U1},0)$	52.432	(3E-4)	[76035]
	2 - 2	5/2		3/2		$(0,1^{U1},0)$	52.452	(3E-4)	[76035]
	2 - 2	7/2		7/2		$(0,1^{U1},0)$	54.764	(3E-4)	[76035]
	2 - 2	5/2		7/2		$(0,1^{U1},0)$	54.963	(3E-4)	[76035]
	2 - 2	3/2		3/2		$(0,1^{U1},0)$	55.038	(3E-4)	[76035]
	2 - 2	5/2		3/2		$(0,1^{U1},0)$	55.051	(3E-4)	[76035]
	2 - 2	7/2		9/2		$(0,1^{U1},0)$	55.308	(3E-4)	[76035]
	2 - 2	3/2		5/2		$(0,1^{U1},0)$	55.424	(3E-4)	[76035]
	2 - 2	5/2		5/2		$(0,1^{U1},0)$	55.681	(3E-4)	[76035]
	3 - 3	9/2		9/2		$(0,1^{L1},0)$	89.474	(3E-4)	[76035]
	3 - 3	11/2		11/2		$(0,1^{L1},0)$	89.552	(3E-4)	[76035]
	3 - 3	5/2		5/2		$(0,1^{L1},0)$	89.628	(3E-4)	[76035]
	3 - 3	7/2		7/2		$(0,1^{L1},0)$	89.666	(3E-4)	[76035]
	3 - 3	3/2		3/2		$(0,1^{L1},0)$	89.679	(3E-4)	[76035]
	3 - 3	5/2		7/2		$(0,1^{L1},0)$	90.093	(3E-4)	[76035]
	3 - 3	5/2		3/2		$(0,1^{L1},0)$	90.262	(3E-4)	[76035]
	3 - 3	9/2		11/2		$(0,1^{L1},0)$	90.362	(3E-4)	[76035]
	3 - 3	5/2		5/2		$(0,1^{L1},0)$	96.330	(3E-4)	[76035]
	3 - 3	5/2		7/2		$(0,1^{L1},0)$	96.796	(3E-4)	[76035]
	3 - 3	9/2		7/2		$(0,1^{L1},0)$	96.931	(3E-4)	[76035]
	3 - 3	5/2		3/2		$(0,1^{L1},0)$	96.964	(3E-4)	[76035]
	3 - 3	7/2		5/2		$(0,1^{L1},0)$	97.051	(3E-4)	[76035]
	3 - 3	7/2		7/2		$(0,1^{L1},0)$	97.516	(3E-4)	[76035]
	3 - 3	3/2		3/2		$(0,1^{U1},0)$	104.343	(3E-4)	[76035]
	3 - 3	7/2		9/2		$(0,1^{U1},0)$	104.977	(3E-4)	[76035]
	3 - 3	7/2		5/2		$(0,1^{U1},0)$	105.073	(3E-4)	[76035]
	3 - 3	9/2		11/2		$(0,1^{U1},0)$	105.279	(3E-4)	[76035]
	3 - 3	5/2		7/2		$(0,1^{U1},0)$	105.347	(3E-4)	[76035]
	3 - 3	5/2		5/2		$(0,1^{U1},0)$	105.500	(3E-4)	[76035]
	3 - 3	7/2		7/2		$(0,1^{U1},0)$	106.068	(3E-4)	[76035]
	17 - 17					$(0,1^{L1},0)$	2283.698	(0.01)	[57003]
	17 - 17					$(0,1^{U1},0)$	2283.906	(0.01)	[57003]
	18 - 18					$(0,1^{L1},0)$	2552.224	(0.01)	[57003]
	18 - 18					$(0,1^{U1},0)$	2552.448	(0.01)	[57003]
	19 - 19					$(0,1^{L1},0)$	2835.622	(0.01)	[57003]
	19 - 19					$(0,1^{U1},0)$	2835.829	(0.01)	[57003]
	23 - 23					$(0,1^{L1},0)$	4117.869	(0.02)	[57003]
	23 - 23					$(0,1^{U1},0)$	4118.067	(0.02)	[57003]
	1 - 0	1/2	3/2	1/2	3/2	$(0,0^0,0)$	11924.33	(0.05)	[65009]
	1 - 0	3/2	3/2	5/2	3/2	$(0,0^0,0)$	11924.89	(0.05)	[65009]
	1 - 0	3/2	3/2	3/2	3/2	$(0,0^0,0)$	11925.57	(0.05)	[65009]
	1 - 0		3/2		3/2	$(0,2^0,0)$	11940.92	(0.10)	[65009]

TABLE 7.4. The microwave spectrum of ClCN—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{35}Cl^{12}C^{14}N$	1 - 0	5/2	5/2	3/2	3/2	$(0,0^0,0)$	11945.27	(0.05)	[65009]
	1 - 0	7/2	5/2	5/2	3/2	$(0,0^0,0)$	11946.06	(0.05)	[65009]
	1 - 0	3/2	5/2	3/2	3/2	$(0,0^0,0)$	11946.32	(0.05)	[65009]
	1 - 0		5/2		3/2	$(0,2^0,0)$	11961.06	(0.20)	[65009]
	1 - 0	3/2	1/2	3/2	3/2	$(0,0^0,0)$	11962.56	(0.05)	[65009]
	1 - 0		1/2		3/2	$(0,2^0,0)$	11978.27	(0.10)	[65009]
	2 - 1	5/2	3/2	3/2	1/2	$(0,0^0,0)$	23862.409	(3E-3)	[55005]
	2 - 1	3/2	3/2	1/2	1/2	$(0,0^0,0)$	23862.487	(3E-3)	[55005]
	2 - 1	5/2	5/2	3/2	5/2	$(0,0^0,0)$	23863.416	(2E-3)	[55005]
	2 - 1	5/2	5/2	7/2	5/2	$(0,0^0,0)$	23863.724	(3E-3)	[55005]
	2 - 1	3/2	5/2	3/2	5/2	$(0,0^0,0)$	23863.959	(3E-3)	[55005]
	2 - 1	7/2	5/2	7/2	5/2	$(0,0^0,0)$	23864.138	(3E-3)	[55005]
	2 - 1	5/2	5/2	5/2	5/2	$(0,0^0,0)$	23864.479	(3E-3)	[55005]
	2 - 1	7/2	5/2	5/2	5/2	$(0,0^0,0)$	23864.888	(3E-3)	[55005]
	2 - 1	3/2	5/2	5/2	5/2	$(0,0^0,0)$	23865.015	(3E-3)	[55005]
	2 - 1	1/2	3/2	3/2	5/2	$(0,0^0,0)$	23878.795	(4E-3)	[55005]
	2 - 1	3/2	3/2	3/2	5/2	$(0,0^0,0)$	23878.795	(4E-3)	[55005]
	2 - 1	5/2	3/2	7/2	5/2	$(0,0^0,0)$	23878.930	(3E-3)	[55005]
	2 - 1	3/2	1/2	3/2	1/2	$(0,0^0,0)$	23883.246	(0.03)	[55005]
	2 - 1	1/2	1/2	3/2	1/2	$(0,0^0,0)$	23883.246	(0.03)	[55005]
	2 - 1	3/2	1/2	1/2	1/2	$(0,0^0,0)$	23883.246	(0.03)	[55005]
	2 - 1	7/2	7/2	7/2	5/2	$(0,0^0,0)$	23884.197	(3E-3)	[55005]
	2 - 1	5/2	5/2	3/2	3/2	$(0,0^0,0)$	23884.197	(3E-3)	[55005]
	2 - 1	3/2	5/2	3/2	3/2	$(0,0^0,0)$	23884.735	(3E-3)	[55005]
	2 - 1	7/2	7/2	5/2	5/2	$(0,0^0,0)$	23884.891	(2E-3)	[55005]
	2 - 1	9/2	7/2	7/2	5/2	$(0,0^0,0)$	23885.142	(2E-3)	[55005]
	2 - 1	5/2	7/2	3/2	5/2	$(0,0^0,0)$	23885.142	(2E-3)	[55005]
	2 - 1	7/2	5/2	5/2	3/2	$(0,0^0,0)$	23885.298	(2E-3)	[55005]
	2 - 1	3/2	5/2	1/2	3/2	$(0,0^0,0)$	23885.988	(2E-3)	[55005]
	2 - 1	5/2	7/2	5/2	5/2	$(0,0^0,0)$	23886.210	(2E-3)	[55005]
	2 - 1	1/2	3/2	3/2	3/2	$(0,0^0,0)$	23899.362	(3E-3)	[55005]
	2 - 1	5/2	3/2	3/2	3/2	$(0,0^0,0)$	23899.362	(3E-3)	[55005]
	2 - 1	3/2	3/2	3/2	3/2	$(0,0^0,0)$	23899.421	(3E-3)	[55005]
	2 - 1	5/2	3/2	5/2	3/2	$(0,0^0,0)$	23900.090	(2E-3)	[55005]
	2 - 1	3/2	3/2	5/2	3/2	$(0,0^0,0)$	23900.090	(2E-3)	[55005]
	2 - 1	1/2	3/2	1/2	3/2	$(0,0^0,0)$	23900.624	(2E-3)	[55005]
	2 - 1	3/2	3/2	1/2	3/2	$(0,0^0,0)$	23900.695	(2E-3)	[55005]
	2 - 1		5/2		3/2	$(0,1^{L1},0)$	23917.9	(0.20)	[48002]
	2 - 1	3/2	1/2	3/2	3/2	$(0,0^0,0)$	23920.233	(3E-3)	[55005]
	2 - 1	1/2	1/2	3/2	3/2	$(0,0^0,0)$	23920.233	(3E-3)	[55005]
	2 - 1	3/2	1/2	5/2	3/2	$(0,0^0,0)$	23920.912	(2E-3)	[55005]
	2 - 1	1/2	1/2	1/2	3/2	$(0,0^0,0)$	23921.520	(4E-3)	[55005]
	2 - 1		3/2		3/2	$(0,1^{L1},0)$	23925.5	(0.20)	[48002]
	2 - 1		5/2		5/2	$(0,1^{L1},0)$	23928.7	(0.20)	[48002]
	2 - 1		7/2		5/2	$(0,1^{L1},0)$	23938.6	(0.20)	[48002]
	2 - 1		3/2		1/2	$(0,1^{L1},0)$	23944.4	(0.20)	[48002]
	2 - 1		5/2		3/2	$(0,1^{U1},0)$	23948.2	(0.20)	[48002]
	2 - 1		1/2		1/2	$(0,1^{L1},0)$	23954.5	(0.20)	[48002]
	2 - 1		3/2		3/2	$(0,1^{U1},0)$	23954.5	(0.20)	[48002]
	2 - 1		5/2		5/2	$(0,1^{U1},0)$	23958.4	(0.20)	[48002]
	2 - 1		7/2		5/2	$(0,1^{U1},0)$	23968.6	(0.20)	[48002]
	2 - 1		3/2		1/2	$(0,1^{U1},0)$	23974.4	(0.20)	[48002]
	2 - 1		1/2		1/2	$(0,1^{U1},0)$	23984.6	(0.20)	[48002]
	3 - 2		7/2		7/2	$(0,0^0,0)$	35805.09	(0.30)	[48003]
	3 - 2		5/2		3/2	$(0,0^0,0)$	35820.93	(0.10)	[63005]
	3 - 2		3/2		1/2	$(0,0^0,0)$	35820.93	(0.10)	[63005]
	3 - 2		9/2		7/2	$(0,0^0,0)$	35825.77	(0.10)	[63005]
	3 - 2		7/2		5/2	$(0,0^0,0)$	35825.77	(0.10)	[63005]
	3 - 2		5/2		5/2	$(0,0^0,0)$	35835.74	(0.30)	[48003]
	3 - 2		7/2		5/2	$(0,2^2,0)$	36005.79	(0.10)	[65009]
	3 - 2		5/2		5/2	$(0,2^2,0)$	36005.79	(0.10)	[65009]
	3 - 2		3/2		5/2	$(0,2^2,0)$	36005.79	(0.10)	[65009]
	3 - 2		5/2		3/2	$(0,2^2,0)$	36019.85	(0.10)	[65009]
	3 - 2		3/2		3/2	$(0,2^2,0)$	36019.85	(0.10)	[65009]
	3 - 2		9/2		7/2	$(0,2^2,0)$	36026.15	(0.10)	[65009]

TABLE 7.4. The microwave spectrum of ClCN—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	(v_1,v_2^{ℓ},v_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{35}Cl^{12}C^{14}N$	3 - 2		7/2		7/2	$(0,2^2,0)$	36026.15	(0.10)	[65009]
	3 - 2		5/2		7/2	$(0,2^2,0)$	36026.15	(0.10)	[65009]
	3 - 2		3/2		1/2	$(0,2^2,0)$	36041.15	(0.10)	[65009]
	8 - 7					$(0,0^0,0)$	95529.86	(0.20)	[56005]
	8 - 7					$(0,1^{L1},0)$	95731.52	(0.20)	[56005]
	8 - 7					$(0,1^{U1},0)$	95850.88	(0.20)	[56005]
	10 - 9					$(0,0^0,0)$	119409.82	(0.25)	[56005]
	10 - 9					$(0,1^{L1},0)$	119662.15	(0.25)	[56005]
	10 - 9					$(0,1^{U1},0)$	119811.35	(0.25)	[56005]
	12 - 11					$(0,0^0,0)$	143288.45	(0.30)	[56005]
	12 - 11					$(0,1^{L1},0)$	143591.01	(0.30)	[56005]
	12 - 11					$(0,1^{U1},0)$	143770.23	(0.30)	[56005]
	14 - 13					$(0,0^0,0)$	167165.15	(0.35)	[56005]
	14 - 13					$(0,1^{L1},0)$	167517.88	(0.35)	[56005]
	14 - 13					$(0,1^{U1},0)$	167726.78	(0.35)	[56005]
	16 - 15					$(0,0^0,0)$	191039.44	(0.40)	[56005]
	16 - 15					$(0,1^{L1},0)$	191442.66	(0.40)	[56005]
	16 - 15					$(0,1^{U1},0)$	191681.13	(0.40)	[56005]
	18 - 17					$(0,0^0,0)$	214911.20	(0.45)	[56005]
	18 - 17					$(0,1^{L1},0)$	215364.77	(0.45)	[56005]
	18 - 17					$(0,1^{U1},0)$	215633.04	(0.45)	[56005]
	20 - 19					$(0,0^0,0)$	238780.22	(0.50)	[56005]
	20 - 19					$(0,1^{L1},0)$	239283.85	(0.50)	[56005]
	20 - 19					$(0,1^{U1},0)$	239582.25	(0.50)	[56005]
	22 - 21					$(0,0^0,0)$	262645.82	(0.55)	[56005]
	24 - 23					$(0,0^0,0)$	286507.95	(0.60)	[56005]
	26 - 25					$(0,0^0,0)$	310365.90	(0.65)	[56005]
	28 - 27					$(0,0^0,0)$	334219.5	(1.5)	[56005]
$^{37}Cl^{12}C^{14}N$	1 - 0		3/2		3/2	$(0,0^0,1)$	11676.01	(0.05)	[65009]
	1 - 0	1/2	3/2	1/2	3/2	$(0,0^0,0)$	11680.70	(0.05)	[65009]
	1 - 0	3/2	3/2	5/2	3/2	$(0,0^0,0)$	11681.23	(0.05)	[65009]
	1 - 0	3/2	3/2	3/2	3/2	$(0,0^0,0)$	11681.89	(0.05)	[65009]
	1 - 0		5/2		3/2	$(0,0^0,1)$	11692.72	(0.05)	[65009]
	1 - 0	5/2	5/2	3/2	3/2	$(0,0^0,0)$	11697.23	(0.05)	[65009]
	1 - 0	7/2	5/2	5/2	3/2	$(0,0^0,0)$	11698.00	(0.05)	[65009]
	1 - 0		3/2		3/2	$(0,2^0,0)$	11702.84	(0.05)	[65009]
	1 - 0		1/2		3/2	$(0,0^0,1)$	11705.77	(0.05)	[65009]
	1 - 0	3/2	1/2	3/2	3/2	$(0,0^0,0)$	11710.98	(0.05)	[65009]
	1 - 0		5/2		3/2	$(0,2^0,0)$	11719.15	(0.05)	[65009]
	1 - 0		1/2		3/2	$(0,2^0,0)$	11732.22	(0.05)	[65009]
	2 - 1	5/2	3/2	3/2	1/2	$(0,0^0,0)$	23372.72	(0.10)	[48002]
	2 - 1		1/2		1/2	$(0,0^0,0)$	23389.00	(0.10)	[48002]
	2 - 1	5/2	5/2	3/2	3/2	$(0,0^0,0)$	23389.61	(0.10)	[48002]
	2 - 1	9/2	7/2	7/2	5/2	$(0,0^0,0)$	23390.53	(0.10)	[48002]
	2 - 1	5/2	7/2	3/2	5/2	$(0,0^0,0)$	23390.53	(0.10)	[48002]
	2 - 1	5/2	3/2	5/2	3/2	$(0,0^0,0)$	23402.47	(0.10)	[48002]
	3 - 2		7/2		7/2	$(0,0^0,0)$	35067.99	(0.10)	[48003]
	3 - 2		5/2		3/2	$(0,0^0,0)$	35080.32	(0.10)	[63005]
	3 - 2		3/2		1/2	$(0,0^0,0)$	35080.32	(0.10)	[63005]
	3 - 2		9/2		7/2	$(0,0^0,0)$	35084.14	(0.10)	[63005]
	3 - 2		7/2		5/2	$(0,0^0,0)$	35084.14	(0.10)	[63005]
	3 - 2		5/2		5/2	$(0,0^0,0)$	35091.97	(0.10)	[48003]
	3 - 2		7/2		5/2	$(0,2^2,0)$	35263.35	(0.10)	[65009]
	3 - 2		5/2		5/2	$(0,2^2,0)$	35263.35	(0.10)	[65009]
	3 - 2		3/2		5/2	$(0,2^2,0)$	35263.35	(0.10)	[65009]
	3 - 2		5/2		3/2	$(0,2^2,0)$	35274.82	(0.10)	[65009]
	3 - 2		3/2		3/2	$(0,2^2,0)$	35274.82	(0.10)	[65009]
	3 - 2		9/2		7/2	$(0,2^2,0)$	35279.83	(0.10)	[65009]
	3 - 2		7/2		7/2	$(0,2^2,0)$	35279.83	(0.10)	[65009]
	3 - 2		5/2		7/2	$(0,2^2,0)$	35279.83	(0.10)	[65009]
	3 - 2		3/2		1/2	$(0,2^2,0)$	35290.98	(0.10)	[65009]
	8 - 7					$(0,0^0,0)$	93552.59	(0.20)	[56005]
	8 - 7					$(0,1^{L1},0)$	93751.28	(0.20)	[56005]
	8 - 7					$(0,1^{U1},0)$	93865.98	(0.20)	[56005]
	10 - 9					$(0,0^0,0)$	116938.45	(0.25)	[56005]

TABLE 7.4. The microwave spectrum of ClCN—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{37}Cl^{12}C^{14}N$	10 - 9					$(0,1^{L1},0)$	117186.54	(0.25)	[56005]
	10 - 9					$(0,1^{U1},0)$	117329.90	(0.25)	[56005]
	12 - 11					$(0,0^0,0)$	140322.75	(0.30)	[56005]
	12 - 11					$(0,1^{L1},0)$	140620.55	(0.30)	[56005]
	12 - 11					$(0,1^{U1},0)$	140792.59	(0.30)	[56005]
	14 - 13					$(0,0^0,0)$	163705.31	(0.35)	[56005]
	14 - 13					$(0,1^{L1},0)$	164052.55	(0.35)	[56005]
	14 - 13					$(0,1^{U1},0)$	164253.26	(0.35)	[56005]
	16 - 15					$(0,0^0,0)$	187085.58	(0.40)	[56005]
	16 - 15					$(0,1^{L1},0)$	187482.50	(0.40)	[56005]
	16 - 15					$(0,1^{U1},0)$	187711.52	(0.40)	[56005]
	18 - 17					$(0,0^0,0)$	210463.24	(0.45)	[56005]
	20 - 19					$(0,0^0,0)$	233838.30	(0.50)	[56005]
	22 - 21					$(0,0^0,0)$	257210.28	(0.55)	[56005]
	24 - 23					$(0,0^0,0)$	280578.92	(0.60)	[56005]
	26 - 25					$(0,0^0,0)$	303943.87	(0.65)	[56005]
$^{35}Cl^{13}C^{14}N$	1 - 0		5/2		3/2	$(0,0^0,0)$	11879.	(2.00)	[51003]
	2 - 1	9/2	7/2	7/2	5/2	$(0,0^0,0)$	23760.98	(0.10)	[48002]
	3 - 2		7/2		7/2	$(0,0^0,0)$	35618.81	(0.10)	[48003]
	3 - 2		5/2		3/2	$(0,0^0,0)$	35634.85	(0.10)	[48003]
	3 - 2		3/2		1/2	$(0,0^0,0)$	35634.85	(0.10)	[48003]
	3 - 2		9/2		7/2	$(0,0^0,0)$	35639.78	(0.10)	[48003]
	3 - 2		7/2		5/2	$(0,0^0,0)$	35639.78	(0.10)	[48003]
	3 - 2		5/2		5/2	$(0,0^0,0)$	35649.56	(0.10)	[48003]
$^{37}Cl^{13}C^{14}N$	2 - 1	9/2	7/2	7/2	5/2	$(0,0^0,0)$	23260.31	(0.20)	[48002]
	3 - 2		9/2		7/2	$(0,0^0,0)$	34889.05	(0.10)	[48003]
$^{35}Cl^{13}C^{15}N$	1 - 0		3/2		3/2	$(0,0^0,0)$	11479.52	(0.10)	[72011]
	1 - 0		5/2		3/2	$(0,0^0,0)$	11500.34	(0.10)	[72011]
	1 - 0		1/2		3/2	$(0,0^0,0)$	11516.99	(0.10)	[72011]
	2 - 1		5/2		5/2	$(0,0^0,0)$	22973.205	(3E-3)	[55005]
	2 - 1		1/2		1/2	$(0,0^0,0)$	22992.235	(3E-3)	[55005]
	2 - 1		5/2		3/2	$(0,0^0,0)$	22994.038	(2E-3)	[55005]
	2 - 1		7/2		5/2	$(0,0^0,0)$	22994.038	(2E-3)	[55005]
	2 - 1		3/2		3/2	$(0,0^0,0)$	23008.896	(3E-3)	[55005]
	2 - 1		5/2		3/2	$(0,1^{L1},0)$	23026.264	(3E-3)	[55005]
	2 - 1		1/2		3/2	$(0,0^0,0)$	23029.709	(3E-3)	[55005]
	2 - 1		3/2		3/2	$(0,1^{L1},0)$	23033.745	(2E-3)	[55005]
	2 - 1		7/2		5/2	$(0,1^{L1},0)$	23046.962	(3E-3)	[55005]
	2 - 1		3/2		1/2	$(0,1^{L1},0)$	23052.177	(4E-3)	[55005]
	2 - 1		1/2		1/2	$(0,1^{L1},0)$	23062.643	(2E-3)	[55005]
	3 - 2		3/2		1/2	$(0,0^0,0)$	34484.32	(0.20)	[63005]
	3 - 2		5/2		3/2	$(0,0^0,0)$	34484.32	(0.20)	[63005]
	3 - 2		9/2		7/2	$(0,0^0,0)$	34489.21	(0.20)	[63005]
	3 - 2		7/2		5/2	$(0,0^0,0)$	34489.21	(0.20)	[63005]
$^{37}Cl^{13}C^{15}N$	3 - 2		3/2		1/2	$(0,0^0,0)$	33755.32	(0.20)	[63005]
	3 - 2		5/2		3/2	$(0,0^0,0)$	33755.32	(0.20)	[63005]
	3 - 2		9/2		7/2	$(0,0^0,0)$	33759.18	(0.20)	[63005]
	3 - 2		7/2		5/2	$(0,0^0,0)$	33759.18	(0.20)	[63005]
$^{36}Cl^{12}C^{14}N$	2 - 1		2		1	$(0,0^0,0)$	23625.60	(0.10)	[49002]
	2 - 1		3		3	$(0,0^0,0)$	23625.60	(0.10)	[49002]
	2 - 1		2		2	$(0,0^0,0)$	23629.84	(1.00)	[49002]
	2 - 1		2		3	$(0,0^0,0)$	23629.84	(1.00)	[49002]
	2 - 1		3		3	$(0,0^0,0)$	23629.84	(1.00)	[49002]
	2 - 1		4		3	$(0,0^0,0)$	23629.84	(0.20)	[49002]
	2 - 1		1		1	$(0,0^0,0)$	23629.84	(1.00)	[49002]
	2 - 1		0		1	$(0,0^0,0)$	23629.84	(1.00)	[49002]
	2 - 1		3		2	$(0,0^0,0)$	23629.84	(1.00)	[49002]
	2 - 1		1		2	$(0,0^0,0)$	23634.68	(0.10)	[49002]

Table 8. Rotational constants for FCN.

Isotopic Species	Vib. State $v_1\ v_2^{\ell}\ v_3$	B_v(MHz)	D_v(kHz)	Reference
$^{19}F^{12}C^{14}N$	0 0^0 0	10554.20(2)	5.3(5)	[63005]
	0 1^1 0 c	10574.79(2)[a]		[67000]
	0 1^1 0 d	10594.44(2)[a]		[67000]
	0 2^0 0	10610.64(2)		[67000]
	0 2^2 0	10614.75(5)		[67000]
	0 3^1 0 c	10618.60(5)		[67000]
	0 3^1 0 d	10656.63(5)		[67000]
	0 3^3 0	10644.71(1)		[67000]
	0 4^0 0	10662.01(10)		[67000]
	0 0^0 1	10510.85(2)		[67000]
	0 1^1 1 c	10532.67(5)		[67000]
	0 2^0 1	10574.63(10)		[67000]
	0 0^0 2	10469.81(10)		[67000]
$^{19}F^{13}C^{14}N$	0 0^0 0	10547.73(2)		[67000]
	0 2^0 0	10602.80(5)		[67000]
	0 0^0 1	10502.71(5)		[67000]
$^{19}F^{12}C^{15}N$	0 0^0 0	10186.42(5)		[63005]

[a] The value q_{010} = 19.68421(34) MHz and μ_{010} = $-5.656(3)\times10^{-5}$ MHz were derived from the observation of ℓ-type doubling transitions [68013]. The observed frequencies were fit to the formula:
$\nu = \frac{1}{2}[q_{010}+\mu_{010}J(J+1)](v_2+1)J(J+1)$.

Table 8.1. Hyperfine structure, dipole moment and Zeeman parameters for FCN.

Parameter	$^{19}F^{12}C^{14}N$ Value	$^{19}F^{12}C^{15}N$ Value	Reference
eqQ(N)(MHz)	-2.67(5)[a]	---	[60001]
μ(D)	2.17(5)	---	[63005]
$g_\perp$ (μ_N)	---	-0.0504(8)	[73029]
$\chi_\perp-\chi_\parallel$($10^{-6}$erg/G^2·mole)	---	7.2(8)	[73029]
$Q_\parallel$ (10^{-26}esu·cm^2)	---	-3.7(10)	[73029]

[a] All of the transitions observed in vibrationally excited states show hyperfine splittings consistent with the ground state value of eqQ given here.

TABLE 8.2. The microwave spectrum of FCN

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{19}F^{12}C^{14}N$	20 - 20					$(0,1^{1},0)$	8257.58	(0.05)	[68013]
	21 - 21					$(0,1^{1},0)$	9082.29	(0.05)	[68013]
	22 - 22					$(0,1^{1},0)$	9945.96	(0.05)	[68013]
	23 - 23					$(0,1^{1},0)$	10848.78	(0.05)	[68013]
	24 - 24					$(0,1^{1},0)$	11790.52	(0.05)	[68013]
	25 - 25					$(0,1^{1},0)$	12771.27	(0.05)	[68013]
	26 - 26					$(0,1^{1},0)$	13790.88	(0.05)	[68013]
	27 - 27					$(0,1^{1},0)$	14849.51	(0.05)	[68013]
	28 - 28					$(0,1^{1},0)$	15946.96	(0.05)	[68013]
	29 - 29					$(0,1^{1},0)$	17083.23	(0.05)	[68013]
	30 - 30					$(0,1^{1},0)$	18258.29	(0.05)	[68013]
	31 - 31					$(0,1^{1},0)$	19472.10	(0.05)	[68013]
	32 - 32					$(0,1^{1},0)$	20742.52	(0.05)	[68013]
	1 - 0					$(0,0^{0},2)$	20939.62	(0.50)	[76001]
	1 - 0					$(1,0^{0},0)$	20953.77	(0.50)	[76001]
	1 - 0					$(0,0^{0},1)$	21021.62	(0.05)	[76001]
	1 - 0		1		1	$(0,0^{0},0)$	21107.73	(0.03)	[76001]
	1 - 0		2		1	$(0,0^{0},0)$	21108.53	(0.03)	[76001]
	1 - 0		0		1	$(0,0^{0},0)$	21109.72	(0.03)	[76001]
	1 - 0					$(0,2^{0},1)$	21149.25	(0.30)	[76001]
	1 - 0		1		1	$(0,1^{0},0)$	21220.59	(0.05)	[76001]
	1 - 0		2		1	$(0,1^{0},0)$	21221.40	(0.05)	[76001]
	1 - 0		1		1	$(0,4^{0},0)$	21323.45	(0.10)	[76001]
	1 - 0		2		1	$(0,4^{0},0)$	21324.21	(0.10)	[76001]
	1 - 0		0		1	$(0,4^{0},0)$	21325.32	(0.10)	[76001]
	33 - 33					$(0,1^{1},0)$	22015.74	(0.05)	[68013]
	34 - 34					$(0,1^{1},0)$	23345.53	(0.05)	[68013]
	35 - 35					$(0,1^{1},0)$	24713.90	(0.05)	[68013]
	36 - 36					$(0,1^{1},0)$	26120.72	(0.05)	[68013]
	37 - 37					$(0,1^{1},0)$	27566.22	(0.05)	[68013]
	38 - 38					$(0,1^{1},0)$	29050.01	(0.05)	[68013]
	2 - 1					$(0,0^{0},1)$	42043.12	(0.10)	[76001]
	2 - 1					$(0,1^{U1},1)$	42130.57	(0.20)	[76001]
	2 - 1		2		2	$(0,0^{0},0)$	42215.86	(0.05)	[76001]
	2 - 1		1		0	$(0,0^{0},0)$	42215.86	(0.05)	[76001]
	2 - 1		2		1	$(0,0^{0},0)$	42216.62	(0.05)	[76001]
	2 - 1		3		2	$(0,0^{0},0)$	42216.62	(0.05)	[76001]
	2 - 1		1		1	$(0,0^{0},0)$	42217.91	(0.05)	[76001]
	2 - 1					$(0,1^{L1},0)$	42299.04	(0.05)	[76001]
	2 - 1					$(0,1^{U1},0)$	42377.61	(0.05)	[76001]
	2 - 1		3		2	$(0,2^{0},0)$	42441.60	(0.10)	[76001]
	2 - 1		2		1	$(0,2^{0},0)$	42441.60	(0.10)	[76001]
	2 - 1		1		0	$(0,2^{0},0)$	42442.46	(0.10)	[76001]
	2 - 1		2		2	$(0,2^{0},0)$	42442.46	(0.10)	[76001]
	2 - 1					$(0,3^{L1},0)$	42474.28	(0.20)	[76001]
	2 - 1					$(0,3^{U1},0)$	42626.52	(0.20)	[76001]
	3 - 2					$(0,0^{0},0)$	63324.68	(0.10)	[76001]
	3 - 2					$(0,1^{L1},0)$	63448.31	(0.20)	[76001]
	3 - 2					$(0,1^{U1},0)$	63566.23	(0.20)	[76001]
	3 - 2					$(0,2^{0},0)$	63663.52	(0.20)	[76001]
	3 - 2					$(0,2^{2},0)$	63687.47	(0.30)	[76001]
	3 - 2					$(0,3^{U1},0)$	63940.01	(0.30)	[76001]
	4 - 3					$(0,0^{0},0)$	84432.23	(0.20)	[76001]
	4 - 3					$(0,2^{0},0)$	84883.65	(0.30)	[76001]
	4 - 3					$(0,2^{2},0)$	84917.66	(0.50)	[76001]
	4 - 3					$(0,3^{3},0)$	85157.08	(0.30)	[76001]
	4 - 3					$(0,3^{U1},0)$	85252.56	(0.20)	[76001]
$^{19}F^{13}C^{14}N$	1 - 0					$(0,0^{0},1)$	21005.42	(0.10)	[76001]
	1 - 0		1		1	$(0,0^{0},0)$	21094.84	(0.05)	[76001]
	1 - 0		2		1	$(0,0^{0},0)$	21095.59	(0.05)	[76001]
	1 - 0		0		1	$(0,0^{0},0)$	21096.84	(0.05)	[76001]
	1 - 0		1		1	$(0,2^{0},0)$	21204.95	(0.10)	[76001]
	1 - 0		2		1	$(0,2^{0},0)$	21205.72	(0.10)	[76001]
	2 - 1					$(0,1^{L1},0)$	42266.10	(0.50)	[76001]
	2 - 1					$(0,1^{U1},0)$	42346.81	(0.50)	[76001]

TABLE 8.2. The microwave spectrum of FCN—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{19}F^{12}C^{15}N$	1 – 0					$(0,0^0,0)$	20372.58	(0.05)	[76001]
	2 – 1					$(0,0^0,0)$	40745.29	(0.20)	[76001]
	2 – 1					$(0,1^{L1},0)$	40826.68	(0.30)	[76001]
	2 – 1					$(0,1^{U1},0)$	40899.70	(0.30)	[76001]

Table 9. Rotational and centrifugal distortion constants for $^{12}C^{19}F_2$ [73030].

Watson's Determinable Parameters	Value[a] (MHz)	Derived Parameters (assuming planarity conditions)	Value[a] (MHz)
A''	88 355.0942±0.066	A'	88 355.071±0.066
B''	12 507.5392±0.010	B'	12 507.605±0.010
C''	10 932.3151±0.009	C'	10 932.336±0.010
τ_1	0.126447±0.011	τ'_{bbcc}	-0.0468±0.0005
τ_2	-0.0181803±0.0015	τ'_{ccaa}	0.1323±0.003
τ_3[b]	3.45±0.04	τ'_{aabb}	0.0410±0.008
τ_{aaaa}	-11.2778±0.036	$\tau_{aabb}(1)$	0.3993±0.0046
τ_{bbbb}	-0.0691387±0.0005	$\tau_{aabb}(2)$	0.3878±0.0040
τ_{cccc}	-0.0340714±0.0004	$\tau_{aabb}(3)$	0.3878±0.0040
H_J	$(0.1162\pm0.2)\times10^{-6}$	$\tau_{abab}(1)$	-0.1784±0.0016
H_{JK}	$(-0.0013\pm0.6)\times10^{-5}$	$\tau_{abab}(2)$	-0.1681±0.0038
H_{KJ}	$(-0.2555\pm0.5)\times10^{-4}$	$\tau_{abab}(3)$	-0.1668±0.0041
H_K	$(0.3337\pm0.4)\times10^{-3}$	$\Delta\tau$	$(-0.215\pm0.07)\times10^{-3}$
h_J[c]	$(0.132\pm0.4)\times10^{-7}$	S	0.82
h_{JK}	$(0.4325\pm0.3)\times10^{-5}$	σ_{rms}	0.109
h_K	$(-0.1580\pm0.14)\times10^{-3}$	μ(D)	0.469(26)

[a] The uncertainties quoted are one standard deviation as estimated by the least squares fit. The number of significant figures quoted are necessary to reproduce the calculated transition frequencies within their standard deviations.

[b] Strictly speaking, τ_3 is not a determinable parameter, but is calculated from τ_1, τ_2, τ_{aaaa} and τ_{bbbb} using the planarity conditions.

[c] Watson uses $2h_J$ for this parameter.

TABLE 9.1. The microwave spectrum of CF_2

Isotopic species	$J'(K'_-,K'_+)$ – $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{12}C^{19}F_2$	33(6,28) – 34(5,29)	(0,0,0)	18635.9	(0.30)	[73030]
	13(2,11) – 14(1,14)	(0,0,0)	19191.45	(0.20)	[73030]
	24(3,22) – 23(4,19)	(0,0,0)	20930.7	(0.10)	[73030]
	27(5,22) – 28(4,25)	(0,0,0)	21179.35	(0.10)	[73030]
	21(4,17) – 22(3,20)	(0,0,0)	21240.62	(0.10)	[73030]
	4(0, 4) – 3(1, 3)	(0,0,0)	21500.1	(0.10)	[66013]
	12(2,10) – 13(1,13)	(0,0,0)	23114.62	(0.10)	[73030]
	36(5,32) – 35(6,29)	(0,0,0)	23589.37	(0.10)	[73030]
	29(4,25) – 28(5,24)	(0,0,0)	25719.86	(0.10)	[73030]
	13(3,11) – 14(2,12)	(0,0,0)	25894.0	(0.10)	[73030]
	30(4,27) – 29(5,24)	(0,0,0)	26194.73	(0.10)	[73030]
	33(6,27) – 34(5,30)	(0,0,0)	26290.25	(0.10)	[73030]
	17(2,15) – 18(1,18)	(0,0,0)	27883.9	(0.20)	[73030]
	1(1, 1) – 2(0, 2)	(0,0,0)	28989.6	(0.20)	[66013]
	11(2, 9) – 12(1,12)	(0,0,0)	29340.6	(0.10)	[73030]
	15(3,12) – 16(2,15)	(0,0,0)	29651.62	(0.10)	[73030]
	20(2,19) – 19(3,16)	(0,0,0)	30220.6	(0.10)	[73030]
	26(5,22) – 27(4,23)	(0,0,0)	31669.8	(0.10)	[73030]
	39(7,32) – 40(6,35)	(0,0,0)	34165.7	(0.30)	[73030]
	16(2,14) – 15(3,13)	(0,0,0)	37171.55	(0.10)	[73030]
	10(2, 8) – 11(1,11)	(0,0,0)	37747.2	(0.10)	[73030]
	25(3,23) – 24(4,20)	(0,0,0)	40826.15	(0.10)	[73030]
	21(2,20) – 20(3,17)	(0,0,0)	40949.2	(0.10)	[73030]
	20(4,16) – 21(3,19)	(0,0,0)	43257.57	(0.10)	[73030]
	19(4,16) – 20(3,17)	(0,0,0)	43639.2	(0.20)	[73030]
	6(2, 5) – 7(1, 6)	(0,0,0)	44286.6	(0.10)	[66013]
	26(5,21) – 27(4,24)	(0,0,0)	45212.6	(0.20)	[73030]
	10(1, 9) – 9(2, 8)	(0,0,0)	45822.8	(0.10)	[73030]
	19(2,17) – 20(1,20)	(0,0,0)	46920.063	(0.04)	[73030]
	5(0, 5) – 4(1, 4)	(0,0,0)	47650.55	(0.10)	[73030]
	23(3,20) – 22(4,19)	(0,0,0)	47701.9	(0.20)	[73030]
	14(3,11) – 15(2,14)	(0,0,0)	47950.8	(0.20)	[73030]
	9(2, 7) – 10(1,10)	(0,0,0)	48186.2	(0.20)	[73030]
	28(2,27) – 27(3,24)	(0,0,0)	50664.596	(0.15)	[73030]
	38(7,31) – 39(6,34)	(0,0,0)	59466.578	(0.09)	[73030]
	26(3,24) – 25(4,21)	(0,0,0)	59733.478	(0.09)	[73030]
	20(2,18) – 21(1,21)	(0,0,0)	59935.200	(0.09)	[73030]
	24(2,23) – 23(3,20)	(0,0,0)	60113.905	(0.09)	[73030]
	8(2, 6) – 9(1, 9)	(0,0,0)	60493.616	(0.09)	[73030]
	1(1, 0) – 1(0, 1)	(0,0,0)	77419.8	(0.20)	[66013]
	2(1, 1) – 2(0, 2)	(0,0,0)	79019.8	(0.20)	[66013]
	3(1, 2) – 3(0, 3)	(0,0,0)	81464.6	(0.20)	[66013]
	4(1, 3) – 4(0, 4)	(0,0,0)	84808.3	(0.20)	[66013]

Table 10. Rotational constants for HCN [74001][a], DCN [74001][a] and TCN [75007].

Isotopic Species	Vib. State $v_1\ v_2^\ell\ v_3$	B_v(MHz)	D_v(kHz)	q_v(kHz)
$H^{12}C^{14}N$[b]	0 0^0 0	44 315.9757(4)	87.24(6)	
	0 1^1 0	44 422.437(30)	89.4	$224\ 476.57(30) - 2.65865(292)\ J(J+1) + 3.602(620)\times10^{-5}\ J^2(J+1)^2$
	0 2^0 0	44 544.033(60)	91.6	
	0 3^1 0			$231\ 120.(4) - 2.98(9)\ J(J+1) + 3.6\times10^{-5}\ J^2(J+1)^2$
	0 0^0 1	44 013.775(100)	86.9	
$H^{13}C^{14}N$	0 0^0 0	43 170.09(6)	83.0	
	0 1^1 0			$214\ 837.4(14) - 2.436(17)\ J(J+1)$
$H^{12}C^{15}N$	0 0^0 0	43 027.69(5)	82.3	
	0 $1^1$0			$211\ 938.1(52) - 2.392(72)\ J(J+1)$
$D^{12}C^{14}N$[c]	0 0^0 0	36 207.4627(2)	57.83(4)	
	0 1^1 0	36 337.037(30)	61.1	$186\ 191.58(50) - 2.20697(380)\ J(J+1) + 4.790(620)\times10^{-5}\ J^2(J+1)^2$
	0 2^0 0	36 474.259(50)	64.3	
	0 3^1 0			$190\ 916.(2) - 2.44(2)\ J(J+1) + 4.8\times10^{-5}\ J^2(J+1)^2$
	0 0^0 1	36 011.116(100)	57.4	
$D^{13}C^{14}N$	0 0^0 0	35 587.62(5)	55.7	
	0 1^1 0			$182\ 294.2(12) - 2.082(12)\ J(J+1)$.
	0 2^0 0	35 833.92(20)	59.5	
$D^{12}C^{15}N$	0 0^0 0	35 169.85(5)	54.5	
	0 1^1 0			$176\ 079.9(22) - 2.019(22)\ J(J+1)$
	0 2^0 0	35 427.09(15)	58.4	
$T^{12}C^{14}N$	0 0^0 0.	30 954.080(8)	43.82(10)	
	0 1^1 0	31 080.410(5)	45.82(8)	$150\ 809.(7) - 4.1(2)\ J(J+1)$
$T^{13}C^{14}N$	0 0^0 0	30 591.036(7)	42.45(9)	
	0 1^1 0	30 709.082(12)	44.37(16)	$149\ 744.(17) - 3.2(4)\ J(J+1)$
$T^{12}C^{15}N$	0 0^0 0	30 064.400(12)	41.19(14)	
	0 1^1 0	30 186.560(8)	43.00(14)	$142\ 674.(12) - 4.2(4)\ J(J+1)$

[a] Original data from [71021], [69021], [67006], and [61001]. Note that this table uses a different vibrational numbering *from that used in the primary references as explained in the Introduction.*

[b] For $H^{12}C^{14}N$ $D_v(\text{kHz}) = 87.24 - 0.83\ v_1 + 2.13\ v_2 + 0.22\ v_3$ kHz and

$q_v(\text{MHz}) = 221.1550 + 2.10\ v_1 + 3.3215\ v_2 - 0.03\ v_3 - (0.002495 + 0.000163\ v_2)\ J(J+1) + 3.6\times10^{-8}\ J^2(J+1)^2$

[c] For $D^{12}C^{14}N$ $D_v(\text{kHz}) = 57.83 - 0.27\ v_1 + 2.10\ v_2 - 0.03\ v_3$

$q_v(\text{MHz}) = 183.8294 - 4.41\ v_1 + 2.3622\ v_2 + 4.53\ v_3 - (0.002089 + 0.000118\ v_2)\ J(J+1) + 4.8\times10^{-8}\ J^2(J+1)^2$

Additional References: [49001], [50007], [50008], [50009], [50010], [50011], [51004], [52009], [52010], [52011], [53006], [53007], [54000], [54001], [55003], [55004], [60002], [60004], [61002], [61003], [64007], [67007], [67008], [67009], [68031], [69023], [69050], [70053], [73032], [74012], [74015], [75033].

Table 10.1. Hyperfine constants, electric dipole moment and Zeeman constants for HCN [74001].

Parameters	HCN 00^00 J=1-0	HCN 01^10 J=2-1	HCN 02^00 J=1-0	HCN 02^20 J=3-2	$HC^{15}N$ 00^00 J=1-0	DCN 00^00 J=1-0	$D^{13}C^{14}N$ 00^00 J=1-0
Hyperfine Constants[a]							
eqQ (N) (kHz)	-4707.89(8)	-4807.9(19)	-4899.0(21)	...	...	-4703.96(47)	...
eqQ (D) (kHz)	...	...	...	...	...	202.23(50)	c
c_N	10.13(3)	12.07(27)	10.70(78)	...	...	8.23(18)	...
c_H or c_D (kHz)	-4.32(7)	-27.4(6)	-3.8(15)	...	...	-0.57(25)	-0.6(3)
$c_{^{13}C}$ (kHz)	...	...	...	...	...	...	15.0(10)
S_{HN} (kHz)	0.154(19)	...	...	...	...	...	...
$\|eqQ_n\|$ (kHz)		395.1(27)					
Electric Dipole Moment[a]							
μ	2.984594(1500)	2.941642(1500)	2.89865(150)	2.89813(150)	...	2.990198(1500)	...
$\frac{\mu}{\mu(H^{12}C^{14}N)}$	1.	0.9856088(80)	0.971204(36)	0.97103(17)	...	1.0018776(70)	...
Zeeman Constants[b]							
$g_\perp$ (μ_N)	-0.0980(40)	-0.100(2)	...	...	-0.0904(6)	...	...
$g_\parallel$ (μ_N)	...	+0.38(12)	...	...	...	...	...
$\chi_\perp - \chi_\parallel$ (erg/G^2·mole)	...	...	...	...	$7.2(8)\times10^{-6}$	...	...
$Q_\parallel$ (esu·cm^2)	...	...	...	...	$3.1(12)\times10^{-26}$	...	...

[a] Original data from [70057] and [74014]. Values refer to the upper J state.

[b] Original data from [73010], [73033] and [70019].

[c] A value of eqQ(D) = 194.4(22) was assumed from the DCN measurements of DeLucia and Gordy [69021]. The spin-rotation constants shown for $D^{13}CN$ are from [74014].

TABLE 10.2. The microwave spectrum of HCN

Isotopic species	J' - J''	F'	F_1'	F''	F_1''	(ν_1,ν_2^ℓ,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$H^{12}C^{14}N$	1 - 1	3/2	1	5/2	2	$(0,1^1,0)$	448.200	(3E-4)	[70046]
	1 - 1	1/2	1	3/2	2	$(0,1^1,0)$	448.213	(5E-4)	[70046]
	1 - 1	3/2	1	3/2	2	$(0,1^1,0)$	448.233	(6E-3)	[70046]
	1 - 1	1/2	1	3/2	1	$(0,1^1,0)$	448.825	(3E-3)	[70046]
	1 - 1	3/2	1	3/2	1	$(0,1^1,0)$	448.845	(4E-4)	[70046]
	1 - 1	1/2	1	1/2	1	$(0,1^1,0)$	448.845	(4E-4)	[70046]
	1 - 1	3/2	1	1/2	1	$(0,1^1,0)$	448.864	(3E-3)	[70046]
	1 - 1	3/2	2	5/2	2	$(0,1^1,0)$	448.929	(3E-3)	[70046]
	1 - 1	3/2	2	3/2	2	$(0,1^1,0)$	448.963	(1E-4)	[70046]
	1 - 1	5/2	2	5/2	2	$(0,1^1,0)$	448.963	(1E-4)	[70046]
	1 - 1	5/2	2	3/2	2	$(0,1^1,0)$	448.996	(3E-3)	[70046]
	1 - 1	3/2	2	3/2	1	$(0,1^1,0)$	449.574	(3E-3)	[70046]
	1 - 1	3/2	2	1/2	1	$(0,1^1,0)$	449.594	(4E-4)	[70046]
	1 - 1	5/2	2	3/2	1	$(0,1^1,0)$	449.608	(2E-4)	[70046]
	1 - 1	1/2	0	3/2	1	$(0,1^1,0)$	450.802	(3E-4)	[70046]
	1 - 1	1/2	0	1/2	1	$(0,1^1,0)$	450.821	(5E-4)	[70046]
	2 - 2		2		2	$(0,1^1,0)$	1346.677	(5E-3)	[56006]
	2 - 2		3		3	$(0,1^1,0)$	1346.796	(5E-3)	[56006]
	2 - 2		1		1	$(0,1^1,0)$	1346.796	(5E-3)	[56006]
	3 - 3		3		2	$(0,1^1,0)$	2691.757	(8E-3)	[56006]
	3 - 3		3		4	$(0,1^1,0)$	2692.071	(6E-3)	[56006]
	3 - 3		3		3	$(0,1^1,0)$	2693.250	(0.01)	[56006]
	3 - 3		4		4	$(0,1^1,0)$	2693.395	(6E-3)	[56006]
	3 - 3		2		2	$(0,1^1,0)$	2693.395	(6E-3)	[56006]
	3 - 3		4		3	$(0,1^1,0)$	2694.582	(0.01)	[56006]
	3 - 3		2		3	$(0,1^1,0)$	2694.954	(0.01)	[56006]
	4 - 4		4		3	$(0,1^1,0)$	4486.762	(0.01)	[56006]
	4 - 4		4		5	$(0,1^1,0)$	4487.000	(6E-3)	[56006]
	4 - 4		4		4	$(0,1^1,0)$	4488.381	(0.02)	[56006]
	4 - 4		5		5	$(0,1^1,0)$	4488.522	(0.02)	[56006]
	4 - 4		3		3	$(0,1^1,0)$	4488.522	(0.02)	[56006]
	5 - 5		5		5	$(0,1^1,0)$	6731.793	(0.01)	[56006]
	5 - 5		6		6	$(0,1^1,0)$	6731.925	(0.01)	[56006]
	5 - 5		4		4	$(0,1^1,0)$	6731.925	(0.01)	[56006]
	16 - 16					$(0,2^2,0)$	8292.88	(0.10)	[67006]
	3 - 3					$(0,5^1,0)$	8557.50	(0.10)	[61001]
	4 - 4					$(0,3^1,0)$	9242.20	(0.10)	[61001]
	6 - 6					$(0,1^1,0)$	9423.32	(0.02)	[61001]
	17 - 17					$(0,2^2,0)$	10464.07	(0.10)	[67006]
	7 - 7					$(0,1^1,0)$	12562.32	(0.03)	[61001]
	18 - 18					$(0,2^2,0)$	13019.97	(0.10)	[67006]
	5 - 5					$(0,3^1,0)$	13861.45	(0.10)	[61001]
	19 - 19					$(0,2^2,0)$	15995.82	(0.10)	[67006]
	8 - 8					$(0,1^1,0)$	16148.55	(0.05)	[61001]
	4 - 4					$(0,5^1,0)$	19224.60	(0.10)	[61001]
	6 - 6					$(0,3^1,0)$	19402.20	(0.10)	[61001]
	20 - 20					$(0,2^2,0)$	19426.18	(0.10)	[67006]
	9 - 9					$(0,1^1,0)$	20181.40	(0.05)	[61001]
	21 - 21					$(0,2^2,0)$	23343.70	(0.15)	[67006]
	10 - 10					$(0,1^1,0)$	24660.31	(0.04)	[67006]
	7 - 7					$(0,3^1,0)$	25863.35	(0.10)	[61001]
	22 - 22					$(0,2^2,0)$	27778.92	(0.15)	[67006]
	11 - 11					$(0,1^1,0)$	29584.66	(0.04)	[67006]
	23 - 23					$(0,2^2,0)$	32759.76	(0.15)	[67006]
	12 - 12					$(0,1^1,0)$	34953.76	(0.05)	[67006]
	24 - 24					$(0,2^2,0)$	38311.12	(0.15)	[67006]
	13 - 13					$(0,1^1,0)$	40766.90	(0.05)	[67006]
	25 - 25					$(0,2^2,0)$	44454.32	(0.15)	[67006]
	14 - 14					$(0,1^1,0)$	47023.20	(0.08)	[67006]
	15 - 15					$(0,1^1,0)$	53721.78	(0.08)	[67006]
	16 - 16					$(0,1^1,0)$	60861.63	(0.08)	[67006]
	17 - 17					$(0,1^1,0)$	68441.92	(*0.04)	[74001]
	18 - 18					$(0,1^1,0)$	76461.43	(0.10)	[67006]
	19 - 19					$(0,1^1,0)$	84919.16	(*0.07)	[74001]
	1 - 0					$(0,0^0,1)$	88027.20	(0.20)	[71021]

TABLE 10.2. The microwave spectrum of HCN—Continued

Isotopic species	J' - J"	F'	F_1'	F"	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$H^{12}C^{14}N$	1 - 0		1		1	$(0,0^0,0)$	88630.416	(1E-3)	[69021]
	1 - 0		2		1	$(0,0^0,0)$	88631.847	(1E-3)	[69021]
	1 - 0		0		1	$(0,0^0,0)$	88633.936	(1E-3)	[69021]
	1 - 0		1		1	$(0,2^0,0)$	89086.53	(0.15)	[71021]
	1 - 0		2		1	$(0,2^0,0)$	89087.92	(0.10)	[71021]
	1 - 0		0		1	$(0,2^0,0)$	89090.13	(0.15)	[71021]
	20 - 20					$(0,1^1,0)$	93813.85	(0.10)	[67006]
	21 - 21					$(0,1^1,0)$	103144.25	(*0.15)	[74001]
	22 - 22					$(0,1^1,0)$	112909.10	(*0.23)	[74001]
	2 - 1		2		1	$(0,1^{L1},0)$	177237.45	(0.15)	[71021]
	2 - 1		1		1	$(0,1^{L1},0)$	177238.96	(0.10)	[71021]
	2 - 1		3		2	$(0,1^{L1},0)$	177238.96	(0.10)	[71021]
	2 - 1		1		0	$(0,1^{L1},0)$	177240.65	(0.15)	[71021]
	2 - 1		2		2	$(0,0^0,0)$	177259.677	(2E-3)	[69021]
	2 - 1		1		0	$(0,0^0,0)$	177259.923	(2E-3)	[69021]
	2 - 1		2		1	$(0,0^0,0)$	177261.110	(2E-3)	[69021]
	2 - 1		3		2	$(0,0^0,0)$	177261.223	(2E-3)	[69021]
	2 - 1		1		2	$(0,0^0,0)$	177262.012	(*2E-3)	[74001]
	2 - 1		1		1	$(0,0^0,0)$	177263.445	(2E-3)	[69021]
	2 - 1		2		1	$(0,1^{U1},0)$	178135.25	(0.15)	[71021]
	2 - 1		1		1	$(0,1^{U1},0)$	178136.76	(0.10)	[71021]
	2 - 1		3		2	$(0,1^{U1},0)$	178136.76	(0.10)	[71021]
	2 - 1		1		0	$(0,1^{U1},0)$	178138.37	(0.15)	[71021]
	3 - 2		2		1	$(0,0^0,0)$	265886.18	(0.55)	[56005]
	3 - 2		3		2	$(0,0^0,0)$	265886.18	(0.55)	[56005]
	3 - 2		4		3	$(0,0^0,0)$	265886.18	(0.55)	[56005]
$H^{13}C^{14}N$	6 - 6					$(0,1^1,0)$	9018.87	(0.05)	[61001]
	7 - 7					$(0,1^1,0)$	12023.25	(0.05)	[61001]
	8 - 8					$(0,1^1,0)$	15455.64	(0.10)	[61001]
	9 - 9					$(0,1^1,0)$	19315.70	(0.10)	[61001]
	10 - 10					$(0,1^1,0)$	23602.60	(0.10)	[61001]
	1 - 0		1		1	$(0,0^0,0)$	86338.767	(0.03)	[76025]
	1 - 0		2		1	$(0,0^0,0)$	86340.184	(0.03)	[76025]
	1 - 0		0		1	$(0,0^0,0)$	86342.274	(0.03)	[76025]
	2 - 1		2		2	$(0,0^0,0)$	172676.573	(0.05)	[76025]
	2 - 1		1		0	$(0,0^0,0)$	172676.573	(0.05)	[76025]
	2 - 1		2		1	$(0,0^0,0)$	172677.959	(0.05)	[76025]
	2 - 1		3		2	$(0,0^0,0)$	172677.959	(0.05)	[76025]
	2 - 1		1		1	$(0,0^0,0)$	172680.209	(0.05)	[76025]
	3 - 2					$(0,0^0,0)$	259011.58	(*0.35)	[74001]
$H^{13}C^{15}N$	1 - 0					$(0,0^0,0)$	83727.590	(0.03)	[76025]
	2 - 1					$(0,0^0,0)$	167453.285	(0.05)	[76025]
$H^{12}C^{15}N$	6 - 6					$(0,1^1,0)$	8897.20	(0.10)	[61001]
	7 - 7					$(0,1^1,0)$	11861.0	(0.1)	[61001]
	8 - 8					$(0,1^1,0)$	15247.1	(0.2)	[61001]
	9 - 9					$(0,1^1,0)$	19055.4	(0.3)	[61001]
	10 - 10					$(0,1^1,0)$	23284.1	(0.3)	[61001]
	1 - 0					$(0,0^0,0)$	86054.961	(0.03)	[76025]
	2 - 1					$(0,0^0,0)$	172107.956	(0.05)	[76025]
	3 - 2					$(0,0^0,0)$	258157.1	(0.2)	[66014]
$D^{12}C^{14}N$	1 - 1					$(0,1^1,0)$	372.374	(*1E-3)	[74001]
	2 - 2					$(0,1^1,0)$	1117.070	(*3E-3)	[74001]
	3 - 3					$(0,1^1,0)$	2233.981	(*6E-3)	[74001]
	4 - 4					$(0,1^1,0)$	3722.98	(0.02)	[56007]
	5 - 5					$(0,1^1,0)$	5583.75	(0.02)	[56007]
	3 - 3					$(0,5^1,0)$	7050.92	(0.10)	[61001]
	4 - 4					$(0,3^1,0)$	7634.45	(0.10)	[61001]
	6 - 6					$(0,1^1,0)$	7816.18	(0.02)	[56007]
	15 - 15					$(0,2^2,0)$	8306.60	(0.10)	[67006]
	24 - 24					$(0,3^3,0)$	9570.98	(0.20)	[67006]
	7 - 7					$(0,1^1,0)$	10419.81	(0.03)	[61001]
	16 - 16					$(0,2^2,0)$	10586.85	(0.10)	[67006]
	5 - 5					$(0,3^1,0)$	11449.55	(0.10)	[61001]
	4 - 4					$(0,5^1,0)$	11680.55	(0.10)	[61001]
	25 - 25					$(0,3^3,0)$	12033.46	(0.20)	[67006]

TABLE 10.2. The microwave spectrum of HCN—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$D^{12}C^{14}N$	17 - 17					$(0,2^2,0)$	13272.45	(0.10)	[67006]
	8 - 8					$(0,1^1,0)$	13394.36	(0.03)	[67006]
	26 - 26					$(0,3^3,0)$	14958.90	(0.20)	[67006]
	6 - 6					$(0,3^1,0)$	16025.35	(0.10)	[61001]
	18 - 18					$(0,2^2,0)$	16393.87	(0.10)	[67006]
	9 - 9					$(0,1^1,0)$	16739.39	(0.03)	[67006]
	27 - 27					$(0,3^3,0)$	18396.45	(0.20)	[67006]
	19 - 19					$(0,2^2,0)$	19977.48	(0.10)	[67006]
	10 - 10					$(0,1^1,0)$	20454.40	(0.05)	[61001]
	7 - 7					$(0,3^1,0)$	21360.15	(0.10)	[61001]
	28 - 28					$(0,3^3,0)$	22392.32	(0.20)	[67006]
	20 - 20					$(0,2^2,0)$	24045.83	(0.10)	[67006]
	11 - 11					$(0,1^1,0)$	24538.92	(0.05)	[61001]
	29 - 29					$(0,3^3,0)$	26989.05	(0.20)	[67006]
	8 - 8					$(0,3^1,0)$	27450.96	(0.20)	[67006]
	21 - 21					$(0,2^2,0)$	28616.97	(0.15)	[67006]
	12 - 12					$(0,1^1,0)$	28992.37	(0.04)	[67006]
	30 - 30					$(0,3^3,0)$	32224.05	(0.20)	[67006]
	22 - 22					$(0,2^2,0)$	33704.62	(0.15)	[67006]
	13 - 13					$(0,1^1,0)$	33814.03	(0.05)	[67006]
	9 - 9					$(0,3^1,0)$	34294.02	(0.20)	[67006]
	31 - 31					$(0,3^3,0)$	38128.05	(0.20)	[67006]
	14 - 14					$(0,1^1,0)$	39003.36	(0.05)	[67006]
	23 - 23					$(0,2^2,0)$	39317.87	(0.15)	[67006]
	10 - 10					$(0,3^1,0)$	41884.00	(0.20)	[67006]
	15 - 15					$(0,1^1,0)$	44559.55	(0.05)	[67006]
	24 - 24					$(0,2^2,0)$	45462.56	(0.15)	[67006]
	16 - 16					$(0,1^1,0)$	50481.79	(0.08)	[67006]
	17 - 17					$(0,1^1,0)$	56769.32	(0.08)	[67006]
	18 - 18					$(0,1^1,0)$	63421.28	(0.08)	[67006]
	19 - 19					$(0,1^1,0)$	70436.84	(0.10)	[67006]
	1 - 0					$(0,0^0,1)$	72022.00	(0.20)	[71021]
	1 - 0	1	1	2	1	$(0,0^0,0)$	72413.484	(1E-3)	[69021]
	1 - 0	1	1	1	1	$(0,0^0,0)$	72413.484	(1E-3)	[69021]
	1 - 0	1	1	0	1	$(0,0^0,0)$	72413.484	(1E-3)	[69021]
	1 - 0	2	1	1	1	$(0,0^0,0)$	72413.514	(1E-3)	[69021]
	1 - 0	2	1	2	1	$(0,0^0,0)$	72413.514	(1E-3)	[69021]
	1 - 0	0	1	1	1	$(0,0^0,0)$	72413.558	(1E-3)	[69021]
	1 - 0	1	2	0	1	$(0,0^0,0)$	72414.905	(1E-3)	[69021]
	1 - 0	1	2	1	1	$(0,0^0,0)$	72414.905	(1E-3)	[69021]
	1 - 0	1	2	2	1	$(0,0^0,0)$	72414.905	(1E-3)	[69021]
	1 - 0	3	2	2	1	$(0,0^0,0)$	72414.927	(1E-3)	[69021]
	1 - 0	2	2	2	1	$(0,0^0,0)$	72414.973	(1E-3)	[69021]
	1 - 0	2	2	1	1	$(0,0^0,0)$	72414.973	(1E-3)	[69021]
	1 - 0	1	0	0	1	$(0,0^0,0)$	72417.030	(1E-3)	[69021]
	1 - 0	1	0	1	1	$(0,0^0,0)$	72417.030	(1E-3)	[69021]
	1 - 0	1	0	2	1	$(0,0^0,0)$	72417.030	(1E-3)	[69021]
	1 - 0		1		1	$(0,2^0,0)$	72947.16	(0.10)	[71021]
	1 - 0		2		1	$(0,2^0,0)$	72948.48	(0.10)	[71021]
	1 - 0		0		1	$(0,2^0,0)$	72950.57	(0.10)	[71021]
	20 - 20					$(0,1^1,0)$	77814.65	(0.10)	[67006]
	21 - 21					$(0,1^1,0)$	85554.169	(*0.09)	[74001]
	22 - 22					$(0,1^1,0)$	93654.08	(0.10)	[67006]
	2 - 1		2		2	$(0,0^0,0)$	144826.573	(*2E-3)	[74001]
	2 - 1	2	1	1	0	$(0,0^0,0)$	144826.810	(1E-3)	[69021]
	2 - 1	1	1	1	0	$(0,0^0,0)$	144826.841	(1E-3)	[69021]
	2 - 1		2		1	$(0,0^0,0)$	144828.000	(*2E-3)	[74001]
	2 - 1		3		2	$(0,0^0,0)$	144828.109	(*2E-3)	[74001]
	2 - 1		1		1	$(0,0^0,0)$	144830.336	(*2E-3)	[74001]
	2 - 1		2		1	$(0,1^{L1},0)$	144973.18	(0.15)	[71021]
	2 - 1		1		1	$(0,1^{L1},0)$	144974.64	(0.10)	[71021]
	2 - 1		3		2	$(0,1^{L1},0)$	144974.64	(0.10)	[71021]
	2 - 1		1		0	$(0,1^{L1},0)$	144976.17	(0.10)	[71021]
	2 - 1		2		1	$(0,1^{U1},0)$	145717.85	(0.15)	[71021]
	2 - 1		1		1	$(0,1^{U1},0)$	145719.28	(0.10)	[71021]

TABLE 10.2. The microwave spectrum of HCN—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$D^{12}C^{14}N$	2 - 1		3		2	$(0,1^{U1},0)$	145719.28	(0.10)	[71021]
	2 - 1		1		0	$(0,1^{U1},0)$	145720.76	(0.10)	[71021]
	2 - 1		2		2	$(0,2^0,0)$	145889.98	(0.15)	[71021]
	2 - 1		1		0	$(0,2^0,0)$	145889.98	(0.15)	[71021]
	2 - 1		2		1	$(0,2^0,0)$	145891.42	(0.10)	[71021]
	2 - 1		3		2	$(0,2^0,0)$	145891.42	(0.10)	[71021]
	3 - 2					$(0,0^0,0)$	217238.40	(0.45)	[56005]
	4 - 3					$(0,0^0,0)$	289644.67	(0.60)	[56005]
$D^{13}C^{14}N$	6 - 6					$(0,1^1,0)$	7652.70	(0.05)	[61001]
	7 - 7					$(0,1^1,0)$	10201.95	(0.05)	[61001]
	8 - 8					$(0,1^1,0)$	13114.35	(0.10)	[61001]
	9 - 9					$(0,1^1,0)$	16389.63	(0.10)	[61001]
	10 - 10					$(0,1^1,0)$	20027.10	(0.10)	[61001]
	11 - 11					$(0,1^1,0)$	24026.60	(0.10)	[61001]
	1 - 0		1		1	$(0,0^0,0)$	71173.89	(0.10)	[71021]
	1 - 0		2		1	$(0,0^0,0)$	71175.22	(0.10)	[71021]
	1 - 0		0		1	$(0,0^0,0)$	71177.36	(0.10)	[71021]
	1 - 0					$(0,2^0,0)$	71667.6	(0.4)	[71021]
	2 - 1		2		2	$(0,0^0,0)$	142347.540	(0.03)	[76025]
	2 - 1		1		0	$(0,0^0,0)$	142347.540	(0.03)	[76025]
	2 - 1		2		1	$(0,0^0,0)$	142348.883	(0.03)	[76025]
	2 - 1		3		2	$(0,0^0,0)$	142348.883	(0.03)	[76025]
	2 - 1		1		1	$(0,0^0,0)$	142351.129	(0.03)	[76025]
	3 - 2					$(0,0^0,0)$	213519.926	(0.05)	[76025]
	4 - 3					$(0,0^0,0)$	284687.32	(0.20)	[76025]
$D^{12}C^{15}N$	6 - 6					$(0,1^1,0)$	7391.80	(0.10)	[61001]
	7 - 7					$(0,1^1,0)$	9854.15	(0.10)	[61001]
	8 - 8					$(0,1^1,0)$	12667.25	(0.10)	[61001]
	9 - 9					$(0,1^1,0)$	15830.90	(0.10)	[61001]
	10 - 10					$(0,1^1,0)$	19344.30	(0.10)	[61001]
	11 - 11					$(0,1^1,0)$	23207.45	(0.20)	[61001]
	1 - 0					$(0,0^0,0)$	70339.48	(0.10)	[71021]
	1 - 0					$(0,2^0,0)$	70853.95	(0.30)	[71021]
	2 - 1					$(0,0^0,0)$	140677.446	(0.05)	[76025]
	3 - 2					$(0,0^0,0)$	211012.926	(0.07)	[76025]
	4 - 3					$(0,0^0,0)$	281344.55	(0.08)	[76025]
$D^{13}C^{15}N$	2 - 1					$(0,0^0,0)$	138123.515	(0.03)	[76025]
	3 - 2					$(0,0^0,0)$	207182.140	(0.06)	[76025]
	4 - 3					$(0,0^0,0)$	276237.239	(0.07)	[76025]
$T^{12}C^{14}N$	2 - 1					$(0,0^0,0)$	123814.96	(0.10)	[75007]
	2 - 1					$(0,1^{L1},0)$	124018.95	(0.10)	[75007]
	2 - 1					$(0,1^{U1},0)$	124622.14	(0.10)	[75007]
	3 - 2					$(0,0^0,0)$	185719.73	(0.10)	[75007]
	3 - 2					$(0,1^{L1},0)$	186025.70	(0.10)	[75007]
	3 - 2					$(0,1^{U1},0)$	186930.45	(0.10)	[75007]
	4 - 3					$(0,0^0,0)$	247621.36	(0.10)	[75007]
	4 - 3					$(0,1^{L1},0)$	248029.20	(0.10)	[75007]
	4 - 3					$(0,1^{U1},0)$	249235.29	(0.10)	[75007]
	5 - 4					$(0,0^0,0)$	309518.91	(0.10)	[75007]
	5 - 4					$(0,1^{L1},0)$	310028.49	(0.10)	[75007]
	5 - 4					$(0,1^{U1},0)$	311535.75	(0.10)	[75007]
	6 - 5					$(0,0^0,0)$	371411.07	(0.10)	[75007]
	6 - 5					$(0,1^{L1},0)$	372022.34	(0.10)	[75007]
	6 - 5					$(0,1^{U1},0)$	373830.55	(0.10)	[75007]
	7 - 6					$(0,0^0,0)$	433297.01	(0.10)	[75007]
	7 - 6					$(0,1^{L1},0)$	434009.72	(0.10)	[75007]
	8 - 7					$(0,0^0,0)$	495175.55	(0.10)	[75007]
$T^{13}C^{14}N$	2 - 1					$(0,0^0,0)$	122362.83	(0.10)	[75007]
	3 - 2					$(0,0^0,0)$	183541.66	(0.10)	[75007]
	3 - 2					$(0,1^{L1},0)$	183801.12	(0.10)	[75007]
	3 - 2					$(0,1^{U1},0)$	184699.31	(0.10)	[75007]
	4 - 3					$(0,0^0,0)$	244717.36	(0.10)	[75007]
	4 - 3					$(0,1^{L1},0)$	245063.09	(0.10)	[75007]
	4 - 3					$(0,1^{U1},0)$	246260.85	(0.10)	[75007]
	5 - 4					$(0,0^0,0)$	305889.14	(0.10)	[75007]

TABLE 10.2. The microwave spectrum of HCN—Continued

Isotopic species	J' - J''	F'	F'_1	F''	F''_1	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$T^{13}C^{14}N$	5 - 4					$(0,1^{L1},0)$	306321.09	(0.10)	[75007]
	5 - 4					$(0,1^{U1},0)$	307817.88	(0.10)	[75007]
	6 - 5					$(0,0^0,0)$	367055.82	(0.10)	[75007]
	6 - 5					$(0,1^{L1},0)$	367573.91	(0.10)	[75007]
	6 - 5					$(0,1^{U1},0)$	369369.70	(0.10)	[75007]
	7 - 6					$(0,0^0,0)$	428216.34	(0.10)	[75007]
	7 - 6					$(0,1^{L1},0)$	428820.22	(0.10)	[75007]
	7 - 6					$(0,1^{U1},0)$	430914.75	(0.10)	[75007]
	8 - 7					$(0,0^0,0)$	489369.57	(0.10)	[75007]
$T^{12}C^{15}N$	2 - 1					$(0,0^0,0)$	120256.55	(0.10)	[75007]
	2 - 1					$(0,1^{L1},0)$	120459.89	(0.10)	[75007]
	2 - 1					$(0,1^{U1},0)$	121030.54	(0.10)	[75007]
	3 - 2					$(0,0^0,0)$	180382.20	(0.10)	[75007]
	3 - 2					$(0,1^{L1},0)$	180687.28	(0.10)	[75007]
	3 - 2					$(0,1^{U1},0)$	181543.14	(0.10)	[75007]
	4 - 3					$(0,0^0,0)$	240505.19	(0.10)	[75007]
	4 - 3					$(0,1^{L1},0)$	240911.68	(0.10)	[75007]
	4 - 3					$(0,1^{U1},0)$	242052.66	(0.10)	[75007]
	5 - 4					$(0,0^0,0)$	300624.06	(0.10)	[75007]
	5 - 4					$(0,1^{L1},0)$	301131.94	(0.10)	[75007]
	5 - 4					$(0,1^{U1},0)$	302557.99	(0.10)	[75007]
	6 - 5					$(0,0^0,0)$	360737.94	(0.10)	[75007]
	6 - 5					$(0,1^{L1},0)$	361347.36	(0.10)	[75007]
	6 - 5					$(0,1^{U1},0)$	363057.83	(0.10)	[75007]
	7 - 6					$(0,0^0,0)$	420845.91	(0.10)	[75007]
	8 - 7					$(0,0^0,0)$	480947.01	(0.10)	[75007]

*Calculated transition frequency.

Table 11. Molecular parameters for HNC.

Isotopic Species	Vib. State v_1 v_2^{ℓ} v_3	B_v(MHz)	D_v(MHz)	Reference
$H^{14}N^{12}C$	0 0^0 0	45 331.999(40)	0.1012(50)	[76025]
	1 0^0 0	45 032.70(6)	0.10^a	[76012]
	0 0^0 1	44 996.81(4)	0.10^a	[76012]
	0 0^0 2	44 660.90(4)	0.10^a	[76012]
$H^{14}N^{13}C$	0 0^0 0	43 545.616(40)	0.0955(50)	[76011]
$H^{15}N^{12}C$	0 0^0 0	44 433.052(40)	0.0973(50)	[76025]
$D^{14}N^{12}C$	0 0^0 0	38 153.004(40)	0.0700(50)	[76011]
$D^{14}N^{13}C$	0 0^0 0	36 684.003(25)	0.0628(20)	[76025]
$D^{15}N^{12}C$	0 0^0 0	37 643.521(30)	0.0675(20)	[76025]
$H^{15}N^{13}C$	0 0^0 0	42 629.642(40)	0.0902(50)	[76025]
$D^{15}N^{13}C$	0 0^0 0	36 155.521(25)	0.0619(20)	[76025]

Electric dipole moment [76009]:

$$\mu_0(H^{14}N^{12}C) = 3.05(10)\ D$$

[a] Assumed value.

Additional References: [76002], [76004] and [76010].

TABLE 11.1. The microwave spectrum of HNC

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$H^{14}N^{12}C$	1 - 0					$(0,0^0,2)$	89321.397	(0.04)	[76012]
	1 - 0					$(0,0^0,1)$	89993.222	(0.04)	[76012]
	1 - 0					$(1,0^0,0)$	90064.991	(0.08)	[76012]
	1 - 0					$(0,0^0,0)$	90663.602	(0.05)	[76011]
	2 - 1					$(0,0^0,0)$	181324.758	(0.10)	[76011]
$H^{14}N^{13}C$	1 - 0					$(0,0^0,0)$	87090.851	(0.05)	[76011]
	2 - 1					$(0,0^0,0)$	174179.411	(0.10)	[76011]
$H^{15}N^{12}C$	1 - 0					$(0,0^0,0)$	88865.692	(0.03)	[76012]
	2 - 1					$(0,0^0,0)$	177729.094	(0.05)	[76025]
$D^{14}N^{12}C$	1 - 0					$(0,0^0,0)$	76305.727	(0.05)	[76011]
	2 - 1					$(0,0^0,0)$	152609.774	(0.10)	[76011]
$D^{14}N^{13}C$	2 - 1					$(0,0^0,0)$	146734.002	(0.08)	[76025]
	3 - 2					$(0,0^0,0)$	220097.238	(0.12)	[76025]
$D^{15}N^{12}C$	2 - 1					$(0,0^0,0)$	150571.926	(0.09)	[76025]
	3 - 2					$(0,0^0,0)$	225853.841	(0.12)	[76025]
$H^{15}N^{13}C$	1 - 0					$(0,0^0,0)$	85258.923	(0.08)	[76025]
	2 - 1					$(0,0^0,0)$	170515.680	(0.11)	[76025]
$D^{15}N^{13}C$	2 - 1					$(0,0^0,0)$	144620.101	(0.08)	[76025]
	3 - 2					$(0,0^0,0)$	216926.436	(0.10)	[76025]

Table 12. Molecular parameters for HCO.

Parameter	$H^{12}C^{16}O$ Value (MHz)	Reference	$D^{12}C^{16}O$ Value (MHz)	Reference
B+C	86 718.4(2)	[72025]	73 533.9(2)	[72025]
B-C	2 836.38(45)	[74022]	3 290.7(20)	[73047]
B	44 777.4(5)	[74022]	38 412.3(10)	[73047]
C	41 941.0(5)	[74022]	35 121.6(10)	[73047]
$\epsilon_{yy}-\epsilon_{xx}$	224.62(65)	[74022]	179.4(4)	[73047]
$\epsilon_{yy}+\epsilon_{xx}$	-190.4(4)	[72035]	-168.4(4)	[72025]
$\lvert\epsilon_{zz}\rvert$	8.12(48) 10^3	[74022]	6.45(70)$\times 10^3$	[73047]
ϵ_{yy}	17.1(7)	[74022]	5.45(3)	[73047]
ϵ_{xx}	-207.5(7)	[74022]	-173.9(3)	[73047]
a_F	372.2(4)	[72022]	58.7(2)	[72025]
$T_{bb}-T_{cc}$			3.0(15)	[73047]
$T_{bb}+T_{cc}$			-1.4(4)	[72025]
τ	5.06(13)	[74022]	...	
D	0.049(19)	[74022]	...	

TABLE 12.1. The microwave spectrum of HCO

Isotopic species	$N'(K'_-,K'_+)$ – $N''(K''_-,K''_+)$	J'	F'	J''	F''	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$H^{12}C^{16}O$	1(1, 0) – 1(1, 1)	1/2	1	1/2	1	(0,0,0)	2733.41	(0.05)	[74022]
	1(1, 0) – 1(1, 1)	3/2	1	3/2	1	(0,0,0)	2888.78	(0.05)	[74022]
	1(1, 0) – 1(1, 1)	3/2	2	3/2	2	(0,0,0)	2891.78	(0.05)	[74022]
	2(1, 1) – 2(1, 2)	3/2	2	3/2	2	(0,0,0)	8340.7	(0.5)	[74022]
	2(1, 1) – 2(1, 2)	3/2	1	3/2	1	(0,0,0)	8347.7	(0.3)	[74022]
	2(1, 1) – 2(1, 2)	5/2	2	5/2	2	(0,0,0)	8620.6	(0.3)	[74022]
	2(1, 1) – 2(1, 2)	5/2	3	5/2	3	(0,0,0)	8624.7	(0.3)	[74022]
	3(1, 2) – 3(1, 3)	5/2	3	5/2	3	(0,0,0)	16798.9	(0.8)	[74022]
	3(1, 2) – 3(1, 3)	5/2	2	5/2	2	(0,0,0)	16804.2	(0.8)	[74022]
	3(1, 2) – 3(1, 3)	7/2	3	7/2	3	(0,0,0)	17190.4	(0.9)	[74022]
	3(1, 2) – 3(1, 3)	7/2	4	7/2	4	(0,0,0)	17196.4	(0.9)	[74022]
	1(0, 1) – 0(0, 0)	3/2	2	1/2	1	(0,0,0)	86670.55	(0.20)	[72025]
	1(0, 1) – 0(0, 0)	3/2	1	1/2	0	(0,0,0)	86707.87	(0.20)	[72025]
	1(0, 1) – 0(0, 0)	1/2	1	1/2	1	(0,0,0)	86777.58	(0.20)	[72025]
$D^{12}C^{16}O$	2(1, 1) – 2(1, 2)	3/2	5/2	3/2	5/2	(0,0,0)	9736.67	(0.51)	[73047]
	2(1, 1) – 2(1, 2)	3/2	3/2	3/2	3/2	(0,0,0)	9737.92	(0.23)	[73047]
	2(1, 1) – 2(1, 2)	3/2	1/2	3/2	1/2	(0,0,0)	9739.16	(0.32)	[73047]
	2(1, 1) – 2(1, 2)	5/2	3/2	5/2	3/2	(0,0,0)	9961.02	(0.31)	[73047]
	2(1, 1) – 2(1, 2)	5/2	5/2	5/2	5/2	(0,0,0)	9961.69	(0.44)	[73047]
	2(1, 1) – 2(1, 2)	5/2	7/2	5/2	7/2	(0,0,0)	9961.85	(0.57)	[73047]
	1(0, 1) – 0(0, 0)	3/2	3/2	1/2	3/2	(0,0,0)	73429.57	(0.20)	[72025]
	1(0, 1) – 0(0, 0)	3/2	5/2	1/2	3/2	(0,0,0)	73491.66	(0.10)	[72025]
	1(0, 1) – 0(0, 0)	3/2	1/2	1/2	1/2	(0,0,0)	73498.24	(0.10)	[72025]
	1(0, 1) – 0(0, 0)	3/2	3/2	1/2	1/2	(0,0,0)	73518.05	(0.10)	[72025]
	1(0, 1) – 0(0, 0)	1/2	3/2	1/2	3/2	(0,0,0)	73592.71	(0.20)	[72025]
	1(0, 1) – 0(0, 0)	1/2	1/2	1/2	3/2	(0,0,0)	73610.92	(0.20)	[72025]
	1(0, 1) – 0(0, 0)	1/2	3/2	1/2	1/2	(0,0,0)	73680.43	(0.30)	[72025]

Table 13. Rotational constants for HCO^+.

Isotopic Species	B_0-2D_0 (MHz)	Reference
$H^{12}C^{16}O^+$	44 594.262(10)	[76013]
$H^{13}C^{16}O^+$	43 377.165(25)	[76006]
$H^{12}C^{18}O^+$	42 581.079(25)	[76006]
$D^{12}C^{16}O^+$	36 019.677(20)	[76013]
$D^{13}C^{16}O^+$	35 366.607(20)	[76013]
$D^{12}C^{18}O^+$	34 413.697(20)	[76013]

Additional references: [75002], [75003], [76002], [76003].

TABLE 13.1. The microwave spectrum of HCO^+

Isotopic species	J' – J''	F'	F'_1	F''	F''_1	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$H^{12}C^{16}O^+$	1 – 0					$(0,0^0,0)$	89188.523	(0.02)	[76013]
$H^{13}C^{16}O^+$	1 – 0					$(0,0^0,0)$	86754.330	(0.05)	[76006]
$H^{12}C^{18}O^+$	1 – 0					$(0,0^0,0)$	85162.157	(0.05)	[76006]
$D^{12}C^{16}O^+$	1 – 0					$(0,0^0,0)$	72039.354	(0.04)	[76013]
$D^{13}C^{16}O^+$	1 – 0					$(0,0^0,0)$	70733.214	(0.04)	[76013]
$D^{12}C^{18}O^+$	1 – 0					$(0,0^0,0)$	68827.393	(0.04)	[76013]

Table 14. Molecular parameters for HCP.

Isotopic Species	Vib. State $v_1\ v_2^{\ell}\ v_3$	Rotational Constants[a] B_v (MHz)	D_v (MHz)	q_v (MHz)	$g_\perp$ (μ_N)	Zeeman Constants[b] $\chi_\perp - \chi_\parallel$ (erg/G^2·mole)	$Q_\parallel$ (esu·cm^2)	Stark[c] μ (D)
$H^{12}C^{31}P$	0 0^0 0	19 976.005(9)	0.02123(10)	0	-0.0430(10)	8.4(9)×10^{-6}	4.4(12)×10^{-26}	0.390(5)
$H^{13}C^{31}P$	0 0^0 0	19 139.29	0.028[d]	0	....	....	....	....
$D^{12}C^{31}P$	0 0^0 0	16 984.375(12)	0.01449(21)	0	....	....	....	0.397(5)
	0 1^1 0	17 017.227(48)	0.0152(12)	44.86(7)	....	....	....	....
$D^{13}C^{31}P$	0 0^0 0	16 427.53	0.016[d]	0	....	....	....	....

[a] Data for the ^{12}C isotopic species is taken from Johns et al. [71020] and for the ^{13}C isotopic species from Tyler [64002].

[b] Reference [73010].

[c] Reference [64002].

[d] Assumed value.

TABLE 14.1. The microwave spectrum of HCP

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$H^{12}C^{31}P$	1 - 0					$(0,0^0,0)$	39951.98	(0.05)	[64002]
	2 - 1					$(0,0^0,0)$	79903.31	(0.05)	[71020]
	3 - 2					$(0,0^0,0)$	119853.67	(0.05)	[71020]
	4 - 3					$(0,0^0,0)$	159802.56	(0.07)	[71020]
	5 - 4					$(0,0^0,0)$	199749.42	(0.10)	[71020]
	6 - 5					$(0,0^0,0)$	239693.82	(0.15)	[71020]
	7 - 6					$(0,0^0,0)$	279634.66	(0.30)	[71020]
	8 - 7					$(0,0^0,0)$	319573.03	(0.50)	[71020]
	9 - 8					$(0,0^0,0)$	359506.14	(0.50)	[71020]
$H^{13}C^{31}P$	1 - 0					$(0,0^0,0)$	38278.46	(0.10)	[64002]
$D^{12}C^{31}P$	1 - 0					$(0,0^0,0)$	33968.73	(0.05)	[64002]
	2 - 1					$(0,0^0,0)$	67937.07	(0.05)	[64002]
	3 - 2					$(0,0^0,0)$	101904.66	(0.05)	[71020]
	3 - 2					$(0,1^{L1},0)$	101967.08	(0.20)	[71020]
	3 - 2					$(0,1^{U1},0)$	102236.32	(0.20)	[71020]
	4 - 3					$(0,0^0,0)$	135871.21	(0.10)	[71020]
	5 - 4					$(0,0^0,0)$	169836.50	(0.15)	[71020]
	5 - 4					$(0,1^{L1},0)$	169940.49	(0.40)	[71020]
	5 - 4					$(0,1^{U1},0)$	170388.96	(0.40)	[71020]
	6 - 5					$(0,0^0,0)$	203799.94	(0.20)	[71020]
	7 - 6					$(0,0^0,0)$	237761.20	(0.25)	[71020]
	8 - 7					$(0,0^0,0)$	271720.66	(0.40)	[71020]
	9 - 8					$(0,0^0,0)$	305676.46	(0.50)	[71020]
$D^{13}C^{31}P$	1 - 0					$(0,0^0,0)$	32855.00	(0.10)	[64002]

Table 15. Molecular parameters for ICN [72026].

Isotopic Species	Vib. State v_1 v_2^{ℓ} v_3	B_v (MHz)	D_v (kHz)	q_v (MHz)	$eq_{zz}Q$ (I) (MHz)	$\eta eq_{zz}Q$ (I) (MHz)	Zeeman parameters for $I^{12}C^{14}N$ $(0,0^0,0)^b$
$^{127}I^{12}C^{14}N$	0 0^0 0	3 225.542(1)	0.589(5)		-2 420.5(1)		$g_{\perp}$ = -0.0325(2)μ_N
	0 1^1 0	3 235.039(1)	0.600(4)	2.659(1)	-2 411.5(1)	-21.1(2)	$\chi_{\perp}-\chi_{\parallel}$ = 16.4(5)×10^{-6} erg/G^2·mole
	0 2^0 0	3 242.006(1)	0.611[a]		-2 404.8(4)		g_I (1-σ) = 1.1175(20)μ_N
	0 2^2 0	3 244.516(1)	0.611[a]		-2 402.6(5)		$Q_{\parallel}$ = -7.33(110)×10^{-26} esu·cm^2
	0 3^1 0	3 249.548(2)	0.622[a]	2.551(2)	-2 395(2)	-37(3)	
	0 3^3 0	3 253.986(2)	0.622[a]		-2 395.0(4)		
	0 0^0 1	3 216.177(1)	0.611(7)		-2 426.9(2)		
	0 0^0 2	3 206.992(2)	0.633[a]		-2 429(2)		
	0 1^1 1	3 227.380(1)	0.605[a]	2.938(3)	-2 413(2)	-21(3)	
$^{127}I^{13}C^{14}N$	0 0^0 0	3 177.043(1)	0.575[a]		-2 420(1)		
$^{127}I^{12}C^{15}N$	0 0^0 0	3 082.668(1)	0.533[a]		-2 419.6(1)		
	0 1^1 0	3 091.852(1)	0.543[a]	2.449(1)	-2 410.7(1)	-21.7(2)	
	0 2^0 0	3 098.653(1)	0.553[a]		-2 402.9(2)		
	0 2^2 0	3 101.016(2)	0.553[a]		-2 401.4(4)		
	0 3^1 0	3 105.988(2)	0.563[a]	2.351(2)	-2 402(2)	-40(3)	
	0 3^3 0	3 110.171(2)	0.563[a]		-2 391.7(4)		
	0 0^0 1	3 073.958(1)	0.553[a]		-2 426.3(3)		
	0 0^0 2	3 065.402(2)	0.573[a]		-2 432(3)		
	0 1^1 1	3 084.746(2)	0.550[a]	2.699(3)	-2 418(1)	-19(2)	
$^{127}I^{13}C^{15}N$	0 0^0 0	3 039.327(1)	0.520[a]		-2 419(2)		

[a] Assumed value held constant.

[b] Reference [72011].

Additional references: [47002], [48003], [48004], [48005], [48006], [50005], [63005], [73031].

Note that this table uses a different vibrational numbering from that used in the primary references as explained in the Introduction.

TABLE 15.1. The microwave spectrum of ICN

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{127}I^{12}C^{14}N$	1 – 0		5/2		5/2	$(0,0^0,1)$	6051.36	(0.50)	[57004]
	1 – 0		5/2		5/2	$(0,0^0,0)$	6070.66	(0.50)	[57004]
	1 – 0		5/2		5/2	$(0,0^0,0)$	6071.61	(0.50)	[57004]
	1 – 0		5/2		5/2	$(0,2^0,0)$	6106.71	(0.50)	[57004]
	1 – 0		7/2		5/2	$(0,0^0,1)$	6559.63	(0.50)	[57004]
	1 – 0		7/2		5/2	$(0,0^0,0)$	6577.06	(0.50)	[57004]
	1 – 0		7/2		5/2	$(0,0^0,0)$	6577.95	(0.50)	[57004]
	1 – 0		7/2		5/2	$(0,2^0,0)$	6610.24	(0.50)	[57004]
	1 – 0		3/2		5/2	$(0,0^0,1)$	6782.16	(0.50)	[57004]
	1 – 0		3/2		5/2	$(0,0^0,0)$	6799.79	(0.50)	[57004]
	1 – 0		3/2		5/2	$(0,2^0,0)$	6830.47	(0.50)	[57004]
	2 – 1		5/2		3/2	$(0,0^0,0)$	12400.35	(0.50)	[57004]
	2 – 1		5/2		3/2	$(0,0^0,0)$	12401.33	(0.50)	[57004]
	2 – 1		7/2		7/2	$(0,0^0,1)$	12451.36	(0.50)	[57004]
	2 – 1		7/2		7/2	$(0,0^0,0)$	12489.27	(0.50)	[57004]
	2 – 1		7/2		7/2	$(0,0^0,0)$	12489.88	(0.50)	[57004]
	2 – 1		7/2		7/2	$(0,2^0,0)$	12558.38	(0.50)	[57004]
	2 – 1		5/2		7/2	$(0,0^0,0)$	12622.19	(0.50)	[57004]
	2 – 1		3/2		3/2	$(0,0^0,1)$	12699.69	(0.50)	[57004]
	2 – 1		3/2		3/2	$(0,0^0,0)$	12737.22	(0.50)	[57004]
	2 – 1		9/2		7/2	$(0,0^0,0)$	12956.38	(0.50)	[57004]
	2 – 1		7/2		5/2	$(0,0^0,1)$	12959.17	(0.50)	[57004]
	2 – 1		7/2		5/2	$(0,0^0,0)$	12994.98	(0.50)	[57004]
	2 – 1		7/2		5/2	$(0,0^0,0)$	12996.50	(0.50)	[57004]
	2 – 1		7/2		5/2	$(0,0^0,0)$	12996.93	(0.50)	[57004]
	2 – 1		1/2		3/2	$(0,0^0,1)$	13011.34	(0.50)	[57004]
	2 – 1		9/2		7/2	$(0,2^0,0)$	13021.92	(0.50)	[57004]
	2 – 1		1/2		3/2	$(0,0^0,0)$	13048.33	(0.50)	[57004]
	2 – 1		5/2		5/2	$(0,0^0,0)$	13129.36	(0.50)	[57004]
	2 – 1		5/2		5/2	$(0,0^0,0)$	13129.68	(0.50)	[57004]
	2 – 1		5/2		5/2	$(0,2^0,0)$	13193.32	(0.50)	[57004]
	2 – 1		3/2		5/2	$(0,0^0,1)$	13429.80	(0.50)	[57004]
	2 – 1		3/2		5/2	$(0,0^0,0)$	13465.77	(0.50)	[57004]
	2 – 1		3/2		5/2	$(0,2^0,0)$	13527.88	(0.50)	[57004]
	4 – 3	9/2	11/2	9/2	11/2	$(0,0^0,0)$	25393.517	(0.05)	[55000]
	4 – 3	13/2	11/2	13/2	11/2	$(0,0^0,0)$	25393.517	(0.05)	[55000]
	4 – 3	11/2	11/2	11/2	11/2	$(0,0^0,0)$	25393.776	(0.05)	[55000]
	4 – 3	13/2	11/2	13/2	11/2	$(0,1^{L1},0)$	25542.856	(0.05)	[55000]
	4 – 3	9/2	11/2	9/2	11/2	$(0,1^{L1},0)$	25542.856	(0.05)	[55000]
	4 – 3	11/2	11/2	11/2	11/2	$(0,1^{L1},0)$	25542.856	(0.05)	[55000]
	4 – 3	11/2	11/2	11/2	11/2	$(0,1^{U1},0)$	25567.571	(0.05)	[55000]
	4 – 3	13/2	11/2	13/2	11/2	$(0,1^{U1},0)$	25567.571	(0.05)	[55000]
	4 – 3	9/2	11/2	9/2	11/2	$(0,1^{U1},0)$	25567.571	(0.05)	[55000]
	4 – 3		5/2		3/2	$(0,0^0,0)$	25711.50	(0.10)	[48002]
	4 – 3		7/2		5/2	$(0,0^0,0)$	25728.77	(0.10)	[48002]
	4 – 3		13/2		11/2	$(0,0^0,1)$	25748.18	(0.10)	[48002]
	4 – 3		3/2		1/2	$(0,0^0,0)$	25752.65	(0.10)	[48002]
	4 – 3		11/2		9/2	$(0,0^0,1)$	25763.23	(0.10)	[48002]
	4 – 3		9/2		7/2	$(0,0^0,0)$	25783.50	(0.10)	[48002]
	4 – 3		9/2		9/2	$(0,0^0,0)$	25789.85	(0.10)	[48002]
	4 – 3		7/2		5/2	$(0,1^{L1},0)$	25802.92	(0.10)	[48002]
	4 – 3		5/2		3/2	$(0,1^{L1},0)$	25815.34	(0.10)	[48002]
	4 – 3		13/2		11/2	$(0,0^0,0)$	25823.08	(0.10)	[48002]
	4 – 3		9/2		7/2	$(0,1^{L1},0)$	25829.31	(0.10)	[48002]
	4 – 3		11/2		9/2	$(0,0^0,0)$	25837.64	(0.10)	[48002]
	4 – 3		9/2		7/2	$(0,1^{U1},0)$	25850.78	(0.10)	[48002]
	4 – 3		11/2		9/2	$(0,1^{L1},0)$	25872.24	(0.10)	[48002]
	4 – 3		11/2		9/2	$(0,1^{U1},0)$	25893.73	(0.10)	[48002]
	4 – 3		13/2		11/2	$(0,1^{L1},0)$	25906.28	(0.10)	[48002]
	4 – 3		13/2		11/2	$(0,1^{U1},0)$	25927.66	(0.10)	[48002]
	4 – 3		7/2		7/2	$(0,0^0,0)$	25954.36	(0.10)	[48002]
	4 – 3		3/2		3/2	$(0,0^0,0)$	25969.58	(0.10)	[48002]
	4 – 3		13/2		11/2	$(0,2^0,0)$	25979.72	(0.10)	[55002]
	4 – 3		5/2		5/2	$(0,0^0,0)$	25991.92	(0.10)	[48002]
	4 – 3		13/2		11/2	$(0,2^2,0)$	26046.32	(0.10)	[48002]

TABLE 15.1. The microwave spectrum of ICN—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{127}I^{12}C^{14}N$	4 – 3	5/2		7/2		$(0,1^{L1},0)$	26196.540	(0.02)	[55000]
	4 – 3	7/2		9/2		$(0,1^{L1},0)$	26196.931	(0.02)	[55000]
	4 – 3	5/2		7/2		$(0,1^{L1},0)$	26197.588	(0.02)	[55000]
	4 – 3	5/2		7/2		$(0,1^{U1},0)$	26216.380	(0.02)	[55000]
	4 – 3	7/2		9/2		$(0,1^{U1},0)$	26216.771	(0.02)	[55000]
	4 – 3	5/2		7/2		$(0,1^{U1},0)$	26217.428	(0.02)	[55000]
	4 – 3	5/2	3/2	7/2	5/2	$(0,1^{L1},0)$	26247.900	(0.02)	[55000]
	4 – 3	5/2	3/2	5/2	5/2	$(0,1^{L1},0)$	26247.900	(0.02)	[55000]
	4 – 3	3/2	3/2	5/2	5/2	$(0,1^{L1},0)$	26248.238	(0.02)	[55000]
	4 – 3	3/2	3/2	3/2	5/2	$(0,1^{L1},0)$	26248.238	(0.02)	[55000]
	4 – 3	1/2	3/2	3/2	5/2	$(0,1^{L1},0)$	26248.300	(0.02)	[55000]
	4 – 3	3/2	3/2	5/2	5/2	$(0,0^{0},0)$	26248.971	(0.02)	[55000]
	4 – 3	5/2	3/2	7/2	5/2	$(0,1^{U1},0)$	26265.210	(0.02)	[55000]
	4 – 3	5/2	3/2	5/2	5/2	$(0,1^{U1},0)$	26265.210	(0.02)	[55000]
	4 – 3	3/2	3/2	3/2	5/2	$(0,1^{U1},0)$	26265.548	(0.02)	[55000]
	4 – 3	3/2	3/2	5/2	5/2	$(0,1^{U1},0)$	26265.548	(0.02)	[55000]
	4 – 3	1/2	3/2	3/2	5/2	$(0,1^{U1},0)$	26265.610	(0.02)	[55000]
	5 – 4		11/2		13/2	$(0,0^{0},0)$	31770.734	(0.10)	[72026]
	5 – 4		13/2		13/2	$(0,0^{0},0)$	31848.732	(0.10)	[72026]
	5 – 4		13/2		13/2	$(0,1^{L1},0)$	31982.970	(0.10)	[72026]
	5 – 4		13/2		13/2	$(0,1^{U1},0)$	32013.035	(0.10)	[72026]
	5 – 4		13/2		13/2	$(0,2^{0},0)$	32015.975	(0.10)	[72026]
	5 – 4		7/2		5/2	$(0,0^{0},2)$	32017.500	(0.10)	[72026]
	5 – 4		9/2		7/2	$(0,0^{0},2)$	32029.765	(0.10)	[72026]
	5 – 4		5/2		3/2	$(0,0^{0},2)$	32040.900	(0.10)	[72026]
	5 – 4		11/2		9/2	$(0,0^{0},2)$	32062.690	(0.10)	[72026]
	5 – 4		15/2		13/2	$(0,0^{0},2)$	32082.720	(0.10)	[72026]
	5 – 4		13/2		11/2	$(0,0^{0},2)$	32092.940	(0.10)	[72026]
	5 – 4		11/2		11/2	$(0,0^{0},1)$	32106.760	(0.10)	[72026]
	5 – 4		7/2		5/2	$(0,0^{0},1)$	32109.584	(0.10)	[72026]
	5 – 4		5/2		3/2	$(0,0^{0},1)$	32132.720	(0.10)	[72026]
	5 – 4		11/2		9/2	$(0,0^{0},1)$	32154.640	(0.10)	[72026]
	5 – 4		15/2		13/2	$(0,0^{0},1)$	32174.500	(0.10)	[72026]
	5 – 4		13/2		11/2	$(0,0^{0},1)$	32184.750	(0.10)	[72026]
	5 – 4		11/2		11/2	$(0,0^{0},0)$	32200.496	(0.10)	[72026]
	5 – 4		7/2		5/2	$(0,0^{0},0)$	32203.340	(0.10)	[72026]
	5 – 4		9/2		7/2	$(0,0^{0},0)$	32215.460	(0.10)	[72026]
	5 – 4		9/2		7/2	$(0,1^{L1},1)$	32218.460	(0.10)	[72026]
	5 – 4		7/2		5/2	$(0,1^{L1},1)$	32220.330	(0.10)	[72026]
	5 – 4		5/2		3/2	$(0,0^{0},0)$	32226.544	(0.10)	[72026]
	5 – 4		11/2		9/2	$(0,1^{L1},1)$	32240.020	(0.10)	[72026]
	5 – 4		11/2		9/2	$(0,0^{0},0)$	32248.354	(0.10)	[72026]
	5 – 4		9/2		7/2	$(0,1^{U1},1)$	32248.380	(0.10)	[72026]
	5 – 4		7/2		5/2	$(0,1^{U1},1)$	32249.960	(0.10)	[72026]
	5 – 4		13/2		13/2	$(0,2^{2},0)$	32251.300	(0.10)	[72026]
	5 – 4		5/2		3/2	$(0,1^{L1},1)$	32254.200	(0.10)	[72026]
	5 – 4		15/2		13/2	$(0,0^{0},0)$	32268.174	(0.10)	[72026]
	5 – 4		11/2		9/2	$(0,1^{U1},1)$	32269.649	(0.10)	[72026]
	5 – 4		11/2		11/2	$(0,1^{L1},0)$	32275.650	(0.10)	[72026]
	5 – 4		13/2		11/2	$(0,0^{0},0)$	32278.330	(0.10)	[72026]
	5 – 4		15/2		13/2	$(0,1^{L1},1)$	32281.838	(0.10)	[72026]
	5 – 4		5/2		3/2	$(0,1^{U1},1)$	32283.732	(0.10)	[72026]
	5 – 4		9/2		9/2	$(0,0^{0},1)$	32292.700	(0.10)	[72026]
	5 – 4		9/2		7/2	$(0,1^{L1},0)$	32296.570	(0.10)	[72026]
	5 – 4		13/2		11/2	$(0,1^{U1},1)$	32297.700	(0.10)	[72026]
	5 – 4		7/2		5/2	$(0,1^{L1},0)$	32298.280	(0.10)	[72026]
	5 – 4		11/2		11/2	$(0,1^{U1},0)$	32302.730	(0.10)	[72026]
	5 – 4		15/2		13/2	$(0,1^{U1},1)$	32311.110	(0.10)	[72026]
	5 – 4		11/2		9/2	$(0,1^{L1},0)$	32318.078	(0.10)	[72026]
	5 – 4		9/2		7/2	$(0,1^{U1},0)$	32323.530	(0.10)	[72026]
	5 – 4		7/2		5/2	$(0,1^{U1},0)$	32325.339	(0.10)	[72026]
	5 – 4		5/2		3/2	$(0,1^{L1},0)$	32332.016	(0.10)	[72026]
	5 – 4		9/2		11/2	$(0,0^{0},0)$	32338.070	(0.10)	[72026]
	5 – 4		11/2		9/2	$(0,1^{U1},0)$	32344.780	(0.10)	[72026]
	5 – 4		13/2		11/2	$(0,1^{L1},0)$	32346.620	(0.10)	[72026]

TABLE 15.1. The microwave spectrum of ICN—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	(ν_1,ν_2^l,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{127}I^{12}C^{14}N$	5 - 4		5/2		3/2	$(0,1^{U1},0)$	32358.990	(0.10)	[72026]
	5 - 4		15/2		13/2	$(0,1^{L1},0)$	32359.780	(0.10)	[72026]
	5 - 4		11/2		11/2	$(0,2^0,0)$	32365.380	(0.10)	[72026]
	5 - 4		11/2		11/2	$(0,2^2,0)$	32366.386	(0.10)	[72026]
	5 - 4		7/2		5/2	$(0,2^0,0)$	32368.320	(0.10)	[72026]
	5 - 4		13/2		11/2	$(0,1^{U1},0)$	32373.080	(0.10)	[72026]
	5 - 4		9/2		7/2	$(0,2^0,0)$	32380.300	(0.10)	[72026]
	5 - 4		9/2		9/2	$(0,0^0,0)$	32386.030	(0.10)	[72026]
	5 - 4		15/2		13/2	$(0,1^{U1},0)$	32386.345	(0.10)	[72026]
	5 - 4		11/2		9/2	$(0,2^2,0)$	32390.234	(0.10)	[72026]
	5 - 4		9/2		11/2	$(0,1^{L1},0)$	32399.591	(0.10)	[72026]
	5 - 4		9/2		7/2	$(0,2^2,0)$	32403.568	(0.10)	[72026]
	5 - 4		11/2		9/2	$(0,2^0,0)$	32412.910	(0.10)	[72026]
	5 - 4		13/2		11/2	$(0,2^2,0)$	32415.407	(0.10)	[72026]
	5 - 4		11/2		9/2	$(0,3^3,0)$	32424.190	(0.10)	[72026]
	5 - 4		9/2		11/2	$(0,1^{U1},0)$	32425.480	(0.10)	[72026]
	5 - 4		9/2		7/2	$(0,3^{L1},0)$	32429.518	(0.10)	[72026]
	5 - 4		7/2		5/2	$(0,3^{L1},0)$	32431.320	(0.10)	[72026]
	5 - 4		15/2		13/2	$(0,2^0,0)$	32432.655	(0.10)	[72026]
	5 - 4		9/2		9/2	$(0,1^{L1},0)$	32441.980	(0.10)	[72026]
	5 - 4		13/2		11/2	$(0,2^0,0)$	32442.783	(0.10)	[72026]
	5 - 4		7/2		5/2	$(0,2^2,0)$	32447.286	(0.10)	[72026]
	5 - 4		13/2		11/2	$(0,3^3,0)$	32447.286	(0.10)	[72026]
	5 - 4		11/2		9/2	$(0,3^{L1},0)$	32451.084	(0.10)	[72026]
	5 - 4		7/2		7/2	$(0,0^0,0)$	32466.102	(0.10)	[72026]
	5 - 4		9/2		9/2	$(0,1^{U1},0)$	32467.530	(0.10)	[72026]
	5 - 4		9/2		9/2	$(0,2^2,0)$	32471.987	(0.10)	[72026]
	5 - 4		13/2		11/2	$(0,3^{L1},0)$	32479.546	(0.10)	[72026]
	5 - 4		9/2		7/2	$(0,3^{U1},0)$	32481.215	(0.10)	[72026]
	5 - 4		5/2		5/2	$(0,0^0,0)$	32484.625	(0.10)	[72026]
	5 - 4		15/2		13/2	$(0,3^{L1},0)$	32492.581	(0.10)	[72026]
	5 - 4		9/2		7/2	$(0,3^3,0)$	32495.974	(0.10)	[72026]
	5 - 4		15/2		13/2	$(0,2^2,0)$	32497.328	(0.10)	[72026]
	5 - 4		11/2		9/2	$(0,3^{U1},0)$	32502.074	(0.10)	[72026]
	5 - 4		5/2		3/2	$(0,2^2,0)$	32512.510	(0.10)	[72026]
	5 - 4		7/2		7/2	$(0,1^{L1},0)$	32523.069	(0.10)	[72026]
	5 - 4		13/2		11/2	$(0,3^{U1},0)$	32530.100	(0.10)	[72026]
	5 - 4		15/2		13/2	$(0,3^{U1},0)$	32543.400	(0.10)	[72026]
	5 - 4		7/2		7/2	$(0,1^{U1},0)$	32547.750	(0.10)	[72026]
	5 - 4		9/2		9/2	$(0,2^0,0)$	32549.670	(0.10)	[72026]
	5 - 4		5/2		5/2	$(0,1^{L1},0)$	32552.187	(0.10)	[72026]
	5 - 4		7/2		7/2	$(0,2^2,0)$	32554.456	(0.10)	[72026]
	5 - 4		5/2		5/2	$(0,1^{U1},0)$	32576.752	(0.10)	[72026]
	5 - 4		5/2		5/2	$(0,2^2,0)$	32616.015	(0.10)	[72026]
	5 - 4		7/2		7/2	$(0,2^0,0)$	32629.437	(0.10)	[72026]
	5 - 4		7/2		9/2	$(0,0^0,0)$	32636.749	(0.10)	[72026]
	5 - 4		15/2		13/2	$(0,3^3,0)$	32640.109	(0.10)	[72026]
	5 - 4		7/2		9/2	$(0,1^{L1},0)$	32668.466	(0.10)	[72026]
	5 - 4		7/2		9/2	$(0,1^{U1},0)$	32691.625	(0.10)	[72026]
	5 - 4		5/2		3/2	$(0,3^3,0)$	32728.701	(0.10)	[72026]
	5 - 4		5/2		7/2	$(0,0^0,0)$	32747.449	(0.10)	[72026]
	5 - 4		5/2		7/2	$(0,1^{L1},0)$	32776.787	(0.10)	[72026]
	5 - 4		5/2		7/2	$(0,1^{U1},0)$	32799.030	(0.10)	[72026]
	6 - 5		15/2		15/2	$(0,0^0,1)$	38190.075	(0.10)	[72026]
	6 - 5		15/2		15/2	$(0,0^0,0)$	38303.568	(0.10)	[72026]
	6 - 5		15/2		15/2	$(0,1^{L1},0)$	38437.434	(0.10)	[72026]
	6 - 5		9/2		7/2	$(0,0^0,2)$	38450.090	(0.10)	[72026]
	6 - 5		11/2		9/2	$(0,0^0,2)$	38459.200	(0.10)	[72026]
	6 - 5		15/2		15/2	$(0,1^{U1},0)$	38472.820	(0.10)	[72026]
	6 - 5		13/2		11/2	$(0,0^0,2)$	38481.326	(0.10)	[72026]
	6 - 5		17/2		15/2	$(0,0^0,2)$	38492.897	(0.10)	[72026]
	6 - 5		15/2		13/2	$(0,0^0,2)$	38500.394	(0.10)	[72026]
	6 - 5		13/2		13/2	$(0,0^0,1)$	38513.520	(0.10)	[72026]
	6 - 5		9/2		7/2	$(0,0^0,1)$	38560.512	(0.10)	[72026]
	6 - 5		11/2		9/2	$(0,0^0,1)$	38569.400	(0.10)	[72026]

TABLE 15.1. The microwave spectrum of ICN—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{127}I^{12}C^{14}N$	6 - 5		7/2		5/2	$(0,0^0,1)$	38575.200	(0.10)	[72026]
	6 - 5		13/2		11/2	$(0,0^0,1)$	38591.560	(0.10)	[72026]
	6 - 5		17/2		15/2	$(0,0^0,1)$	38603.160	(0.10)	[72026]
	6 - 5		15/2		13/2	$(0,0^0,1)$	38610.680	(0.10)	[72026]
	6 - 5		13/2		13/2	$(0,0^0,0)$	38626.068	(0.10)	[72026]
	6 - 5		9/2		7/2	$(0,0^0,0)$	38672.900	(0.10)	[72026]
	6 - 5		11/2		9/2	$(0,0^0,0)$	38681.886	(0.10)	[72026]
	6 - 5		9/2		7/2	$(0,1^{L1},1)$	38682.900	(0.10)	[72026]
	6 - 5		11/2		9/2	$(0,1^{L1},1)$	38684.304	(0.10)	[72026]
	6 - 5		7/2		5/2	$(0,0^0,0)$	38687.658	(0.10)	[72026]
	6 - 5		13/2		11/2	$(0,1^{L1},1)$	38701.035	(0.10)	[72026]
	6 - 5		13/2		11/2	$(0,0^0,0)$	38704.000	(0.10)	[72026]
	6 - 5		7/2		5/2	$(0,1^{L1},1)$	38704.701	(0.10)	[72026]
	6 - 5		11/2		11/2	$(0,0^0,1)$	38707.392	(0.10)	[72026]
	6 - 5		17/2		15/2	$(0,0^0,0)$	38715.562	(0.10)	[72026]
	6 - 5		9/2		7/2	$(0,1^{U1},1)$	38718.390	(0.10)	[72026]
	6 - 5		11/2		9/2	$(0,1^{U1},1)$	38719.833	(0.10)	[72026]
	6 - 5		15/2		13/2	$(0,1^{L1},1)$	38720.650	(0.10)	[72026]
	6 - 5		15/2		13/2	$(0,0^0,0)$	38723.030	(0.10)	[72026]
	6 - 5		17/2		15/2	$(0,1^{L1},1)$	38726.073	(0.10)	[72026]
	6 - 5		13/2		11/2	$(0,1^{U1},1)$	38736.252	(0.10)	[72026]
	6 - 5		7/2		5/2	$(0,1^{U1},1)$	38740.074	(0.10)	[72026]
	6 - 5		15/2		13/2	$(0,1^{U1},1)$	38755.713	(0.10)	[72026]
	6 - 5		13/2		13/2	$(0,1^{U1},0)$	38756.380	(0.10)	[72026]
	6 - 5		17/2		15/2	$(0,1^{U1},1)$	38761.210	(0.10)	[72026]
	6 - 5		9/2		7/2	$(0,1^{L1},0)$	38776.539	(0.10)	[72026]
	6 - 5		11/2		9/2	$(0,1^{L1},0)$	38778.021	(0.10)	[72026]
	6 - 5		13/2		11/2	$(0,1^{L1},0)$	38794.690	(0.10)	[72026]
	6 - 5		7/2		5/2	$(0,1^{L1},0)$	38798.223	(0.10)	[72026]
	6 - 5		9/2		7/2	$(0,1^{U1},0)$	38808.753	(0.10)	[72026]
	6 - 5		11/2		9/2	$(0,1^{U1},0)$	38810.118	(0.10)	[72026]
	6 - 5		9/2		9/2	$(0,0^0,1)$	38811.873	(0.10)	[72026]
	6 - 5		15/2		13/2	$(0,1^{L1},0)$	38814.220	(0.10)	[72026]
	6 - 5		11/2		11/2	$(0,0^0,0)$	38819.612	(0.10)	[72026]
	6 - 5		17/2		15/2	$(0,1^{L1},0)$	38819.657	(0.10)	[72026]
	6 - 5		13/2		13/2	$(0,2^0,0)$	38824.080	(0.10)	[72026]
	6 - 5		13/2		11/2	$(0,1^{U1},0)$	38826.577	(0.10)	[72026]
	6 - 5		7/2		5/2	$(0,1^{U1},0)$	38830.232	(0.10)	[72026]
	6 - 5		15/2		13/2	$(0,1^{U1},0)$	38845.998	(0.10)	[72026]
	6 - 5		17/2		15/2	$(0,1^{U1},0)$	38851.497	(0.10)	[72026]
	6 - 5		7/2		7/2	$(0,0^0,1)$	38857.268	(0.10)	[72026]
	6 - 5		9/2		7/2	$(0,2^0,0)$	38870.568	(0.10)	[72026]
	6 - 5		11/2		9/2	$(0,2^0,0)$	38879.538	(0.10)	[72026]
	6 - 5		7/2		5/2	$(0,2^0,0)$	38885.294	(0.10)	[72026]
	6 - 5		13/2		11/2	$(0,2^0,0)$	38901.530	(0.10)	[72026]
	6 - 5		11/2		11/2	$(0,1^{L1},0)$	38901.944	(0.10)	[72026]
	6 - 5		11/2		9/2	$(0,2^2,0)$	38902.263	(0.10)	[72026]
	6 - 5		13/2		11/2	$(0,2^2,0)$	38902.462	(0.10)	[72026]
	6 - 5		17/2		15/2	$(0,2^0,0)$	38913.010	(0.10)	[72026]
	6 - 5		15/2		13/2	$(0,2^0,0)$	38920.420	(0.10)	[72026]
	6 - 5		9/2		7/2	$(0,2^2,0)$	38923.600	(0.10)	[72026]
	6 - 5		15/2		13/2	$(0,2^2,0)$	38923.600	(0.10)	[72026]
	6 - 5		9/2		9/2	$(0,0^0,0)$	38923.630	(0.10)	[72026]
	6 - 5		11/2		11/2	$(0,1^{U1},0)$	38932.823	(0.10)	[72026]
	6 - 5		9/2		7/2	$(0,3^{L1},0)$	38935.960	(0.10)	[72026]
	6 - 5		11/2		9/2	$(0,3^{L1},0)$	38937.560	(0.10)	[72026]
	6 - 5		7/2		5/2	$(0,3^{L1},0)$	38957.500	(0.10)	[72026]
	6 - 5		7/2		5/2	$(0,2^2,0)$	38965.776	(0.10)	[72026]
	6 - 5		17/2		15/2	$(0,2^2,0)$	38967.464	(0.10)	[72026]
	6 - 5		7/2		7/2	$(0,0^0,0)$	38969.020	(0.10)	[72026]
	6 - 5		15/2		13/2	$(0,3^{L1},0)$	38973.560	(0.10)	[72026]
	6 - 5		17/2		15/2	$(0,3^{L1},0)$	38979.000	(0.10)	[72026]
	6 - 5		13/2		11/2	$(0,3^3,0)$	38979.400	(0.10)	[72026]
	6 - 5		11/2		11/2	$(0,2^2,0)$	38983.920	(0.10)	[72026]
	6 - 5		9/2		7/2	$(0,3^{U1},0)$	38997.680	(0.10)	[72026]

TABLE 15.1. The microwave spectrum of ICN—Continued

Isotopic species	J' - J''	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{127}I^{12}C^{14}N$	6 - 5		11/2		9/2	$(0,3^{U1},0)$	38999.136	(0.10)	[72026]
	6 - 5		9/2		9/2	$(0,1^{L1},0)$	39002.960	(0.10)	[72026]
	6 - 5		15/2		13/2	$(0,3^{3},0)$	39004.520	(0.10)	[72026]
	6 - 5		11/2		9/2	$(0,3^{3},0)$	39006.200	(0.10)	[72026]
	6 - 5		13/2		11/2	$(0,3^{U1},0)$	39015.440	(0.10)	[72026]
	6 - 5		11/2		11/2	$(0,2^{0},0)$	39016.240	(0.10)	[72026]
	6 - 5		7/2		5/2	$(0,3^{U1},0)$	39019.120	(0.10)	[72026]
	6 - 5		9/2		9/2	$(0,1^{U1},0)$	39032.880	(0.10)	[72026]
	6 - 5		17/2		15/2	$(0,3^{U1},0)$	39040.100	(0.10)	[72026]
	6 - 5		7/2		7/2	$(0,1^{L1},0)$	39052.055	(0.10)	[72026]
	6 - 5		9/2		11/2	$(0,0^{0},0)$	39061.221	(0.10)	[72026]
	6 - 5		9/2		7/2	$(0,3^{3},0)$	39065.895	(0.10)	[72026]
	6 - 5		9/2		9/2	$(0,2^{2},0)$	39074.480	(0.10)	[72026]
	6 - 5		7/2		7/2	$(0,1^{U1},0)$	39081.680	(0.10)	[72026]
	6 - 5		17/2		15/2	$(0,3^{3},0)$	39110.730	(0.10)	[72026]
	6 - 5		7/2		7/2	$(0,2^{2},0)$	39134.580	(0.10)	[72026]
	6 - 5		7/2		5/2	$(0,3^{3},0)$	39142.359	(0.10)	[72026]
	10 - 9		17/2		15/2	$(0,0^{0},1)$	64310.803	(0.10)	[72026]
	10 - 9		19/2		17/2	$(0,0^{0},1)$	64314.581	(0.10)	[72026]
	10 - 9		15/2		13/2	$(0,0^{0},1)$	64315.429	(0.10)	[72026]
	10 - 9		21/2		19/2	$(0,0^{0},1)$	64322.190	(0.10)	[72026]
	10 - 9		25/2		23/2	$(0,0^{0},1)$	64324.956	(0.10)	[72026]
	10 - 9		23/2		21/2	$(0,0^{0},1)$	64327.970	(0.10)	[72026]
	10 - 9		21/2		21/2	$(0,0^{0},0)$	64382.522	(0.10)	[72026]
	10 - 9		17/2		15/2	$(0,0^{0},0)$	64498.246	(0.10)	[72026]
	10 - 9		19/2		17/2	$(0,0^{0},0)$	64502.006	(0.10)	[72026]
	10 - 9		15/2		13/2	$(0,0^{0},0)$	64502.826	(0.10)	[72026]
	10 - 9		21/2		19/2	$(0,0^{0},0)$	64509.583	(0.10)	[72026]
	10 - 9		25/2		23/2	$(0,0^{0},0)$	64512.352	(0.10)	[72026]
	10 - 9		23/2		21/2	$(0,0^{0},0)$	64515.362	(0.10)	[72026]
	10 - 9		17/2		15/2	$(0,1^{L1},0)$	64662.085	(0.10)	[72026]
	10 - 9		19/2		17/2	$(0,1^{L1},0)$	64664.356	(0.10)	[72026]
	10 - 9		15/2		13/2	$(0,1^{L1},0)$	64668.420	(0.10)	[72026]
	10 - 9		21/2		19/2	$(0,1^{L1},0)$	64671.271	(0.10)	[72026]
	10 - 9		25/2		23/2	$(0,1^{L1},0)$	64677.120	(0.10)	[72026]
	10 - 9		23/2		21/2	$(0,1^{L1},0)$	64677.624	(0.10)	[72026]
	10 - 9		17/2		15/2	$(0,1^{U1},0)$	64715.284	(0.10)	[72026]
	10 - 9		19/2		17/2	$(0,1^{U1},0)$	64717.564	(0.10)	[72026]
	10 - 9		15/2		13/2	$(0,1^{U1},0)$	64721.627	(0.10)	[72026]
	10 - 9		21/2		19/2	$(0,1^{U1},0)$	64724.387	(0.10)	[72026]
	10 - 9		25/2		23/2	$(0,1^{U1},0)$	64730.282	(0.10)	[72026]
	10 - 9		23/2		21/2	$(0,1^{U1},0)$	64730.756	(0.10)	[72026]
	10 - 9		17/2		15/2	$(0,2^{0},0)$	64827.546	(0.10)	[72026]
	10 - 9		19/2		17/2	$(0,2^{0},0)$	64831.293	(0.10)	[72026]
	10 - 9		15/2		13/2	$(0,2^{0},0)$	64832.095	(0.10)	[72026]
	10 - 9		21/2		19/2	$(0,2^{0},0)$	64838.854	(0.10)	[72026]
	10 - 9		25/2		23/2	$(0,2^{0},0)$	64841.579	(0.10)	[72026]
	10 - 9		23/2		21/2	$(0,2^{0},0)$	64844.550	(0.10)	[72026]
	10 - 9		19/2		17/2	$(0,2^{2},0)$	64877.606	(0.10)	[72026]
	10 - 9		17/2		15/2	$(0,2^{2},0)$	64879.608	(0.10)	[72026]
	10 - 9		21/2		19/2	$(0,2^{2},0)$	64882.385	(0.10)	[72026]
	10 - 9		23/2		21/2	$(0,2^{2},0)$	64890.447	(0.10)	[72026]
	10 - 9		15/2		13/2	$(0,2^{2},0)$	64891.233	(0.10)	[72026]
	10 - 9		25/2		23/2	$(0,2^{2},0)$	64897.533	(0.10)	[72026]
	11 - 10		19/2		17/2	$(0,0^{0},0)$	70950.507	(0.10)	[72026]
	11 - 10		21/2		19/2	$(0,0^{0},0)$	70953.604	(0.10)	[72026]
	11 - 10		17/2		15/2	$(0,0^{0},0)$	70954.155	(0.10)	[72026]
	11 - 10		23/2		21/2	$(0,0^{0},0)$	70959.870	(0.10)	[72026]
	11 - 10		27/2		25/2	$(0,0^{0},0)$	70962.031	(0.10)	[72026]
	11 - 10		25/2		23/2	$(0,0^{0},0)$	70964.570	(0.10)	[72026]
	12 - 11		21/2		19/2	$(0,0^{0},1)$	77177.150	(0.10)	[72026]
	12 - 11		25/2		23/2	$(0,0^{0},1)$	77185.077	(0.10)	[72026]
	12 - 11		29/2		27/2	$(0,0^{0},1)$	77186.803	(0.10)	[72026]
	12 - 11		27/2		25/2	$(0,0^{0},1)$	77188.927	(0.10)	[72026]
	12 - 11		21/2		19/2	$(0,0^{0},0)$	77402.118	(0.10)	[72026]

TABLE 15.1. The microwave spectrum of ICN—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{127}I^{12}C^{14}N$	12 - 11		23/2		21/2	$(0,0^0,0)$	77404.756	(0.10)	[72026]
	12 - 11		19/2		17/2	$(0,0^0,0)$	77405.167	(0.10)	[72026]
	12 - 11		25/2		23/2	$(0,0^0,0)$	77409.960	(0.10)	[72026]
	12 - 11		29/2		27/2	$(0,0^0,0)$	77411.694	(0.10)	[72026]
	12 - 11		27/2		25/2	$(0,0^0,0)$	77413.868	(0.10)	[72026]
	12 - 11		21/2		19/2	$(0,1^{L1},0)$	77598.200	(0.10)	[72026]
	12 - 11		23/2		21/2	$(0,1^{L1},0)$	77600.120	(0.10)	[72026]
	12 - 11		19/2		17/2	$(0,1^{L1},0)$	77602.314	(0.10)	[72026]
	12 - 11		25/2		23/2	$(0,1^{L1},0)$	77605.011	(0.10)	[72026]
	12 - 11		29/2		27/2	$(0,1^{L1},0)$	77608.511	(0.10)	[72026]
	12 - 11		27/2		25/2	$(0,1^{L1},0)$	77609.274	(0.10)	[72026]
	12 - 11		21/2		19/2	$(0,1^{U1},0)$	77662.093	(0.10)	[72026]
	12 - 11		23/2		21/2	$(0,1^{U1},0)$	77663.978	(0.10)	[72026]
	12 - 11		19/2		17/2	$(0,1^{U1},0)$	77666.231	(0.10)	[72026]
	12 - 11		25/2		23/2	$(0,1^{U1},0)$	77668.784	(0.10)	[72026]
	12 - 11		29/2		27/2	$(0,1^{U1},0)$	77672.288	(0.10)	[72026]
	12 - 11		27/2		25/2	$(0,1^{U1},0)$	77673.042	(0.10)	[72026]
	13 - 12					$(0,0^0,0)$	83864.	(1.0)	[49001]
$^{127}I^{13}C^{14}N$	1 - 0		5/2		5/2	$(0,0^0,0)$	5974.43	(0.5)	[57004]
	1 - 0		7/2		5/2	$(0,0^0,0)$	6480.72	(0.5)	[57004]
	1 - 0		3/2		5/2	$(0,0^0,0)$	6703.25	(0.5)	[57004]
	5 - 4		11/2		11/2	$(0,0^0,0)$	31715.412	(0.10)	[72026]
	5 - 4		7/2		5/2	$(0,0^0,0)$	31718.296	(0.10)	[72026]
	5 - 4		9/2		7/2	$(0,0^0,0)$	31730.384	(0.10)	[72026]
	5 - 4		5/2		3/2	$(0,0^0,0)$	31741.424	(0.10)	[72026]
	5 - 4		11/2		9/2	$(0,0^0,0)$	31763.344	(0.10)	[72026]
	5 - 4		15/2		13/2	$(0,0^0,0)$	31783.184	(0.10)	[72026]
	5 - 4		13/2		11/2	$(0,0^0,0)$	31793.310	(0.10)	[72026]
	5 - 4		9/2		9/2	$(0,0^0,0)$	31901.070	(0.10)	[72026]
	6 - 5		11/2		9/2	$(0,0^0,0)$	38099.958	(0.10)	[72026]
	6 - 5		7/2		5/2	$(0,0^0,0)$	38105.810	(0.10)	[72026]
	6 - 5		13/2		11/2	$(0,0^0,0)$	38122.040	(0.10)	[72026]
	6 - 5		17/2		15/2	$(0,0^0,0)$	38133.550	(0.10)	[72026]
	6 - 5		15/2		13/2	$(0,0^0,0)$	38140.975	(0.10)	[72026]
$^{127}I^{12}C^{15}N$	5 - 4		13/2		13/2	$(0,0^0,1)$	30331.926	(0.10)	[72026]
	5 - 4		9/2		7/2	$(0,0^0,0)$	30353.210	(0.10)	[72026]
	5 - 4		15/2		13/2	$(0,0^0,0)$	30406.081	(0.10)	[72026]
	5 - 4		13/2		11/2	$(0,0^0,0)$	30416.179	(0.10)	[72026]
	5 - 4		13/2		13/2	$(0,1^{L1},0)$	30552.346	(0.10)	[72026]
	5 - 4		13/2		13/2	$(0,1^{U1},0)$	30580.464	(0.10)	[72026]
	5 - 4		15/2		13/2	$(0,0^0,2)$	30666.963	(0.10)	[72026]
	5 - 4		13/2		11/2	$(0,0^0,2)$	30677.018	(0.10)	[72026]
	5 - 4		11/2		11/2	$(0,0^0,1)$	30684.701	(0.10)	[72026]
	5 - 4		7/2		5/2	$(0,0^0,1)$	30687.254	(0.10)	[72026]
	5 - 4		9/2		7/2	$(0,0^0,1)$	30699.460	(0.10)	[72026]
	5 - 4		5/2		3/2	$(0,0^0,1)$	30710.512	(0.10)	[72026]
	5 - 4		11/2		9/2	$(0,0^0,1)$	30732.486	(0.10)	[72026]
	5 - 4		15/2		13/2	$(0,0^0,1)$	30752.460	(0.10)	[72026]
	5 - 4		13/2		11/2	$(0,0^0,1)$	30762.627	(0.10)	[72026]
	5 - 4		9/2		7/2	$(0,1^{L1},1)$	30793.325	(0.10)	[72026]
	5 - 4		7/2		5/2	$(0,1^{L1},1)$	30795.183	(0.10)	[72026]
	5 - 4		11/2		9/2	$(0,1^{L1},1)$	30814.912	(0.10)	[72026]
	5 - 4		13/2		13/2	$(0,2^2,0)$	30816.640	(0.10)	[72026]
	5 - 4		9/2		7/2	$(0,1^{U1},1)$	30820.598	(0.10)	[72026]
	5 - 4		7/2		5/2	$(0,1^{U1},1)$	30822.382	(0.10)	[72026]
	5 - 4		5/2		3/2	$(0,1^{L1},1)$	30828.867	(0.10)	[72026]
	5 - 4		11/2		9/2	$(0,1^{U1},1)$	30841.709	(0.10)	[72026]
	5 - 4		13/2		11/2	$(0,1^{L1},1)$	30843.462	(0.10)	[72026]
	5 - 4		11/2		11/2	$(0,1^{L1},0)$	30844.974	(0.10)	[72026]
	5 - 4		15/2		13/2	$(0,1^{L1},1)$	30856.784	(0.10)	[72026]
	5 - 4		9/2		7/2	$(0,1^{L1},0)$	30865.792	(0.10)	[72026]
	5 - 4		7/2		5/2	$(0,1^{L1},0)$	30867.504	(0.10)	[72026]
	5 - 4		11/2		11/2	$(0,1^{U1},0)$	30870.006	(0.10)	[72026]
	5 - 4		9/2		9/2	$(0,0^0,1)$	30870.460	(0.10)	[72026]
	5 - 4		13/2		11/2	$(0,1^{U1},1)$	30870.460	(0.10)	[72026]

TABLE 15.1. The microwave spectrum of ICN—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{127}I^{12}C^{15}N$	5 - 4		15/2		13/2	$(0,1^{U1},1)$	30883.690	(0.10)	[72026]
	5 - 4		11/2		9/2	$(0,1^{L1},0)$	30887.219	(0.10)	[72026]
	5 - 4		9/2		7/2	$(0,1^{U1},0)$	30890.605	(0.10)	[72026]
	5 - 4		7/2		5/2	$(0,1^{U1},0)$	30892.488	(0.10)	[72026]
	5 - 4		5/2		3/2	$(0,1^{L1},0)$	30901.286	(0.10)	[72026]
	5 - 4		11/2		9/2	$(0,1^{U1},0)$	30911.798	(0.10)	[72026]
	5 - 4		13/2		11/2	$(0,1^{L1},0)$	30915.824	(0.10)	[72026]
	5 - 4		5/2		3/2	$(0,1^{U1},0)$	30925.952	(0.10)	[72026]
	5 - 4		15/2		13/2	$(0,1^{L1},0)$	30929.091	(0.10)	[72026]
	5 - 4		11/2		11/2	$(0,2^2,0)$	30931.360	(0.10)	[72026]
	5 - 4		11/2		11/2	$(0,2^0,0)$	30932.093	(0.10)	[72026]
	5 - 4		7/2		5/2	$(0,2^0,0)$	30934.720	(0.10)	[72026]
	5 - 4		13/2		11/2	$(0,1^{U1},0)$	30940.083	(0.10)	[72026]
	5 - 4		9/2		7/2	$(0,2^0,0)$	30946.730	(0.10)	[72026]
	5 - 4		7/2		7/2	$(0,0^0,1)$	30950.893	(0.10)	[72026]
	5 - 4		15/2		13/2	$(0,1^{U1},0)$	30953.496	(0.10)	[72026]
	5 - 4		11/2		9/2	$(0,2^2,0)$	30955.267	(0.10)	[72026]
	5 - 4		9/2		7/2	$(0,2^2,0)$	30968.550	(0.10)	[72026]
	5 - 4		11/2		9/2	$(0,2^0,0)$	30979.494	(0.10)	[72026]
	5 - 4		13/2		11/2	$(0,2^2,0)$	30980.294	(0.10)	[72026]
	5 - 4		11/2		9/2	$(0,3^3,0)$	30986.243	(0.10)	[72026]
	5 - 4		9/2		7/2	$(0,3^{L1},0)$	30995.814	(0.10)	[72026]
	5 - 4		7/2		5/2	$(0,3^{L1},0)$	30997.351	(0.10)	[72026]
	5 - 4		15/2		13/2	$(0,2^0,0)$	30999.226	(0.10)	[72026]
	5 - 4		13/2		11/2	$(0,2^0,0)$	31009.286	(0.10)	[72026]
	5 - 4		13/2		11/2	$(0,3^3,0)$	31009.286	(0.10)	[72026]
	5 - 4		9/2		9/2	$(0,1^{L1},0)$	31011.283	(0.10)	[72026]
	5 - 4		7/2		5/2	$(0,2^2,0)$	31012.196	(0.10)	[72026]
	5 - 4		11/2		9/2	$(0,3^{L1},0)$	31017.290	(0.10)	[72026]
	5 - 4		5/2		3/2	$(0,3^{L1},0)$	31031.333	(0.10)	[72026]
	5 - 4		9/2		9/2	$(0,1^{U1},0)$	31034.569	(0.10)	[72026]
	5 - 4		9/2		7/2	$(0,3^{U1},0)$	31043.654	(0.10)	[72026]
	5 - 4		7/2		5/2	$(0,3^{U1},0)$	31045.233	(0.10)	[72026]
	5 - 4		13/2		11/2	$(0,3^{L1},0)$	31045.939	(0.10)	[72026]
	5 - 4		9/2		7/2	$(0,3^3,0)$	31057.948	(0.10)	[72026]
	5 - 4		15/2		13/2	$(0,3^{L1},0)$	31059.046	(0.10)	[72026]
	5 - 4		15/2		13/2	$(0,2^2,0)$	31062.286	(0.10)	[72026]
	5 - 4		11/2		9/2	$(0,3^{U1},0)$	31064.419	(0.10)	[72026]
	5 - 4		5/2		3/2	$(0,2^2,0)$	31077.424	(0.10)	[72026]
	5 - 4		7/2		7/2	$(0,3^3,0)$	31085.219	(0.10)	[72026]
	5 - 4		7/2		7/2	$(0,1^{L1},0)$	31092.086	(0.10)	[72026]
	5 - 4		15/2		13/2	$(0,3^{U1},0)$	31105.847	(0.10)	[72026]
	5 - 4		7/2		7/2	$(0,1^{U1},0)$	31114.701	(0.10)	[72026]
	5 - 4		9/2		9/2	$(0,2^0,0)$	31116.214	(0.10)	[72026]
	5 - 4		7/2		7/2	$(0,2^2,0)$	31119.408	(0.10)	[72026]
	5 - 4		5/2		5/2	$(0,1^{L1},0)$	31121.174	(0.10)	[72026]
	5 - 4		5/2		5/2	$(0,1^{U1},0)$	31143.581	(0.10)	[72026]
	5 - 4		7/2		5/2	$(0,3^3,0)$	31172.682	(0.10)	[72026]
	5 - 4		5/2		5/2	$(0,2^2,0)$	31180.902	(0.10)	[72026]
	5 - 4		15/2		13/2	$(0,3^3,0)$	31201.830	(0.10)	[72026]
	5 - 4		5/2		3/2	$(0,3^3,0)$	31290.224	(0.10)	[72026]
	6 - 5		9/2		7/2	$(0,0^0,0)$	36438.300	(0.10)	[72026]
	6 - 5		11/2		9/2	$(0,0^0,0)$	36447.269	(0.10)	[72026]
	6 - 5		7/2		5/2	$(0,0^0,0)$	36453.263	(0.10)	[72026]
	6 - 5		13/2		11/2	$(0,0^0,0)$	36469.463	(0.10)	[72026]
	6 - 5		17/2		15/2	$(0,0^0,0)$	36480.986	(0.10)	[72026]
	6 - 5		15/2		13/2	$(0,0^0,0)$	36488.500	(0.10)	[72026]
	6 - 5		15/2		15/2	$(0,1^{L1},1)$	36632.797	(0.10)	[72026]
	6 - 5		15/2		15/2	$(0,1^{L1},0)$	36720.521	(0.10)	[72026]
	6 - 5		9/2		7/2	$(0,0^0,2)$	36750.996	(0.10)	[72026]
	6 - 5		15/2		15/2	$(0,1^{U1},0)$	36753.570	(0.10)	[72026]
	6 - 5		11/2		9/2	$(0,0^0,2)$	36760.067	(0.10)	[72026]
	6 - 5		7/2		5/2	$(0,0^0,2)$	36766.034	(0.10)	[72026]
	6 - 5		13/2		11/2	$(0,0^0,2)$	36782.235	(0.10)	[72026]
	6 - 5		15/2		15/2	$(0,2^0,0)$	36783.792	(0.10)	[72026]

TABLE 15.1. The microwave spectrum of ICN—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	(ν_1,ν_2^{l},ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{127}I^{12}C^{15}N$	6 – 5		17/2		15/2	$(0,0^0,2)$	36793.931	(0.10)	[72026]
	6 – 5		15/2		13/2	$(0,0^0,2)$	36801.415	(0.10)	[72026]
	6 – 5		13/2		13/2	$(0,0^0,1)$	36807.133	(0.10)	[72026]
	6 – 5		9/2		7/2	$(0,0^0,1)$	36853.862	(0.10)	[72026]
	6 – 5		11/2		9/2	$(0,0^0,1)$	36862.793	(0.10)	[72026]
	6 – 5		7/2		5/2	$(0,0^0,1)$	36868.678	(0.10)	[72026]
	6 – 5		13/2		11/2	$(0,0^0,1)$	36885.008	(0.10)	[72026]
	6 – 5		17/2		15/2	$(0,0^0,1)$	36896.661	(0.10)	[72026]
	6 – 5		15/2		13/2	$(0,0^0,1)$	36904.114	(0.10)	[72026]
	6 – 5		13/2		13/2	$(0,1^{L1},1)$	36919.921	(0.10)	[72026]
	6 – 5		15/2		15/2	$(0,2^2,0)$	36955.979	(0.10)	[72026]
	6 – 5		13/2		11/2	$(0,1^{L1},1)$	36990.894	(0.10)	[72026]
	6 – 5		7/2		5/2	$(0,1^{L1},1)$	36994.480	(0.10)	[72026]
	6 – 5		9/2		7/2	$(0,1^{U1},1)$	37005.420	(0.10)	[72026]
	6 – 5		13/2		13/2	$(0,1^{L1},0)$	37006.896	(0.10)	[72026]
	6 – 5		15/2		13/2	$(0,1^{L1},1)$	37010.445	(0.10)	[72026]
	6 – 5		17/2		15/2	$(0,1^{L1},1)$	37015.981	(0.10)	[72026]
	6 – 5		13/2		11/2	$(0,1^{U1},1)$	37023.324	(0.10)	[72026]
	6 – 5		7/2		5/2	$(0,1^{U1},1)$	37027.000	(0.10)	[72026]
	6 – 5		13/2		13/2	$(0,1^{U1},0)$	37036.980	(0.10)	[72026]
	6 – 5		15/2		13/2	$(0,1^{U1},1)$	37042.802	(0.10)	[72026]
	6 – 5		17/2		15/2	$(0,1^{U1},1)$	37048.388	(0.10)	[72026]
	6 – 5		9/2		7/2	$(0,1^{L1},0)$	37059.583	(0.10)	[72026]
	6 – 5		13/2		11/2	$(0,1^{L1},0)$	37077.724	(0.10)	[72026]
	6 – 5		9/2		7/2	$(0,1^{U1},0)$	37089.317	(0.10)	[72026]
	6 – 5		11/2		9/2	$(0,1^{U1},0)$	37090.635	(0.10)	[72026]
	6 – 5		15/2		13/2	$(0,1^{L1},0)$	37097.304	(0.10)	[72026]
	6 – 5		17/2		15/2	$(0,1^{L1},0)$	37102.768	(0.10)	[72026]
	6 – 5		13/2		11/2	$(0,1^{U1},0)$	37107.124	(0.10)	[72026]
	6 – 5		7/2		5/2	$(0,1^{U1},0)$	37110.841	(0.10)	[72026]
	6 – 5		15/2		13/2	$(0,1^{U1},0)$	37126.515	(0.10)	[72026]
	6 – 5		11/2		11/2	$(0,1^{U1},1)$	37129.850	(0.10)	[72026]
	6 – 5		13/2		13/2	$(0,2^2,0)$	37131.488	(0.10)	[72026]
	6 – 5		17/2		15/2	$(0,1^{U1},0)$	37132.088	(0.10)	[72026]
	6 – 5		7/2		7/2	$(0,0^0,1)$	37150.489	(0.10)	[72026]
	6 – 5		9/2		7/2	$(0,2^0,0)$	37150.489	(0.10)	[72026]
	6 – 5		11/2		9/2	$(0,2^0,0)$	37159.420	(0.10)	[72026]
	6 – 5		13/2		13/2	$(0,3^{L1},0)$	37163.120	(0.10)	[72026]
	6 – 5		7/2		5/2	$(0,2^0,0)$	37165.203	(0.10)	[72026]
	6 – 5		11/2		9/2	$(0,2^2,0)$	37180.363	(0.10)	[72026]
	6 – 5		13/2		11/2	$(0,2^2,0)$	37180.363	(0.10)	[72026]
	6 – 5		13/2		11/2	$(0,2^0,0)$	37181.373	(0.10)	[72026]
	6 – 5		11/2		11/2	$(0,1^{L1},0)$	37185.047	(0.10)	[72026]
	6 – 5		7/2		5/2	$(0,2^0,0)$	37192.886	(0.10)	[72026]
	6 – 5		15/2		13/2	$(0,2^0,0)$	37200.268	(0.10)	[72026]
	6 – 5		9/2		7/2	$(0,2^2,0)$	37201.629	(0.10)	[72026]
	6 – 5		15/2		13/2	$(0,2^2,0)$	37201.629	(0.10)	[72026]
	6 – 5		11/2		11/2	$(0,1^{U1},0)$	37213.424	(0.10)	[72026]
	6 – 5		9/2		7/2	$(0,3^{L1},0)$	37215.762	(0.10)	[72026]
	6 – 5		11/2		9/2	$(0,3^{L1},0)$	37217.190	(0.10)	[72026]
	6 – 5		13/2		11/2	$(0,3^{L1},0)$	37233.822	(0.10)	[72026]
	6 – 5		7/2		5/2	$(0,3^{L1},0)$	37237.318	(0.10)	[72026]
	6 – 5		13/2		13/2	$(0,3^3,0)$	37241.858	(0.10)	[72026]
	6 – 5		7/2		5/2	$(0,2^2,0)$	37243.756	(0.10)	[72026]
	6 – 5		17/2		15/2	$(0,2^2,0)$	37245.499	(0.10)	[72026]
	6 – 5		7/2		7/2	$(0,1^{L1},1)$	37248.855	(0.10)	[72026]
	6 – 5		15/2		13/2	$(0,3^{L1},0)$	37253.313	(0.10)	[72026]
	6 – 5		17/2		15/2	$(0,3^{L1},0)$	37258.800	(0.10)	[72026]
	6 – 5		9/2		7/2	$(0,3^{U1},0)$	37272.740	(0.10)	[72026]
	6 – 5		11/2		9/2	$(0,3^{U1},0)$	37273.986	(0.10)	[72026]
	6 – 5		15/2		13/2	$(0,3^3,0)$	37278.717	(0.10)	[72026]
	6 – 5		11/2		9/2	$(0,3^3,0)$	37280.625	(0.10)	[72026]
	6 – 5		9/2		9/2	$(0,1^{L1},0)$	37285.949	(0.10)	[72026]
	6 – 5		13/2		11/2	$(0,3^{U1},0)$	37290.341	(0.10)	[72026]
	6 – 5		11/2		11/2	$(0,2^0,0)$	37296.098	(0.10)	[72026]

TABLE 15.1. The microwave spectrum of ICN—Continued

Isotopic species	J' - J''	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{127}I^{12}C^{15}N$	6 - 5		15/2		13/2	$(0,3^{U1},0)$	37309.501	(0.10)	[72026]
	6 - 5		9/2		9/2	$(0,1^{U1},0)$	37313.396	(0.10)	[72026]
	6 - 5		17/2		15/2	$(0,3^{U1},0)$	37315.036	(0.10)	[72026]
	6 - 5		7/2		7/2	$(0,1^{L1},0)$	37334.969	(0.10)	[72026]
	6 - 5		9/2		7/2	$(0,3^{3},0)$	37340.156	(0.10)	[72026]
	6 - 5		9/2		9/2	$(0,2^{2},0)$	37352.485	(0.10)	[72026]
	6 - 5		7/2		7/2	$(0,1^{U1},0)$	37361.979	(0.10)	[72026]
	6 - 5		17/2		15/2	$(0,3^{3},0)$	37385.011	(0.10)	[72026]
	6 - 5		9/2		9/2	$(0,2^{0},0)$	37399.443	(0.10)	[72026]
	6 - 5		9/2		11/2	$(0,1^{L1},0)$	37409.988	(0.10)	[72026]
	6 - 5		7/2		5/2	$(0,3^{3},0)$	37416.583	(0.10)	[72026]
	6 - 5		7/2		7/2	$(0,2^{0},0)$	37444.432	(0.10)	[72026]
$^{127}I^{13}C^{15}N$	5 - 4		11/2		13/2	$(0,0^{0},0)$	30342.429	(0.20)	[72026]
	5 - 4		13/2		13/2	$(0,0^{0},0)$	30420.132	(0.20)	[72026]
	5 - 4		11/2		11/2	$(0,0^{0},0)$	30771.939	(0.20)	[72026]
	5 - 4		7/2		5/2	$(0,0^{0},0)$	30774.609	(0.20)	[72026]
	5 - 4		9/2		7/2	$(0,0^{0},0)$	30786.641	(0.20)	[72026]
	5 - 4		5/2		3/2	$(0,0^{0},0)$	30797.745	(0.20)	[72026]
	5 - 4		11/2		9/2	$(0,0^{0},0)$	30819.640	(0.20)	[72026]
	5 - 4		15/2		13/2	$(0,0^{0},0)$	30839.536	(0.20)	[72026]
	5 - 4		13/2		11/2	$(0,0^{0},0)$	30849.690	(0.20)	[72026]
	5 - 4		9/2		11/2	$(0,0^{0},0)$	30909.647	(0.20)	[72026]
	5 - 4		9/2		9/2	$(0,0^{0},0)$	30957.251	(0.20)	[72026]
	5 - 4		7/2		7/2	$(0,0^{0},0)$	31037.378	(0.20)	[72026]
	5 - 4		5/2		5/2	$(0,0^{0},0)$	31055.745	(0.20)	[72026]
	5 - 4		7/2		9/2	$(0,0^{0},0)$	31207.972	(0.20)	[72026]
	6 - 5		13/2		13/2	$(0,0^{0},0)$	36911.836	(0.20)	[72026]
	6 - 5		9/2		7/2	$(0,0^{0},0)$	36958.453	(0.20)	[72026]
	6 - 5		11/2		9/2	$(0,0^{0},0)$	36967.486	(0.20)	[72026]
	6 - 5		7/2		5/2	$(0,0^{0},0)$	36973.292	(0.20)	[72026]
	6 - 5		13/2		11/2	$(0,0^{0},0)$	36989.549	(0.20)	[72026]
	6 - 5		17/2		15/2	$(0,0^{0},0)$	37001.207	(0.20)	[72026]
	6 - 5		15/2		13/2	$(0,0^{0},0)$	37008.659	(0.20)	[72026]
	6 - 5		11/2		13/2	$(0,0^{0},0)$	37027.404	(0.20)	[72026]
	6 - 5		11/2		11/2	$(0,0^{0},0)$	37105.132	(0.20)	[72026]
	6 - 5		9/2		9/2	$(0,0^{0},0)$	37209.147	(0.20)	[72026]
	6 - 5		7/2		7/2	$(0,0^{0},0)$	37254.420	(0.20)	[72026]
	6 - 5		9/2		11/2	$(0,0^{0},0)$	37346.825	(0.20)	[72026]
	6 - 5		7/2		9/2	$(0,0^{0},0)$	37505.103	(0.20)	[72026]

Table 16. Molecular parameters for NCO.

Parameters		$^{14}N^{12}C^{16}O$ Gnd. $(^2\Pi)$	$^{14}N^{12}C^{16}O$ v_2=1 $(^2\Delta)$	Reference
B_0	(MHz)	11 677.40(10)	...	[70020]
D_0	(MHz)	0.0071(15)	...	[70020]
$B(^2\Delta_{\frac{3}{2}})$	(MHz)	...	11 756.32(8)	[72027]
$B(^2\Delta_{\frac{5}{2}})$	(MHz)	...	11 660.25(9)	[72027]
p_{eff}	(MHz)	76.8(11)	...	[70020]
a	(MHz)	64.31(64)	60.47(26)	[72027]
b+c	(MHz)	-21.20(126)	-17.33(50)	[72027]
d	(MHz)	90.96(109)	...	[72027]
eqQ (N)	(MHz)	-1.85(40)	-2.11(54)	[72027]
A_{eff}	(cm^{-1})	-95.26(1)	...	[70020]
A	(cm^{-1})	-95.86(1)	...	[70020]
α_p	(MHz)	-38.33(55)	...	[70020]
μ	(D)	0.64(8)	...	[70020]

TABLE 16.1. The microwave spectrum of NCO

Isotopic species	J′ - J″	F_1'	F_1''	(ν_1,ν_2,ν_3)	Parity	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{14}N^{12}C^{16}O$ $^2\Pi_{3/2}$	5/2 - 3/2	5/2	5/2	(0,0,0)		58108.23	(0.21)	[70020]
	5/2 - 3/2	3/2	3/2	(0,0,0)		58139.05	(0.30)	[72027]
	5/2 - 3/2	7/2	5/2	(0,0,0)		58140.76	(0.10)	[70020]
	5/2 - 3/2	5/2	3/2	(0,0,0)		58161.68	(0.15)	[70020]
	5/2 - 3/2	3/2	1/2	(0,0,0)		58171.77	(0.28)	[70020]
	7/2 - 5/2	7/2	7/2	(0,0,0)		81380.88	(0.20)	[72027]
	7/2 - 5/2	9/2	7/2	(0,0,0)		81404.09	(0.07)	[70020]
	7/2 - 5/2	7/2	5/2	(0,0,0)		81413.15	(0.28)	[70020]
	7/2 - 5/2	5/2	3/2	(0,0,0)		81418.46	(0.23)	[70020]
$^{14}N^{12}C^{16}O$ $^2\Pi_{1/2}$	5/2 - 3/2	7/2	5/2	(0,0,0)	a	58577.90	(0.14)	[70020]
	5/2 - 3/2	5/2	3/2	(0,0,0)	a	58581.96	(0.20)	[70020]
	5/2 - 3/2	3/2	1/2	(0,0,0)	a	58588.98	(0.14)	[70020]
	5/2 - 3/2	3/2	3/2	(0,0,0)	a	58611.15	(0.20)	[72027]
	5/2 - 3/2	5/2	5/2	(0,0,0)	a	58617.30	(0.20)	[72027]
	5/2 - 3/2	3/2	3/2	(0,0,0)	b	58627.54	(0.20)	[72027]
	5/2 - 3/2	7/2	5/2	(0,0,0)	b	58660.01	(0.28)	[70020]
	5/2 - 3/2	3/2	1/2	(0,0,0)	b	58674.90	(0.28)	[70020]
$^{14}N^{12}C^{16}O$ $^2\Delta_{3/2}$	5/2 - 3/2	7/2	5/2	(0,1,0)		58769.73	(0.20)	[72027]
	5/2 - 3/2	5/2	3/2	(0,1,0)		58796.56	(0.20)	[72027]
	5/2 - 3/2	3/2	1/2	(0,1,0)		58809.69	(0.20)	[72027]
	7/2 - 5/2	9/2	7/2	(0,1,0)		82287.07	(0.20)	[72027]
	7/2 - 5/2	7/2	5/2	(0,1,0)		82298.75	(0.20)	[72027]
	7/2 - 5/2	5/2	3/2	(0,1,0)		82305.69	(0.20)	[72027]
$^{14}N^{12}C^{16}O$ $^2\Delta_{5/2}$	7/2 - 5/2	9/2	7/2	(0,1,0)		81613.04	(0.20)	[72027]
	7/2 - 5/2	7/2	5/2	(0,1,0)		81627.30	(0.20)	[72027]
	7/2 - 5/2	5/2	3/2	(0,1,0)		81636.35	(0.20)	[72027]

Table 17. Rotational constants for OCS [74001][a]

Isotopic Species	Vib. State $v_1\ v_2^{\ell}\ v_3$	B_v (MHz)	D_v (kHz)	q_v (MHz)
$^{16}O^{12}C^{32}S$	0 0^0 0	6 081.492475(81)[b]	1.301777(90)[b]	
	0 1^1 0 c	6 088.89837(28)	1.32374(47)	6.36141271(161)[c]
	0 1^1 0 d	6 095.25802(54)	1.32344(93)	
	0 2^0 0	6 100.19105(46)	1.0964(12)	
	0 2^2 0 c	6 102.55846(33)	1.5720(9)	
	0 2^2 0 d	6 102.56019(44)	1.3440(12)	
	0 3^1 0	6 108.626(12)		6.18838(17)[d]
	0 3^3 0	6 112.925(12)		
	0 4^0 0	6 114.723(20)		
	0 4^2 0	6 117.310(20)		
	0 4^4 0	6 123.244(20)		
	0 5^1 0	6 121.724(30)		6.055(30)
	0 0^0 1	6 063.35748(70)	1.3274(18)	
	0 1^1 1	6 075.503(15)		6.856(20)
	0 2^0 1	6 084.385(20)		
	0 2^2 1	6 087.227(20)		
	0 3^1 1	6 093.56(10)		6.50(10)
	0 0^0 2	6 044.873(20)		
	0 1^1 2	6 058.536(30)		7.285(20)
	1 0^0 0	6 045.051(20)		
	1 1^1 0	6 056.259(30)		6.450(20)
$^{16}O^{12}C^{34}S$	0 0^0 0	5 932.8379(50)	1.2691(370)	
	0 1^1 0	5 943.158(10)		6.0688022(100)[c]
	0 2^0 0	5 951.273(10)		
	0 2^2 0	5 953.392(10)		
	0 0^0 1	5 915.152(10)		
	0 0^0 2	5 897.120(20)		
	1 0^0 0	5 897.390(20)		
$^{16}O^{13}C^{32}S$	0 0^0 0	6 061.92510(59)	1.2993(16)	
	0 1^1 0	6 071.913(4)		6.5078418(52)[c]
	0 2^0 0	6 079.250(5)	1.133(38)	
	0 2^2 0	6 081.801(7)	1.363(46)[e]	
	0 3^1 0	6 087.031(5)		6.287(5)
	0 3^3 0	6 091.583(5)		
	0 4^0 0	6 092.200(17)		
	0 4^2 0	6 095.070(8)		
	0 4^4 0	6 101.262(9)		
	0 0^0 1	6 043.949(5)	1.403(35)	
	0 1^1 1	6 055.610(8)		7.066(14)
	0 2^0 1	6 063.680(13)		
	0 2^2 1	6 066.811(17)		
	0 0^0 2	6 025.643(12)		
	1 0^0 0	6 027.649(19)		

[a] Original sources of data are: [48007], [49005], [51011], [67021], [67020], [72036], [73045], [74028], [74033]. Note that this table uses a different vibrational numbering from that used in the primary references as explained in the Introduction.

[b] The value of $H_v = -0.25(14)\times10^{-4}$ Hz [74033].

[c] For rotational dependence of q_v see insert in lower portion of table.

[d] Reference [74035].

[e] The value D_v $(02^{2c}0)$ = 1.597(46) kHz for $^{16}O^{13}C^{32}S$ and 1.335(20) kHz for $^{18}O^{12}C^{32}S$. The values shown in the table are D_v $(02^{2d}0)$.

Table 17. Rotational constants for OCS [74001][a]. (continued)

Isotopic Species	Vib. State v_1 v_2^{ℓ} v_3	B_v (MHz)	D_v (kHz)	q_v (MHz)
$^{16}O^{12}C^{33}S$	0 0^0 0	6 004.922(6)		
	0 1^1 0	6 015.47(20)		6.209878(31)[c]
	0 2^0 0	6 023.11(25)		
	0 0^0 1	5 986.86(25)		
$^{18}O^{12}C^{32}S$	0 0^0 0	5 704.8607(4)	1.1353(160)	
	0 1^1 0	5 714.995(4)	1.198(15)	5.6530026(101)[c]
	0 2^0 0	5 722.924(5)	1.020(33)	
	0 2^2 0	5 725.024(4)	1.156(20)[e]	
	0 3^1 0	5 731.142(7)		5.504(7)
	0 3^3 0	5 734.973(5)	1.304(24)	
	0 4^0 0	5 737.002(10)		
	0 4^2 0	5 739.504(10)		
	0 4^4 0	5 744.819(10)	1.284(71)	
	0 0^0 1	5 688.653(5)	1.170(25)	
	0 1^1 1	5 700.182(6)		6.053(11)
	0 2^0 1	5 708.826(12)		
	0 2^2 1	5 711.369(17)	1.386(81)	
	0 0^0 2	5 672.140(10)		
	1 0^0 0	5 669.854(20)		
$^{16}O^{13}C^{34}S$	0 0^0 0	5 911.733(4)		
	0 1^1 0	5 921.462(15)		6.199(15)
	0 2^0 0	5 928.866(10)		
	0 2^2 0	5 931.050(10)		
	0 0^0 1	5 894.148(10)		
$^{17}O^{12}C^{32}S$	0 0^0 0	5 883.675(120)		
$^{18}O^{13}C^{32}S$	0 0^0 0	5 691.069(5)		
	0 1^1 0	5 700.627(20)		5.800(20)
	0 0^0 1	5 674.994(40)		
$^{18}O^{12}C^{34}S$	0 0^0 0	5 559.971(5)		
	0 1^1 0	5 569.845(13)		5.393(13)
	0 2^0 0	5 577.726(15)		
	0 0^0 1	5 544.199(10)		
$^{18}O^{13}C^{34}S$	0 0^0 0	5 544.864(20)		
$^{16}O^{12}C^{36}S$	0 0^0 0	5 799.680(25)		
$^{16}O^{12}C^{35}S$	0 0^0 0	5 864.371(7)		
$^{16}O^{14}C^{32}S$	0 0^0 0	6 043.26(50)		
	0 1^1 0	6 052.65(80)		6.70(20)

Rotational dependence of q_v:

$q_v\,(^{16}O^{12}C^{32}S) = 6.36141271(161) - 4.2720(177)\times10^{-6}J(J+1) + 9.3(91)\times10^{-12}J^2(J+1)^2$

$q_v\,(^{16}O^{12}C^{34}S) = 6.0688022(100) - 3.926(260)\times10^{-6}J(J+1)$

$q_v\,(^{16}O^{13}C^{32}S) = 6.5078418(52) - 4.4890(843)\times10^{-6}J(J+1) + 2.2(48)\times10^{-11}J^2(J+1)^2$

$q_v\,(^{18}O^{12}C^{32}S) = 5.6530026(101) - 3.5940(676)\times10^{-6}J(J+1) + 3.0(30)\times10^{-11}J^2(J+1)^2$

$q_v\,(^{16}O^{12}C^{33}S) = 6.209878(31) - 4.4(11)\times10^{-6}J(J+1)$ [74028].

Table 17.1. Electric dipole moments, Zeeman constants and hyperfine constants for OCS [74001].

Parameter	$^{16}O^{12}C^{32}S$	$^{16}O^{12}C^{34}S$	$^{16}O^{13}C^{32}S$	$^{18}O^{12}C^{33}S$	$^{16}O^{12}C^{33}S$	References
μ (v_2=0) (D)	0.71519(3)					[74028]
μ (v_2=1) (D)	0.70433(3)					[74028]
μ ($V_2=2^2$) (D)	0.6936(3)					[74035]
μ (v_2=0)/μ ($^{16}O^{12}C^{32}S$,v_2=0)	1.	1.00031(2)	1.00017(2)	0.99904(3)	1.00024(25)	[74028]
μ (v_2=1)/μ ($^{16}O^{12}C^{32}S$,v_2=1)	1.	1.00033(2)	1.00067(2)	0.99907(4)	1.00012(9)	[74028]
$\alpha_{\parallel}-\alpha_{\perp}$ (cm^3)	$4.67(16)\times10^{-24}$					[70029]
$g_{\perp}$ (v_2=0,J=1) (μ_N)	-0.028839(6)[a]	-0.028242(10)	-0.028710(15)			[70049]
$g_{\perp}$ (v_2=1,J-1) (μ_N)	-0.02930(4)					[72036]
$g_{\parallel}-g_{\perp}$ (v_2=1) (μ_N)	0.0905(5)					[72036]
$\chi_{\perp}-\chi_{\parallel}$ (v_2=0) (erg/G^2·mole)	$9.369(12)\times10^{-6}$	$9.345(20)\times10^{-6}$	$9.417(36)\times10^{-6}$			[70049]
$\chi_{\perp}$ $\chi_{\parallel}$ (v_2=1) (erg/G^2·mole)	$9.50(40)\times10^{-6}$					[72036]
Q (esu·cm^2)	$-0.786(14)\times10^{-26}$	$-0.858(23)\times10^{-26}$	$-0.716(40)\times10^{-26}$			[70049]
$\sigma_{\parallel}-\sigma_{\perp}$ (ppm)			372(42)			[70049]
Hyperfine constants: eqQ	(^{17}O) for $^{17}O^{12}C^{32}S$	= -1.32(14)	MHz [52014]			
eqQ	(^{33}S) for $^{16}O^{12}C^{33}S$	(v_2=0) = -29.1184(12)	MHz [74028]			
eq_1Q	(^{33}S) for $^{16}O^{12}C^{33}S$	(v_2=1) = -28.6825(18)	MHz [74028]			
eq_2Q	(^{33}S) for $^{16}O^{12}C^{33}S$	(v_2=1) = -1.1808(18)	MHz [74028]			
eqQ	(^{35}S) for $^{16}O^{12}C^{35}S$	= 21.90(8)	MHz [54005]			
$c_{\perp}$	(^{13}C) for $^{16}O^{13}C^{32}S$	= 3.1(2)	kHz [70049]			
$c_{\perp}$	(^{33}S) for $^{16}O^{12}C^{33}S$	(v_2=0) = 0.87(5)	kHz [74028]			
$c_{\perp}$	(^{33}S) for $^{16}O^{12}C^{33}S$	(v_2=1) = 1.16(8)	kHz [74028]			

[a] The rotational dependence of g has been measured for $^{16}O^{12}C^{32}S$ for J=1 to J=5 with the overage value $|g_J|$ = 0.028827(12) μ_N and centrifugal distortion term $D_g < 3\times10^{-7}$ μ_N.

Table 17.2. Additional references for OCS divided into general categories.

Microwave Spectrum	Stark Effect	Zeeman Effect	Hyperfine Structure	Pressure Broadening Line Width (T_1,T_2)	Other
[46000]	[50016]	[51008]	[48008]	[52016] [68018] [74007]	[54004]
[47001]	[51012]	[51009]	[49007]	[54003] [69044] [74013]	[59008]
[47005]	[55008]	[52013]	[50017]	[54009] [70050] [74030]	[59015]
[47007]	[57007]	[56013]	[54008]	[55001] [70051] [74031]	[64006]
[48002]	[61009]	[67019]	[55005]	[55007] [70058] [74040]	[64007]
[49006]	[65013]	[68019]		[56012] [71006] [74045]	[66024]
[50011]	[67016]	[69010]		[59009] [71027] [75021]	[68033]
[50007]	[68020]	[70019]		[64003] [71028] [75022]	[72040]
[51010]	[72038]	[73054]		[64004] [71031] [75024]	[74012]
[51013]				[64005] [72039] [75025]	[75023]
[53011]				[65000] [72041] [75032]	
[54006]				[66022] [72053] [76016]	
[55002]				[66023] [73043] [76021]	
[56005]				[67015] [73044]	
[58002]				[68009] [73053]	
[69022]				[68015] [73055]	
[74041]				[68016] [73064]	

TABLE 17.3. The microwave spectrum of OCS

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{12}C^{32}S$	4 - 4					$(0,2^{2},0)$	0.0818	(1E-4)	[74035]
	5 - 5					$(0,2^{2},0)$	0.1909	(1E-4)	[74035]
	6 - 6					$(0,2^{2},0)$	0.3817	(1E-4)	[74035]
	7 - 7					$(0,2^{2},0)$	0.6870	(1E-4)	[74035]
	8 - 8					$(0,2^{2},0)$	1.1452	(1E-4)	[74035]
	9 - 9					$(0,2^{2},0)$	1.7999	(1E-4)	[74035]
	10 - 10					$(0,2^{2},0)$	2.7005	(1E-4)	[74035]
	11 - 11					$(0,2^{2},0)$	3.9018	(1E-4)	[74035]
	12 - 12					$(0,2^{2},0)$	5.4641	(1E-4)	[74035]
	13 - 13					$(0,2^{2},0)$	7.4535	(1E-4)	[74035]
	14 - 14					$(0,2^{2},0)$	9.9416	(1E-4)	[74035]
	1 - 1					$(0,1^{1},0)$	12.77288	(1E-4)	[72036]
	15 - 15					$(0,2^{2},0)$	13.0054	(1E-4)	[74035]
	16 - 16					$(0,2^{2},0)$	16.7279	(1E-4)	[74035]
	17 - 17					$(0,2^{2},0)$	21.1977	(1E-4)	[74035]
	1 - 1					$(0,3^{1},0)$	24.7535	(5E-4)	[74035]
	18 - 18					$(0,2^{2},0)$	26.5088	(1E-4)	[74035]
	19 - 19					$(0,2^{2},0)$	32.7613	(1E-4)	[74035]
	2 - 2					$(0,1^{1},0)$	38.16836	(1E-4)	[72036]
	20 - 20					$(0,2^{2},0)$	40.0611	(1E-4)	[74035]
	2 - 2					$(0,3^{1},0)$	74.262	(1E-3)	[74035]
	3 - 3					$(0,1^{1},0)$	76.33632	(1E-4)	[72036]
	4 - 4					$(0,1^{1},0)$	127.22648	(1E-4)	[72036]
	5 - 5					$(0,1^{1},0)$	190.83850	(1E-4)	[72036]
	6 - 6					$(0,1^{1},0)$	267.17186	(1E-4)	[72036]
	7 - 7					$(0,1^{1},0)$	356.22585	(1E-3)	[72036]
	8 - 8					$(0,1^{1},0)$	457.99960	(1E-4)	[72036]
	9 - 9					$(0,1^{1},0)$	572.49246	(2E-4)	[72036]
	10 - 10					$(0,1^{1},0)$	699.70355	(2E-4)	[72036]
	11 - 11					$(0,1^{1},0)$	839.63220	(2E-4)	[72036]
	12 - 12					$(0,1^{1},0)$	992.27600	(2E-3)	[72036]
	35 - 35					$(0,1^{1},0)$	8008.57	(0.20)	[67020]
	36 - 36					$(0,1^{1},0)$	8465.84	(0.20)	[67020]
	37 - 37					$(0,1^{1},0)$	8935.76	(0.20)	[67020]
	38 - 38					$(0,1^{1},0)$	9418.21	(0.20)	[67020]
	39 - 39					$(0,1^{1},0)$	9913.34	(0.20)	[67020]
	40 - 40					$(0,1^{1},0)$	10421.23	(0.20)	[67020]
	41 - 41					$(0,1^{1},0)$	10941.70	(0.20)	[67020]
	42 - 42					$(0,1^{1},0)$	11474.84	(0.20)	[67020]
	43 - 43					$(0,1^{1},0)$	12020.52	(0.20)	[67020]
	1 - 0					$(0,0^{0},0)$	12162.979	(1E-3)	[74032]
	1 - 0					$(0,4^{0},0)$	12229.44	(0.08)	[67021]
	44 - 44					$(0,1^{1},0)$	12578.89	(0.20)	[67020]
	45 - 45					$(0,1^{1},0)$	13149.92	(0.20)	[67020]
	46 - 46					$(0,1^{1},0)$	13733.48	(0.20)	[67020]
	47 - 47					$(0,1^{1},0)$	14329.70	(0.20)	[67020]
	48 - 48					$(0,1^{1},0)$	14938.59	(0.20)	[67020]
	49 - 49					$(0,1^{1},0)$	15559.98	(0.20)	[67020]
	50 - 50					$(0,1^{1},0)$	16194.00	(0.20)	[67020]
	2 - 1					$(0,0^{0},2)$	24179.46	(0.08)	[67021]
	2 - 1					$(1,0^{0},0)$	24180.17	(0.08)	[67021]
	2 - 1					$(0,1^{L1},2)$	24219.54	(0.12)	[67021]
	2 - 1					$(0,1^{U1},2)$	24248.68	(0.12)	[67021]
	2 - 1					$(0,0^{0},1)$	24253.38	(0.04)	[67021]
	2 - 1					$(0,1^{L1},1)$	24288.36	(0.06)	[67021]
	2 - 1					$(0,1^{U1},1)$	24315.82	(0.06)	[67021]
	2 - 1					$(0,0^{0},0)$	24325.927	(1E-3)	[73052]
	2 - 1					$(0,2^{0},1)$	24337.50	(0.08)	[67021]
	2 - 1					$(0,3^{L1},1)$	24348.2	(0.4)	[67021]
	2 - 1					$(0,1^{L1},0)$	24355.58	(0.04)	[67021]
	2 - 1					$(0,1^{U1},0)$	24381.00	(0.04)	[67021]
	2 - 1					$(0,3^{U1},1)$	24400.2	(0.4)	[67021]
	2 - 1					$(0,2^{0},0)$	24400.72	(0.04)	[67021]
	2 - 1					$(0,3^{L1},0)$	24409.74	(0.05)	[67021]
	2 - 1					$(0,3^{U1},0)$	24459.20	(0.05)	[67021]

TABLE 17.3. The microwave spectrum of OCS—Continued

Isotopic species	J' - J"	F'	F_1'	F"	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{12}C^{32}S$	3 - 2					$(1,1^{L1},0)$	36318.08	(0.18)	[67021]
	3 - 2					$(1,1^{U1},0)$	36356.78	(0.18)	[67021]
	3 - 2					$(0,1^{L1},1)$	36432.39	(0.09)	[67021]
	3 - 2					$(0,1^{U1},1)$	36473.47	(0.09)	[67021]
	3 - 2					$(0,0^0,0)$	36488.813	(2E-3)	[69048]
	3 - 2					$(0,2^2,1)$	36523.38	(0.12)	[67021]
	3 - 2					$(0,1^{L1},0)$	36533.38	(0.06)	[67021]
	3 - 2					$(0,1^{U1},0)$	36571.36	(0.06)	[67021]
	3 - 2					$(0,2^0,0)$	36601.11	(0.06)	[67021]
	3 - 2					$(0,2^2,0)$	36615.23	(0.06)	[67021]
	3 - 2					$(0,5^{L1},0)$	36675.75	(0.18)	[67021]
	3 - 2					$(0,4^2,0)$	36703.77	(0.12)	[67021]
	3 - 2					$(0,5^{U1},0)$	36784.74	(0.18)	[67021]
	4 - 3					$(1,0^0,0)$	48360.195	(0.03)	[75018]
	4 - 3					$(0,0^0,1)$	48506.24	(0.40)	[52017]
	4 - 3					$(0,0^0,0)$	48651.64	(0.05)	[49004]
	4 - 3					$(0,1^{L1},0)$	48710.80	(0.40)	[52017]
	4 - 3					$(0,1^{U1},0)$	48761.55	(0.40)	[52017]
	4 - 3					$(0,2^0,0)$	48801.08	(0.40)	[52017]
	4 - 3					$(0,2^2,0)$	48819.92	(0.40)	[52017]
	5 - 4					$(1,0^0,0)$	60449.97	(0.10)	[74029]
	5 - 4					$(1,1^{L1},0)$	60530.2	(0.5)	[67021]
	5 - 4					$(1,1^{U1},0)$	60594.3	(0.5)	[67021]
	5 - 4					$(0,1^{L1},1)$	60720.4	(0.5)	[67021]
	5 - 4					$(0,1^{U1},1)$	60788.3	(0.5)	[67021]
	5 - 4					$(0,0^0,0)$	60814.270	(0.02)	[74033]
	5 - 4					$(0,2^0,1)$	60843.48	(0.15)	[67021]
	5 - 4					$(0,2^2,1)$	60871.68	(0.15)	[67021]
	5 - 4					$(0,1^{L1},0)$	60888.35	(0.10)	[67021]
	5 - 4					$(0,1^{U1},0)$	60951.94	(0.10)	[67021]
	5 - 4					$(0,3^{U1},1)$	61000.1	(0.50)	[67021]
	5 - 4					$(0,2^0,0)$	61001.48	(0.10)	[67021]
	5 - 4					$(0,2^2,0)$	61024.96	(0.10)	[67021]
	5 - 4					$(0,3^3,0)$	61128.86	(0.12)	[67021]
	5 - 4					$(0,4^2,0)$	61172.69	(0.15)	[67021]
	5 - 4					$(0,4^4,0)$	61231.85	(0.15)	[67021]
	6 - 5					$(1,0^0,0)$	72539.62	(0.10)	[74029]
	6 - 5					$(0,0^0,0)$	72976.796	(0.02)	[74033]
	7 - 6					$(0,0^0,1)$	84885.188	(0.02)	[74033]
	7 - 6					$(0,0^0,0)$	85139.121	(0.01)	[74033]
	7 - 6					$(0,1^{L1},0)$	85242.800	(0.02)	[74033]
	7 - 6					$(0,1^{U1},0)$	85331.824	(0.02)	[74033]
	7 - 6					$(0,2^0,0)$	85401.177	(0.02)	[74033]
	7 - 6					$(0,2^{L2},0)$	85433.833	(0.02)	[74033]
	7 - 6					$(0,2^{U2},0)$	85434.156	(0.02)	[74033]
	8 - 7					$(1,0^0,0)$	96718.345	(0.06)	[75018]
	8 - 7					$(0,0^0,0)$	97301.212	(0.02)	[74033]
	9 - 8					$(0,0^0,0)$	109463.063	(0.01)	[70036]
	10 - 9					$(1,0^0,0)$	120896.08	(0.06)	[75018]
	10 - 9					$(0,0^0,1)$	121261.832	(0.02)	[74033]
	10 - 9					$(0,0^0,0)$	121624.638	(0.01)	[70036]
	10 - 9					$(0,1^{L1},0)$	121772.716	(0.02)	[74033]
	10 - 9					$(0,1^{U1},0)$	121899.928	(0.02)	[74033]
	10 - 9					$(0,2^0,0)$	121999.429	(0.02)	[74033]
	10 - 9					$(0,2^{L2},0)$	122045.138	(0.02)	[74033]
	10 - 9					$(0,2^{U2},0)$	122046.037	(0.02)	[74033]
	11 - 10					$(1,0^0,0)$	132984.42	(0.06)	[75018]
	11 - 10					$(0,0^0,0)$	133785.900	(0.01)	[70036]
	12 - 11					$(1,0^0,0)$	145072.35	(0.06)	[75018]
	12 - 11					$(0,0^0,0)$	145946.821	(0.01)	[70036]
	13 - 12					$(1,0^0,0)$	157160.13	(0.06)	[75018]
	13 - 12					$(0,0^0,0)$	158107.360	(0.01)	[70036]
	14 - 13					$(0,0^0,1)$	169759.449	(0.02)	[74033]
	14 - 13					$(0,0^0,0)$	170267.494	(0.01)	[70036]
	14 - 13					$(0,1^{L1},0)$	170474.706	(0.02)	[74033]

TABLE 17.3. The microwave spectrum of OCS—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{12}C^{32}S$	14 - 13					$(0,1^{U1},0)$	170652.759	(0.02)	[74033]
	14 - 13					$(0,2^{0},0)$	170793.315	(0.02)	[74033]
	14 - 13					$(0,2^{L2},0)$	170854.734	(0.02)	[74033]
	14 - 13					$(0,2^{U2},0)$	170857.232	(0.02)	[74033]
	15 - 14					$(0,0^{0},1)$	181882.798	(0.02)	[74033]
	15 - 14					$(0,0^{0},0)$	182427.198	(0.01)	[70036]
	15 - 14					$(0,1^{L1},0)$	182649.161	(0.02)	[74033]
	15 - 14					$(0,1^{U1},0)$	182839.968	(0.02)	[74033]
	15 - 14					$(0,2^{0},0)$	182990.933	(0.02)	[74033]
	15 - 14					$(0,2^{L2},0)$	183055.908	(0.02)	[74033]
	15 - 14					$(0,2^{U2},0)$	183058.987	(0.02)	[74033]
	16 - 15					$(0,0^{0},0)$	194586.433	(0.01)	[70036]
	17 - 16					$(0,0^{0},0)$	206745.161	(0.01)	[70036]
	18 - 17					$(0,0^{0},0)$	218903.374	(0.03)	[74033]
	19 - 18					$(0,0^{0},0)$	231061.022	(0.03)	[74033]
	20 - 19					$(0,0^{0},0)$	243218.040	(0.01)	[70036]
	20 - 19					$(0,1^{L1},0)$	243513.679	(0.03)	[74033]
	20 - 19					$(0,1^{U1},0)$	243768.075	(0.03)	[74033]
	21 - 20					$(0,0^{0},0)$	255374.461	(0.01)	[70036]
	22 - 21					$(0,0^{0},0)$	267530.239	(0.03)	[74033]
	23 - 22					$(0,0^{0},0)$	279685.318	(0.03)	[74033]
	24 - 23					$(0,0^{0},0)$	291839.686	(0.03)	[74033]
	25 - 24					$(0,0^{0},0)$	303993.242	(0.02)	[74033]
	26 - 25					$(0,0^{0},0)$	316144.7	(2.0)	[54007]
	28 - 27					$(0,0^{0},0)$	340449.2	(2.0)	[54007]
	30 - 29					$(0,0^{0},0)$	364747.5	(3.0)	[54007]
	32 - 31					$(0,0^{0},0)$	389041.	(4.)	[54007]
	40 - 39					$(0,0^{0},0)$	486184.2	(3.0)	[56014]
	42 - 41					$(0,0^{0},0)$	510457.3	(3.0)	[56014]
	58 - 57					$(0,0^{0},0)$	704437.052	(0.03)	[70007]
	59 - 58					$(0,0^{0},0)$	716546.559	(0.03)	[70007]
	66 - 65					$(0,0^{0},0)$	801259.782	(0.03)	[70007]
	67 - 66					$(0,0^{0},0)$	813353.706	(0.03)	[70007]
$^{16}O^{12}C^{34}S$	1 - 1					$(0,1^{1},0)$	12.13773	(2E-4)	[74028]
	2 - 2					$(0,1^{1},0)$	36.41273	(2E-4)	[74028]
	3 - 3					$(0,1^{1},0)$	72.82507	(2E-4)	[74028]
	4 - 4					$(0,1^{1},0)$	121.37446	(2E-4)	[74028]
	5 - 5					$(0,1^{1},0)$	182.06049	(2E-4)	[74028]
	6 - 6					$(0,1^{1},0)$	243.88278	(2E-4)	[74028]
	7 - 7					$(0,1^{1},0)$	339.84058	(2E-3)	[74028]
	8 - 8					$(0,1^{1},0)$	436.93348	(1E-3)	[74028]
	1 - 0					$(0,0^{0},0)$	11865.712	(0.05)	[67018]
	2 - 1					$(0,0^{0},2)$	23588.44	(0.08)	[67021]
	2 - 1					$(1,0^{0},0)$	23589.52	(0.08)	[67021]
	2 - 1					$(0,0^{0},1)$	23660.56	(0.04)	[67021]
	2 - 1					$(0,0^{0},0)$	23731.302	(0.02)	[73045]
	2 - 1					$(0,1^{L1},0)$	23760.48	(0.04)	[67021]
	2 - 1					$(0,1^{U1},0)$	23784.74	(0.04)	[67021]
	2 - 1					$(0,2^{0},0)$	23804.97	(0.04)	[67021]
	3 - 2					$(0,0^{0},1)$	35490.77	(0.06)	[67021]
	3 - 2					$(0,0^{0},0)$	35596.91	(0.03)	[67021]
	3 - 2					$(0,1^{L1},0)$	35640.66	(0.06)	[67021]
	3 - 2					$(0,1^{U1},0)$	35676.98	(0.06)	[67021]
	3 - 2					$(0,2^{0},0)$	35707.50	(0.06)	[67021]
	3 - 2					$(0,2^{2},0)$	35720.27	(0.06)	[67021]
	4 - 3					$(0,0^{0},0)$	47462.40	(0.20)	[49004]
	5 - 4					$(0,0^{0},0)$	59327.745	(*0.04)	[74001]
	6 - 5					$(0,0^{0},0)$	71192.959	(*0.04)	[74001]
	7 - 6					$(0,0^{0},0)$	83057.990	(*0.05)	[74001]
	8 - 7					$(0,0^{0},0)$	94922.81	(*0.06)	[74001]
	9 - 8					$(0,0^{0},0)$	106787.38	(*0.08)	[74001]
	10 - 9					$(0,0^{0},0)$	118651.68	(0.08)	[73045]
	11 - 10					$(0,0^{0},0)$	130515.68	(*0.15)	[74001]
	12 - 11					$(0,0^{0},0)$	142379.34	(*0.20)	[74001]
	13 - 12					$(0,0^{0},0)$	154242.63	(*0.27)	[74001]

TABLE 17.3. The microwave spectrum of OCS—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{12}C^{34}S$	14 - 13					$(0,0^0,0)$	166105.53	(*0.53)	[74001]
	15 - 14					$(0,0^0,0)$	177968.00	(*0.43)	[74001]
	16 - 15					$(0,0^0,0)$	189830.02	(*0.53)	[74001]
	17 - 16					$(0,0^0,0)$	201691.55	(*0.64)	[74001]
	18 - 17					$(0,0^0,0)$	213552.56	(*0.77)	[74001]
	19 - 18					$(0,0^0,0)$	225413.02	(*0.92)	[74001]
	20 - 19					$(0,0^0,0)$	237272.91	(*1.08)	[74001]
	21 - 20					$(0,0^0,0)$	249132.18	(*1.26)	[74001]
	22 - 21					$(0,0^0,0)$	260990.82	(*1.46)	[74001]
	23 - 22					$(0,0^0,0)$	272848.78	(*1.68)	[74001]
	24 - 23					$(0,0^0,0)$	284706.04	(*1.92)	[74001]
	25 - 24					$(0,0^0,0)$	296562.58	(*2.18)	[74001]
$^{16}O^{13}C^{32}S$	1 - 1					$(0,1^1,0)$	13.01592	(5E-4)	[74028]
	2 - 2					$(0,1^1,0)$	39.04683	(5E-4)	[74028]
	3 - 3					$(0,1^1,0)$	78.09336	(5E-4)	[74028]
	4 - 4					$(0,1^1,0)$	130.15495	(5E-4)	[74028]
	5 - 5					$(0,1^1,0)$	195.23106	(6E-4)	[74028]
	6 - 6					$(0,1^1,0)$	273.32135	(6E-4)	[74028]
	7 - 7					$(0,1^1,0)$	364.42517	(6E-4)	[74028]
	8 - 8					$(0,1^1,0)$	468.54143	(6E-4)	[74028]
	9 - 9					$(0,1^1,0)$	585.66942	(*3E-4)	[74001]
	10 - 10					$(0,1^1,0)$	715.80831	(*5E-4)	[74001]
	11 - 11					$(0,1^1,0)$	858.95695	(*8E-4)	[74001]
	12 - 12					$(0,1^1,0)$	1015.11416	(*1E-3)	[74001]
	35 - 35					$(0,1^1,0)$	8192.77	(0.20)	[67020]
	36 - 36					$(0,1^1,0)$	8660.53	(0.20)	[67020]
	37 - 37					$(0,1^1,0)$	9141.14	(0.20)	[67020]
	38 - 38					$(0,1^1,0)$	9634.86	(0.20)	[67020]
	39 - 39					$(0,1^1,0)$	10141.34	(0.20)	[67020]
	40 - 40					$(0,1^1,0)$	10660.91	(0.20)	[67020]
	41 - 41					$(0,1^1,0)$	11193.26	(0.20)	[67020]
	42 - 42					$(0,1^1,0)$	11738.66	(0.20)	[67020]
	1 - 0					$(0,0^0,0)$	12123.845	(*2E-3)	[74001]
	43 - 43					$(0,1^1,0)$	12296.918	(*0.06)	[74001]
	44 - 44					$(0,1^1,0)$	12868.15	(0.20)	[67020]
	45 - 45					$(0,1^1,0)$	13452.195	(*0.09)	[74001]
	46 - 46					$(0,1^1,0)$	14049.196	(*0.12)	[74001]
	47 - 47					$(0,1^1,0)$	14659.100	(*0.15)	[74001]
	48 - 48					$(0,1^1,0)$	15281.901	(*0.19)	[74001]
	49 - 49					$(0,1^1,0)$	15917.59	(*0.23)	[74001]
	50 - 50					$(0,1^1,0)$	16566.18	(*0.28)	[74001]
	2 - 1					$(0,0^0,2)$	24102.54	(0.04)	[73045]
	2 - 1					$(1,0^0,0)$	24110.60	(0.10)	[73045]
	2 - 1					$(0,0^0,1)$	24175.751	(0.02)	[73045]
	2 - 1					$(0,1^{L1},1)$	24208.276	(0.04)	[73045]
	2 - 1					$(0,1^{U1},1)$	24236.538	(0.04)	[73045]
	2 - 1					$(0,0^0,0)$	24247.668	(0.01)	[73045]
	2 - 1					$(0,2^0,1)$	24254.68	(0.05)	[73045]
	2 - 1					$(0,1^{L1},0)$	24274.60	(0.05)	[73045]
	2 - 1					$(0,1^{U1},0)$	24300.64	(0.05)	[73045]
	2 - 1					$(0,2^0,0)$	24316.962	(0.02)	[73045]
	2 - 1					$(0,3^{L1},0)$	24322.92	(0.04)	[73045]
	2 - 1					$(0,4^0,0)$	24368.76	(0.10)	[73045]
	2 - 1					$(0,3^{U1},0)$	24373.26	(0.05)	[73045]
	3 - 2					$(0,0^0,2)$	36153.67	(0.10)	[73045]
	3 - 2					$(1,0^0,0)$	36165.72	(0.10)	[73045]
	3 - 2					$(0,0^0,1)$	36263.46	(0.10)	[73045]
	3 - 2					$(0,0^0,0)$	36371.390	(0.03)	[73045]
	3 - 2					$(0,2^2,1)$	36400.79	(0.10)	[73045]
	3 - 2					$(0,1^{U1},0)$	36450.876	(0.02)	[73045]
	3 - 2					$(0,2^0,0)$	36475.38	(0.10)	[73045]
	3 - 2					$(0,3^{L1},0)$	36484.348	(0.03)	[73045]
	3 - 2					$(0,2^2,0)$	36490.723	(0.04)	[73045]
	3 - 2					$(0,3^{U1},0)$	36559.81	(0.10)	[73045]
	4 - 3					$(0,0^0,0)$	48494.76	(0.40)	[52017]

TABLE 17.3. The microwave spectrum of OCS—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{13}C^{32}S$	5 - 4					$(0,0^0,0)$	60618.600	(*7E-3)	[74001]
	5 - 4					$(0,3^3,0)$	60915.415	(0.02)	[73045]
	5 - 4					$(0,3^{U1},0)$	60932.540	(0.03)	[73045]
	5 - 4					$(0,4^2,0)$	60950.15	(0.06)	[73045]
	5 - 4					$(0,4^4,0)$	61012.39	(0.09)	[73045]
	6 - 5					$(0,0^0,0)$	72741.977	(*8E-3)	[74001]
	7 - 6					$(0,0^0,0)$	84865.166	(0.01)	[74033]
	8 - 7					$(0,0^0,0)$	96988.139	(*9E-3)	[74001]
	9 - 8					$(0,0^0,0)$	109110.862	(*9E-3)	[74001]
	10 - 9					$(0,0^0,1)$	120873.34	(0.05)	[73045]
	10 - 9					$(0,0^0,0)$	121233.301	(0.01)	[74033]
	10 - 9					$(0,2^0,0)$	121580.46	(0.07)	[73045]
	10 - 9					$(0,2^{L2},0)$	121629.93	(0.10)	[73045]
	10 - 9					$(0,2^{U2},0)$	121630.78	(0.10)	[73045]
	11 - 10					$(0,0^0,0)$	133355.434	(*8E-3)	[74001]
	12 - 11					$(0,0^0,0)$	145477.221	(*7E-3)	[74001]
	13 - 12					$(0,0^0,0)$	157598.634	(*7E-3)	[74001]
	14 - 13					$(0,0^0,0)$	169719.648	(0.01)	[74033]
	15 - 14					$(0,0^0,0)$	181840.209	(0.01)	[74033]
	16 - 15					$(0,0^0,0)$	193960.317	(*0.01)	[74001]
	17 - 16					$(0,0^0,0)$	206079.922	(*0.02)	[74001]
	18 - 17					$(0,0^0,0)$	218198.997	(*0.03)	[74001]
	19 - 18					$(0,0^0,0)$	230217.510	(*0.03)	[74001]
	20 - 19					$(0,0^0,0)$	242435.432	(*0.04)	[74001]
	21 - 20					$(0,0^0,0)$	254552.730	(*0.05)	[74001]
	22 - 21					$(0,0^0,0)$	266669.373	(*0.06)	[74001]
	23 - 22					$(0,0^0,0)$	278785.330	(*0.07)	[74001]
	24 - 23					$(0,0^0,0)$	290900.570	(*0.09)	[74001]
$^{16}O^{12}C^{33}S$	1 - 1		5/2		3/2	$(0,1^1,0)$	8.94085	(1E-3)	[74028]
	1 - 1		5/2		5/2	$(0,1^1,0)$	12.36085	(1E-3)	[74028]
	1 - 1		3/2		3/2	$(0,1^1,0)$	12.65645	(1E-3)	[74028]
	1 - 1		3/2		5/2	$(0,1^1,0)$	16.07590	(1E-3)	[74028]
	1 - 1		3/2		1/2	$(0,1^1,0)$	18.85435	(1E-3)	[74028]
	2 - 2		7/2		7/2	$(0,1^1,0)$	37.17495	(1E-3)	[74028]
	2 - 2		3/2		3/2	$(0,1^1,0)$	37.25870	(1E-3)	[74028]
	2 - 2		3/2		5/2	$(0,1^1,0)$	39.91853	(1E-3)	[74028]
	2 - 2		1/2		3/2	$(0,1^1,0)$	40.69360	(2E-3)	[74028]
	2 - 2		7/2		5/2	$(0,1^1,0)$	40.91805	(1E-3)	[74028]
	3 - 3		9/2		9/2	$(0,1^1,0)$	74.41935	(5E-4)	[74028]
	3 - 3		5/2		5/2	$(0,1^1,0)$	74.57740	(5E-4)	[74028]
	3 - 3		5/2		7/2	$(0,1^1,0)$	77.14858	(5E-4)	[74028]
	3 - 3		3/2		5/2	$(0,1^1,0)$	79.80285	(7E-4)	[74028]
	3 - 3		9/2		7/2	$(0,1^1,0)$	79.95391	(8E-4)	[74028]
	4 - 4		11/2		11/2	$(0,1^1,0)$	124.08806	(5E-4)	[74028]
	4 - 4		7/2		7/2	$(0,1^1,0)$	124.27980	(1E-3)	[74028]
	4 - 4		7/2		9/2	$(0,1^1,0)$	126.46180	(5E-4)	[74028]
	4 - 4		5/2		7/2	$(0,1^1,0)$	130.22205	(5E-4)	[74028]
	4 - 4		11/2		9/2	$(0,1^1,0)$	130.33988	(5E-4)	[74028]
	5 - 5		13/2		13/2	$(0,1^1,0)$	186.17853	(5E-4)	[74028]
	5 - 5		7/2		9/2	$(0,1^1,0)$	192.69020	(5E-4)	[74028]
	5 - 5		13/2		11/2	$(0,1^1,0)$	192.78980	(5E-4)	[74028]
	2 - 1					$(0,0^0,1)$	23947.4	(0.10)	[68038]
	2 - 1		3/2		1/2	$(0,0^0,0)$	24012.292	(0.01)	[51011]
	2 - 1		5/2		5/2	$(0,0^0,0)$	24012.974	(0.01)	[51011]
	2 - 1		3/2		5/2	$(0,0^0,0)$	24018.13	(0.05)	[52015]
	2 - 1		1/2		1/2	$(0,0^0,0)$	24019.641	(0.01)	[51011]
	2 - 1		5/2		3/2	$(0,0^0,0)$	24020.264	(0.01)	[51011]
	2 - 1		7/2		5/2	$(0,0^0,0)$	24020.264	(0.01)	[51011]
	2 - 1		1/2		3/2	$(0,0^0,0)$	24032.68	(0.05)	[52015]
	2 - 1		3/2		3/2	$(0,0^0,0)$	24025.467	(0.01)	[51011]
	2 - 1		5/2		3/2	$(0,1^{L1},0)$	24044.0	(0.10)	[68038]
	2 - 1		5/2		5/2	$(0,1^{L1},0)$	24046.9	(0.10)	[68038]
	2 - 1		3/2		3/2	$(0,1^{L1},0)$	24046.9	(0.10)	[68038]
	2 - 1		7/2		5/2	$(0,1^{L1},0)$	24051.2	(0.10)	[68038]
	2 - 1		5/2		3/2	$(0,1^{U1},0)$	24069.2	(0.10)	[68038]

TABLE 17.3. The microwave spectrum of OCS—Continued

Isotopic species	J' - J''	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{12}C^{33}S$	2 - 1		5/2		5/2	$(0,1^{U1},0)$	24072.0	(0.10)	[68038]
	2 - 1		3/2		3/2	$(0,1^{U1},0)$	24072.0	(0.10)	[68038]
	2 - 1		7/2		5/2	$(0,1^{U1},0)$	24075.7	(0.10)	[68038]
	2 - 1					$(0,2^0,0)$	24092.4	(0.10)	[68038]
	4 - 3		5/2		3/2	$(0,0^0,0)$	48038.19	(0.40)	[52017]
	4 - 3		7/2		5/2	$(0,0^0,0)$	48038.19	(0.40)	[52017]
	4 - 3		9/2		7/2	$(0,0^0,0)$	48039.13	(0.40)	[52017]
	4 - 3		11/2		9/2	$(0,0^0,0)$	48039.13	(0.40)	[52017]
$^{18}O^{12}C^{32}S$	1 - 1					$(0,1^1,0)$	11.30655	(5E-4)	[74028]
	2 - 2					$(0,1^1,0)$	33.91795	(1E-3)	[74028]
	3 - 3					$(0,1^1,0)$	67.83550	(1E-3)	[74028]
	4 - 4					$(0,1^1,0)$	113.05850	(1E-3)	[74028]
	5 - 5					$(0,1^1,0)$	169.58685	(1E-3)	[74028]
	6 - 6					$(0,1^1,0)$	237.41975	(1E-3)	[74028]
	7 - 7					$(0,1^1,0)$	316.55685	(1E-3)	[74028]
	8 - 8					$(0,1^1,0)$	406.99756	(*7E-4)	[74001]
	9 - 9					$(0,1^1,0)$	508.74114	(*8E-4)	[74001]
	10 - 10					$(0,1^1,0)$	621.78683	(*1E-3)	[74001]
	11 - 11					$(0,1^1,0)$	746.13378	(*1E-3)	[74001]
	12 - 12					$(0,1^1,0)$	881.78105	(*2E-3)	[74001]
	35 - 35					$(0,1^1,0)$	7117.137	(*0.04)	[74001]
	36 - 36					$(0,1^1,0)$	7523.494	(*0.05)	[74001]
	37 - 37					$(0,1^1,0)$	7941.100	(*0.05)	[74001]
	38 - 38					$(0,1^1,0)$	8369.97	(0.14)	[73045]
	39 - 39					$(0,1^1,0)$	8810.00	(0.14)	[73045]
	40 - 40					$(0,1^1,0)$	9261.36	(0.14)	[73045]
	41 - 41					$(0,1^1,0)$	9723.966	(*0.05)	[74001]
	42 - 42					$(0,1^1,0)$	10197.81	(0.14)	[73045]
	43 - 43					$(0,1^1,0)$	10682.819	(*0.04)	[74001]
	44 - 44					$(0,1^1,0)$	11179.10	(0.20)	[73045]
	1 - 0					$(0,0^0,0)$	11409.717	(*6E-3)	[74001]
	45 - 45					$(0,1^1,0)$	11686.59	(0.20)	[73045]
	46 - 46					$(0,1^1,0)$	12205.295	(*0.04)	[74001]
	47 - 47					$(0,1^1,0)$	12735.24	(0.14)	[73045]
	48 - 48					$(0,1^1,0)$	13276.41	(0.14)	[73045]
	49 - 49					$(0,1^1,0)$	13828.724	(*0.08)	[74001]
	50 - 50					$(0,1^1,0)$	14392.20	(0.20)	[73045]
	2 - 1					$(1,0^0,0)$	22679.38	(0.08)	[73045]
	2 - 1					$(0,0^0,2)$	22688.524	(0.04)	[73045]
	2 - 1					$(0,0^0,1)$	22754.570	(0.02)	[73045]
	2 - 1					$(0,1^{L1},1)$	22788.585	(0.04)	[73045]
	2 - 1					$(0,1^{U1},1)$	22812.773	(0.04)	[73045]
	2 - 1					$(0,0^0,0)$	22819.404	(0.02)	[73045]
	2 - 1					$(0,2^0,1)$	22835.26	(0.10)	[73045]
	2 - 1					$(0,1^{L1},0)$	22848.653	(0.02)	[73045]
	2 - 1					$(0,1^{U1},0)$	22871.228	(0.02)	[73045]
	2 - 1					$(0,2^0,0)$	22891.663	(0.02)	[73045]
	2 - 1					$(0,3^{L1},0)$	22902.513	(0.03)	[73045]
	2 - 1					$(0,3^{U1},0)$	22946.543	(0.04)	[73045]
	2 - 1					$(0,4^0,0)$	22947.972	(0.04)	[73045]
	3 - 2					$(0,0^0,1)$	34131.83	(0.10)	[73045]
	3 - 2					$(0,1^{L1},1)$	34182.85	(0.15)	[73045]
	3 - 2					$(0,1^{U1},1)$	34219.151	(0.03)	[73045]
	3 - 2					$(0,0^0,0)$	34229.045	(0.03)	[73045]
	3 - 2					$(0,2^0,1)$	34252.84	(0.07)	[73045]
	3 - 2					$(0,2^2,1)$	34268.13	(0.10)	[73045]
	3 - 2					$(0,1^{L1},0)$	34272.920	(0.03)	[73045]
	3 - 2					$(0,1^{U1},0)$	34306.73	(0.10)	[73045]
	3 - 2					$(0,2^0,0)$	34337.45	(0.10)	[73045]
	3 - 2					$(0,2^2,0)$	34350.073	(0.03)	[73045]
	3 - 2					$(0,3^{L1},0)$	34353.748	(0.04)	[73045]
	3 - 2					$(0,3^{U1},0)$	34419.83	(0.15)	[73045]
	3 - 2					$(0,4^0,0)$	34421.89	(0.15)	[73045]
	4 - 3					$(0,0^0,0)$	45638.595	(*0.02)	[74001]
	5 - 4					$(0,0^0,0)$	57048.039	(*0.02)	[74001]

TABLE 17.3. The microwave spectrum of OCS—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{18}O^{12}C^{32}S$	5 - 4					$(0,3^3,0)$	57349.313	(0.03)	[73045]
	5 - 4					$(0,4^2,0)$	57394.56	(0.08)	[73045]
	5 - 4					$(0,4^4,0)$	57447.96	(0.10)	[73045]
	6 - 5					$(0,0^0,0)$	68457.347	(*0.02)	[74001]
	7 - 6					$(0,0^0,0)$	79866.492	(*0.03)	[74001]
	8 - 7					$(0,0^0,0)$	91275.445	(*0.03)	[74001]
	9 - 8					$(0,0^0,0)$	102684.181	(*0.03)	[74001]
	10 - 9					$(0,0^0,0)$	114092.672	(*0.03)	[74001]
	11 - 10					$(0,0^0,1)$	125144.13	(0.08)	[73045]
	11 - 10					$(0,0^0,0)$	125500.89	(0.03)	[73045]
	11 - 10					$(0,2^2,1)$	125642.98	(0.15)	[73045]
	11 - 10					$(0,1^{L1},0)$	125661.45	(0.03)	[73045]
	11 - 10					$(0,2^0,0)$	125898.90	(0.13)	[73045]
	11 - 10					$(0,2^{L2},0)$	125943.69	(0.04)	[73045]
	11 - 10					$(0,2^{U2},0)$	125944.57	(0.03)	[73045]
	11 - 10					$(0,3^3,0)$	126162.98	(0.07)	[73045]
	11 - 10					$(0,4^4,0)$	126380.09	(0.20)	[73045]
	12 - 11					$(0,0^0,0)$	136908.808	(*0.06)	[74001]
	13 - 12					$(0,0^0,0)$	148316.400	(*0.08)	[74001]
	14 - 13					$(0,0^0,0)$	159723.64	(*0.11)	[74001]
	15 - 14					$(0,0^0,0)$	171130.49	(*0.14)	[74001]
	16 - 15					$(0,0^0,0)$	182536.94	(*0.17)	[74001]
	17 - 16					$(0,0^0,0)$	193942.95	(*0.22)	[74001]
	18 - 17					$(0,0^0,0)$	205348.50	(*0.26)	[74001]
	19 - 18					$(0,0^0,0)$	216753.56	(*0.32)	[74001]
	20 - 19					$(0,0^0,0)$	228158.10	(*0.38)	[74001]
	21 - 20					$(0,0^0,0)$	239562.09	(*0.44)	[74001]
	22 - 21					$(0,0^0,0)$	250965.51	(*0.52)	[74001]
	23 - 22					$(0,0^0,0)$	262368.34	(*0.60)	[74001]
	24 - 23					$(0,0^0,0)$	273770.53	(*0.69)	[74001]
	25 - 24					$(0,0^0,0)$	285172.07	(*0.79)	[74001]
	26 - 25					$(0,0^0,0)$	296572.94	(*0.90)	[74001]
$^{16}O^{13}C^{34}S$	2 - 1					$(0,0^0,1)$	23576.55	(0.03)	[73045]
	2 - 1					$(0,0^0,0)$	23646.888	(0.01)	[73045]
	2 - 1					$(0,1^{L1},0)$	23673.41	(0.06)	[74001]
	2 - 1					$(0,1^{U1},0)$	23698.20	(0.06)	[74001]
	3 - 2					$(0,0^0,0)$	35470.264	(0.02)	[73045]
	3 - 2					$(0,2^0,0)$	35573.06	(0.04)	[73045]
	3 - 2					$(0,2^2,0)$	35586.22	(0.04)	[73045]
$^{17}O^{12}C^{32}S$	2 - 1		5/2		3/2	$(0,0^0,0)$	23534.101	(0.03)	[52014]
	2 - 1		7/2		7/2	$(0,0^0,0)$	23534.164	(0.02)	[52014]
	2 - 1		1/2		3/2	$(0,0^0,0)$	23534.308	(0.02)	[52014]
	2 - 1		7/2		5/2	$(0,0^0,0)$	23534.422	(0.02)	[52014]
	2 - 1		9/2		7/2	$(0,0^0,0)$	23534.422	(0.02)	[52014]
	2 - 1		3/2		3/2	$(0,0^0,0)$	23534.481	(0.03)	[52014]
	2 - 1		5/2		5/2	$(0,0^0,0)$	23534.481	(0.03)	[52014]
$^{18}O^{13}C^{32}S$	2 - 1					$(0,0^0,1)$	22699.94	(0.15)	[73045]
	2 - 1					$(0,0^0,0)$	22764.240	(0.02)	[73045]
	2 - 1					$(0,1^{L1},0)$	22790.88	(0.08)	[73045]
	2 - 1					$(0,1^{U1},0)$	22814.034	(0.06)	[73045]
	3 - 2					$(0,1^{U1},0)$	34221.116	(0.06)	[73045]
$^{18}O^{12}C^{34}S$	2 - 1					$(0,0^0,1)$	22176.76	(0.03)	[73045]
	2 - 1					$(0,0^0,0)$	22239.850	(0.02)	[73045]
	2 - 1					$(0,1^{L1},0)$	22268.57	(0.05)	[73045]
	2 - 1					$(0,1^{U1},0)$	22290.14	(0.05)	[73045]
	2 - 1					$(0,2^0,0)$	22310.87	(0.06)	[73045]
$^{18}O^{13}C^{34}S$	2 - 1					$(0,0^0,0)$	22179.42	(0.08)	[73045]
$^{16}O^{12}C^{36}S$	2 - 1					$(0,0^0,0)$	23198.67	(0.10)	[49005]
$^{16}O^{12}C^{35}S$	2 - 1		5/2		5/2	$(0,0^0,0)$	23452.444	(0.02)	[54005]
	2 - 1		3/2		3/2	$(0,0^0,0)$	23453.055	(0.02)	[54005]
	2 - 1		5/2		3/2	$(0,0^0,0)$	23456.963	(0.02)	[51011]
	2 - 1		7/2		5/2	$(0,0^0,0)$	23456.963	(0.02)	[51011]
	2 - 1		3/2		1/2	$(0,0^0,0)$	23462.906	(0.02)	[54005]
$^{16}O^{14}C^{32}S$	2 - 1					$(0,0^0,0)$	24173.0	(2.0)	[48007]

*Calculated transition frequency.

Table 18. Rotational constants for OCSe.

Isotopic Species	Vib. State v_1 v_2^{ℓ} v_3	B_v (MHz)	q_v (MHz)	Reference	Isotopic Species	Vib. State v_1 v_2^{ℓ} v_3	B_v (MHz)	q_v (MHz)	Reference
$^{16}O^{12}C^{74}Se$ [a]	0 0^0 0	4 095.806(5)		[50012]	$^{16}O^{12}C^{82}Se$ [f]	0 0^0 0	3 994.064(3)		[56005]
	0 0^1 0	4 102.89(5)	3.17	[67010]		0 1^1 0	4 000.95(5)	3.12	[49003]
	0 0^0 1	4 082.18(5)		[67010]		0 2^0 0	4 007.06(6)		[67010]
$^{16}O^{12}C^{75}Se$ [a]	0 0^0 0	4 081.938(10)		[55006]		0 2^2 0	4 007.68(6)		[67010]
$^{16}O^{12}C^{76}Se$ [b]	0 0^0 0	4 068.438(10)		[56005]		0 0^0 1	3 980.972(50)		[49003]
	0 1^1 0	4 075.46(5)	3.24	[49003]		0 1^1 1	3 988.15(6)	3.35	[67010]
	0 2^0 0	4 081.66(6)		[67010]	$^{16}O^{13}C^{76}Se$ [b]	0 0^0 0	4 031.43(6)		[67010]
	0 2^2 0	4 082.37(6)		[67010]	$^{16}O^{13}C^{77}Se$ [c]	0 0^0 0	4 018.12(6)		[67010]
	0 0^0 1	4 054.96(2)		[67010]	$^{16}O^{13}C^{78}Se$ [d]	0 0^0 0	4 005.11(5)		[67010]
$^{16}O^{12}C^{77}Se$ [c]	0 0^0 0	4 055.241(3)		[56005]	$^{16}O^{13}C^{80}Se$ [g]	0 0^0 0	3 979.9918(15)		[76015]
	0 1^1 0	4 062.28(5)	3.21	[67010]		1 0^0 0	3 959.5582(60)		[76015]
	0 2^2 0	4 069.08(6)		[67010]		0 1^1 0	3 986.4500(20)	3.1952(40)	[76015]
	0 0^0 1	4 041.82(5)		[49003]		0 2^0 0	3 992.1789(50)		[76015]
$^{16}O^{12}C^{78}Se$ [d]	0 0^0 0	4 042.413(3)		[56005]		0 2^2 0	3 992.8295(30)		[76015]
	0 1^1 0	4 049.41(5)	3.19	[67010]		0 0^0 1	3 966.7858(30)		[76015]
	0 2^0 0	4 055.55(5)		[67010]	$^{16}O^{13}C^{82}Se$ [f]	0 0^0 0	3 956.05(6)		[67010]
	0 2^2 0	4 056.26(5)		[67010]	$^{18}O^{12}C^{78}Se$ [h]	0 0^0 0	3 746.86(6)		[67010]
	0 3^1 0	4 061.83(6)	3.38	[67010]	$^{18}O^{12}C^{80}Se$ [h]	0 0^0 0	3 722.6821(10)		[76015]
	0 0^0 1	4 029.06(5)		[49003]		1 0^0 0	3 702.0201(60)		[76015]
	0 1^1 1	4 036.38(6)	3.30	[67010]		0 1^1 0	3 729.2448(40)	2.7530(50)	[76015]
	0 0^0 2	4 015.46(6)		[67010]		0 2^0 0	3 735.1216(60)		[76015]
$^{16}O^{12}C^{79}Se$	0 0^0 0	4 029.848(1)		[55005]		0 2^2 0	3 735.745(10)		[76015]
$^{16}O^{12}C^{80}Se$ [e]	0 0^0 0	4 017.650(3)		[76015]		0 0^0 1	3 711.0384(40)		[76015]
	1 0^0 0	3 995.859(25)		[76015]					
	0 1^1 0	4 024.556(3)	3.172(2)	[76015]					
	0 2^0 0	4 030.674(40)		[76015]					
	0 2^2 0	4 031.370(40)		[76015]					
	0 3^1 0	4 036.734(60)	3.20	[67010]					
	0 0^0 1	4 004.389(40)		[76015]					
	0 1^1 1	4 011.709(60)	3.25	[67010]					
	0 0^0 2	3 990.92(5)		[67010]					

[a] Assumed D_v = 0.70 kHz.

[b] D_0 = 0.6846 kHz [56005] was assumed for the vibrational states.

[c] D_0 = 0.6834 kHz [56005] was assumed for the vibrational states.

[d] D_0 = 0.6771 kHz [56005] was assumed for the vibrational states.

[e] D_0 = 0.6695 kHz [56005] was assumed for the vibrational states.

[f] D_0 = 0.6640 kHz [56005] was assumed for the vibrational states.

[g] $D(00^00)$ = 0.665(4) kHz, $D(01^10)$ = 0.671(4) kHz, and $D(00^01)$ = 0.665 kHz (assumed)[76015].

[h] $D(00^00)$ = 0.566(4) kHz, and $D(01^10)$ = 0.580(40) kHz [76015].

Table 18.1. Hyperfine constants, electric dipole moments and Zeeman constants for OCSe.

Parameter	Isotopic Species	Vib. State v_1 v_2^{ℓ} v_3	Value	Reference
eqQ (^{79}Se)	$^{16}O^{12}C^{79}Se$	0 0^0 0	752.21(2) MHz	[55005]
eqQ (^{75}Se)	$^{16}O^{12}C^{75}Se$	0 0^0 0	946 MHz	[55006]
$c_{^{79}Se}$	$^{16}O^{12}C^{79}Se$	0 0^0 0	3.2(15) kHz	[55005]
μ	$^{16}O^{12}C^{80}Se$	0 0^0 0	0.754 D	[49003]
μ	$^{16}O^{12}C^{80}Se$	0 1^1 0	0.730 D	[49003]
μ	$^{16}O^{12}C^{80}Se$	0 0^0 1	0.728 D	[49003]
$g_{\perp}$	$^{16}O^{12}C^{76}Se$	0 0^0 0	$-0.01969(20)\mu_N$	[70037]
$g_{\perp}$	$^{16}O^{12}C^{80}Se$	0 0^0 0	$-0.01952(10)\mu_N$	[70037]
$\chi_{\perp}-\chi_{\parallel}$ [a]	$OC^{76}Se$, $OC^{77}Se$	0 0^0 0	$10.06(18)\times10^{-6}$	[70037]

[a] Units are erg/G^2·mole.

Additional reference: [52012].

TABLE 18.2. The microwave spectrum of OCSe

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{12}C^{74}Se$	3 - 2					$(0,0^0,0)$	24574.76	(0.02)	[50012]
	4 - 3					$(0,0^0,1)$	32657.3	(0.20)	[67010]
	4 - 3					$(0,1^{L1},0)$	32809.7	(0.20)	[67010]
	4 - 3					$(0,1^{U1},0)$	32836.1	(0.20)	[67010]
$^{16}O^{12}C^{75}Se$	3 - 2		5/2		5/2	$(0,0^0,0)$	24429.58	(0.05)	[55006]
	3 - 2		3/2		3/2	$(0,0^0,0)$	24455.21	(0.05)	[55006]
	3 - 2		9/2		7/2	$(0,0^0,0)$	24471.31	(0.05)	[55006]
	3 - 2		11/2		9/2	$(0,0^0,0)$	24480.45	(0.05)	[55006]
	3 - 2		7/2		5/2	$(0,0^0,0)$	24517.93	(0.05)	[55006]
	3 - 2		5/2		3/2	$(0,0^0,0)$	24565.87	(0.05)	[55006]
$^{16}O^{12}C^{76}Se$	1 - 0					$(0,0^0,0)$	8136.9	(0.10)	[70037]
	3 - 2					$(0,0^0,0)$	24410.48	(0.02)	[50012]
	3 - 2					$(0,1^{L1},0)$	24442.98	(0.30)	[49003]
	3 - 2					$(0,1^{U1},0)$	24462.42	(0.30)	[49003]
	4 - 3					$(0,0^0,1)$	32439.52	(0.10)	[67010]
	4 - 3					$(0,2^0,0)$	32653.1	(0.50)	[67010]
	4 - 3					$(0,2^2,0)$	32658.8	(0.50)	[67010]
	12 - 11					$(0,0^0,0)$	97637.78	(0.20)	[56005]
	15 - 14					$(0,0^0,0)$	122043.90	(0.25)	[56005]
	18 - 17					$(0,0^0,0)$	146447.90	(0.30)	[56005]
	21 - 20					$(0,0^0,0)$	170849.06	(0.35)	[56005]
	24 - 23					$(0,0^0,0)$	195247.17	(0.40)	[56005]
	27 - 26					$(0,0^0,0)$	219641.79	(0.45)	[56005]
	30 - 29					$(0,0^0,0)$	244032.33	(0.50)	[56005]
$^{16}O^{12}C^{77}Se$	3 - 2					$(0,0^0,1)$	24250.84	(0.30)	[49003]
	3 - 2					$(0,0^0,0)$	24331.38	(0.02)	[50012]
	3 - 2					$(0,1^{L1},0)$	24363.97	(0.30)	[49003]
	3 - 2					$(0,1^{U1},0)$	24383.21	(0.30)	[49003]
	4 - 3					$(0,2^2,0)$	32552.5	(0.50)	[67010]
	12 - 11					$(0,0^0,0)$	97321.07	(0.20)	[56005]
	15 - 14					$(0,0^0,0)$	121647.98	(0.25)	[56005]
	18 - 17					$(0,0^0,0)$	145972.74	(0.30)	[56005]
	21 - 20					$(0,0^0,0)$	170294.80	(0.35)	[56005]
	24 - 23					$(0,0^0,0)$	194613.75	(0.40)	[56005]
	27 - 26					$(0,0^0,0)$	218929.21	(0.45)	[56005]
$^{16}O^{12}C^{78}Se$	3 - 2					$(0,0^0,1)$	24174.30	(0.30)	[49003]
	3 - 2					$(0,0^0,0)$	24254.43	(0.02)	[50012]
	3 - 2					$(0,1^{L1},0)$	24286.82	(0.30)	[49003]
	3 - 2					$(0,1^{U1},0)$	24305.95	(0.30)	[49003]
	4 - 3					$(0,0^0,2)$	32123.5	(0.50)	[67010]
	4 - 3					$(0,1^{L1},1)$	32277.7	(0.50)	[67010]
	4 - 3					$(0,1^{U1},1)$	32304.1	(0.50)	[67010]

TABLE 18.2. The microwave spectrum of OCSe—Continued

Isotopic species	J' - J''	F	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{12}C^{78}Se$	4 - 3					$(0,2^0,0)$	32444.20	(0.20)	[67010]
	4 - 3					$(0,2^2,0)$	32449.94	(0.20)	[67010]
	4 - 3					$(0,3^{L1},0)$	32467.4	(0.50)	[67010]
	4 - 3					$(0,3^{U1},0)$	32521.5	(0.50)	[67010]
	6 - 5					$(0,0^0,0)$	48508.88	(0.30)	[49003]
	7 - 6					$(0,0^0,0)$	56593.16	(0.30)	[49003]
	12 - 11					$(0,0^0,0)$	97013.24	(0.20)	[56005]
	15 - 14					$(0,0^0,0)$	121263.28	(0.25)	[56005]
	18 - 17					$(0,0^0,0)$	145511.08	(0.30)	[56005]
	21 - 20					$(0,0^0,0)$	169756.27	(0.35)	[56005]
	24 - 23					$(0,0^0,0)$	193998.34	(0.40)	[56005]
	27 - 26					$(0,0^0,0)$	218236.97	(0.45)	[56005]
	30 - 29					$(0,0^0,0)$	242471.47	(0.50)	[56005]
	33 - 32					$(0,0^0,0)$	266701.93	(0.55)	[56005]
$^{16}O^{12}C^{79}Se$	3 - 2		7/2		7/2	$(0,0^0,0)$	24153.201	(4E-3)	[55005]
	3 - 2		11/2		9/2	$(0,0^0,0)$	24159.928	(4E-3)	[55005]
	3 - 2		1/2		3/2	$(0,0^0,0)$	24159.928	(4E-3)	[55005]
	3 - 2		13/2		11/2	$(0,0^0,0)$	24170.179	(3E-3)	[55005]
	3 - 2		9/2		7/2	$(0,0^0,0)$	24190.772	(4E-3)	[55005]
	3 - 2		3/2		3/2	$(0,0^0,0)$	24204.692	(0.01)	[53008]
	3 - 2		7/2		5/2	$(0,0^0,0)$	24234.352	(5E-3)	[55005]
$^{16}O^{12}C^{80}Se$	1 - 0					$(0,0^0,0)$	8035.3	(0.10)	[70037]
	3 - 2					$(0,0^0,1)$	24026.26	(0.30)	[49003]
$^{16}O^{12}C^{80}Se$	3 - 2					$(0,0^0,0)$	24105.85	(0.02)	[50012]
	3 - 2					$(0,1^{L1},0)$	24137.80	(0.30)	[55002]
	3 - 2					$(0,1^{U1},0)$	24156.46	(0.30)	[55002]
	3 - 2					$(0,2^0,0)$	24184.97	(0.30)	[55002]
	3 - 2					$(0,2^2,0)$	24188.97	(0.30)	[55002]
	4 - 3					$(0,0^0,2)$	31927.15	(0.30)	[67010]
	4 - 3					$(0,1^{L1},1)$	32080.5	(0.50)	[67010]
	4 - 3					$(0,1^{U1},1)$	32106.5	(0.50)	[67010]
	4 - 3					$(0,2^0,0)$	32245.38	(0.30)	[67010]
	4 - 3					$(0,2^2,0)$	32251.05	(0.30)	[67010]
	4 - 3					$(0,3^{L1},0)$	32268.1	(0.50)	[67010]
	4 - 3					$(0,3^{U1},0)$	32319.3	(0.50)	[67010]
	6 - 5					$(0,0^0,0)$	48211.46	(0.30)	[49003]
	7 - 6					$(0,0^0,0)$	56246.47	(0.30)	[49003]
	12 - 11					$(0,0^0,0)$	96418.95	(0.20)	[56005]
	12 - 11					$(0,1^{L1},0)$	96546.60	(0.20)	[56005]
	12 - 11					$(0,1^{U1},0)$	96622.76	(0.20)	[56005]
	15 - 14					$(0,0^0,0)$	120520.40	(0.25)	[56005]
	15 - 14					$(0,1^{L1},0)$	120679.98	(0.25)	[56005]
	15 - 14					$(0,1^{U1},0)$	120775.11	(0.25)	[56005]
	18 - 17					$(0,0^0,0)$	144619.81	(0.30)	[56005]
	18 - 17					$(0,1^{L1},0)$	144811.06	(0.30)	[56005]
	18 - 17					$(0,1^{U1},0)$	144925.26	(0.30)	[56005]
	21 - 20					$(0,0^0,0)$	168716.41	(0.35)	[56005]
	21 - 20					$(0,1^{L1},0)$	168939.60	(0.35)	[56005]
	21 - 20					$(0,1^{U1},0)$	169072.81	(0.35)	[56005]
	24 - 23					$(0,0^0,0)$	192810.17	(0.40)	[56005]
	24 - 23					$(0,1^{L1},0)$	193065.08	(0.40)	[56005]
	24 - 23					$(0,1^{U1},0)$	193217.26	(0.40)	[56005]
	27 - 26					$(0,0^0,0)$	216900.38	(0.45)	[56005]
	27 - 26					$(0,1^{L1},0)$	217186.90	(0.45)	[56005]
	27 - 26					$(0,1^{U1},0)$	217358.18	(0.45)	[56005]
	30 - 29					$(0,0^0,0)$	240986.62	(0.50)	[56005]
	33 - 32					$(0,0^0,0)$	265068.60	(0.55)	[56005]
	36 - 35					$(0,0^0,0)$	289145.50	(0.60)	[56005]
	39 - 38					$(0,0^0,0)$	313217.57	(0.65)	[56005]
$^{16}O^{12}C^{82}Se$	3 - 2					$(0,0^0,1)$	23885.76	(0.30)	[49003]
	3 - 2					$(0,0^0,0)$	23964.33	(0.02)	[50012]
	3 - 2					$(0,1^{L1},0)$	23996.26	(0.30)	[49003]
	3 - 2					$(0,1^{U1},0)$	24014.97	(0.30)	[49003]
	4 - 3					$(0,1^{L1},1)$	31891.6	(0.50)	[67010]
	4 - 3					$(0,1^{U1},1)$	31918.4	(0.50)	[67010]
	4 - 3					$(0,2^0,0)$	32056.3	(0.50)	[67010]

TABLE 18.2. The microwave spectrum of OCSe—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{12}C^{82}Se$	4 - 3					$(0,2^2,0)$	32061.3	(0.50)	[67010]
	7 - 6					$(0,0^0,0)$	55916.19	(0.30)	[49003]
	12 - 11					$(0,0^0,0)$	95852.94	(0.20)	[56005]
	15 - 14					$(0,0^0,0)$	119812.89	(0.25)	[56005]
	18 - 17					$(0,0^0,0)$	143770.82	(0.30)	[56005]
	21 - 20					$(0,0^0,0)$	167726.08	(0.35)	[56005]
	24 - 23					$(0,0^0,0)$	191678.34	(0.40)	[56005]
	27 - 26					$(0,0^0,0)$	215627.18	(0.45)	[56005]
	30 - 29					$(0,0^0,0)$	239572.08	(0.50)	[56005]
	33 - 32					$(0,0^0,0)$	263512.90	(0.55)	[56005]
$^{16}O^{13}C^{76}Se$	4 - 3					$(0,0^0,0)$	32251.3	(0.50)	[67010]
$^{16}O^{13}C^{77}Se$	4 - 3					$(0,0^0,0)$	32144.8	(0.50)	[67010]
$^{16}O^{13}C^{78}Se$	3 - 2					$(0,0^0,0)$	24030.58	(0.30)	[49003]
$^{16}O^{13}C^{80}Se$	3 - 2					$(0,0^0,1)$	23800.634	(0.03)	[76015]
	3 - 2					$(0,0^0,0)$	23879.891	(0.02)	[76015]
	3 - 2					$(0,1^{L1},0)$	23909.100	(0.03)	[76015]
	3 - 2					$(0,1^{U1},0)$	23928.239	(0.03)	[76015]
	4 - 3					$(0,0^0,1)$	31734.128	(0.02)	[76015]
	4 - 3					$(0,0^0,0)$	31839.760	(0.01)	[76015]
	4 - 3					$(0,1^{L1},0)$	31878.643	(0.01)	[76015]
	4 - 3					$(0,1^{U1},0)$	31904.215	(0.01)	[76015]
	4 - 3					$(0,2^0,0)$	31937.261	(0.03)	[76015]
$^{16}O^{13}C^{80}Se$	4 - 3					$(0,2^2,0)$	31942.508	(0.01)	[76015]
$^{16}O^{13}C^{82}Se$	4 - 3					$(0,0^0,0)$	31648.2	(0.50)	[67010]
$^{18}O^{12}C^{78}Se$	4 - 3					$(0,0^0,0)$	29974.7	(0.50)	[67010]
$^{18}O^{12}C^{80}Se$	3 - 2					$(0,0^0,1)$	22266.19	(0.09)	[76015]
	3 - 2					$(0,0^0,0)$	22336.032	(0.03)	[76015]
	3 - 2					$(0,1^{L1},0)$	22367.186	(0.05)	[76015]
	3 - 2					$(0,1^{U1},0)$	22383.680	(0.05)	[76015]
	3 - 2					$(0,2^0,0)$	22410.68	(0.06)	[76015]
	3 - 2					$(0,2^2,0)$	22414.43	(0.06)	[76015]
	4 - 3					$(0,0^0,1)$	29688.158	(0.03)	[76015]
	4 - 3					$(0,0^0,0)$	29781.312	(0.01)	[76015]
	4 - 3					$(0,1^{L1},0)$	29822.800	(0.03)	[76015]
	4 - 3					$(0,1^{U1},0)$	29844.832	(0.03)	[76015]
	4 - 3					$(0,2^0,0)$	29880.832	(0.05)	[76015]
	4 - 3					$(0,2^2,0)$	29885.86	(0.08)	[76015]
	5 - 4					$(0,0^0,1)$	37110.09	(0.10)	[76015]
	5 - 4					$(0,0^0,0)$	37226.535	(0.03)	[76015]
	5 - 4					$(0,2^0,0)$	37350.90	(0.10)	[76015]

Table 19. Molecular parameters for SCSe [71022].

Parameter	Vib. State $v_1\ v_2^{\ell}\ v_3$	$^{32}S^{12}C^{82}Se$	$^{32}S^{12}C^{80}Se$	$^{32}S^{12}C^{78}Se$	$^{32}S^{12}C^{76}Se$
B_v (MHz)[a]	0 0^0 0	2 027.113	2 043.310	2 060.321	2 078.190
B_v (MHz)	0 1^1 0	2 031.229(5)	2 047.443(3)	2 064.490(3)	2 082.405(5)
B_v (MHz)	0 2^2 0	2 035.345(5)	2 051.576(3)	2 068.659(3)	2 086.620(5)
q_v (MHz)	0 1^1 0	0.996(5)	1.005(3)	1.021(3)	1.041(5)
D_J (kHz)		...	0.163(40)	0.225(150)	...
μ (D)	0 2^2 0	...	0.031(5)	...	...

[a] The rotational constants for the ground vibrational state were extrapolated from those derived for the excited vibrational states. These are believed to be more accurate than the vales derived from measurements reported in [50013].

TABLE 19.1. The microwave spectrum of SCSe

Isotopic species	$J' - J''$	F'	F'_1	F''	F''_1	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{32}S^{12}C^{82}Se$	8 - 7					$(0,1^{L1},0)$	32491.00	(0.05)	[71022]
	8 - 7					$(0,1^{U1},0)$	32506.95	(0.05)	[71022]
	8 - 7					$(0,2^{2},0)$	32564.60	(0.05)	[71022]
	9 - 8					$(0,1^{L1},0)$	36552.28	(0.05)	[71022]
	9 - 8					$(0,1^{U1},0)$	36570.20	(0.03)	[71022]
	9 - 8					$(0,2^{2},0)$	36635.05	(0.05)	[71022]
$^{32}S^{12}C^{80}Se$	7 - 6					$(0,1^{L1},0)$	28656.94	(0.01)	[71022]
	7 - 6					$(0,1^{U1},0)$	28671.00	(0.01)	[71022]
	7 - 6					$(0,2^{2},0)$	28721.86	(0.01)	[71022]
	8 - 7					$(0,1^{L1},0)$	32750.70	(0.01)	[71022]
	8 - 7					$(0,1^{U1},0)$	32766.80	(0.01)	[71022]
	8 - 7					$(0,2^{2},0)$	32824.92	(0.01)	[71022]
	9 - 8					$(0,1^{L1},0)$	36844.45	(0.01)	[71022]
	9 - 8					$(0,1^{U1},0)$	36862.55	(0.01)	[71022]
	9 - 8					$(0,2^{2},0)$	36927.93	(0.01)	[71022]
$^{32}S^{12}C^{78}Se$	7 - 6					$(0,1^{L1},0)$	28895.44	(0.03)	[71022]
	7 - 6					$(0,1^{U1},0)$	28909.71	(0.03)	[71022]
	7 - 6					$(0,2^{2},0)$	28960.95	(0.05)	[71022]
	8 - 7					$(0,1^{L1},0)$	33023.19	(0.01)	[71022]
	8 - 7					$(0,1^{U1},0)$	33039.55	(0.01)	[71022]
	8 - 7					$(0,2^{2},0)$	33098.06	(0.01)	[71022]
	9 - 8					$(0,1^{L1},0)$	37151.01	(0.01)	[71022]
	9 - 8					$(0,1^{U1},0)$	37169.39	(0.01)	[71022]
	9 - 8					$(0,2^{2},0)$	37235.24	(0.01)	[71022]
$^{32}S^{12}C^{76}Se$	8 - 7					$(0,1^{L1},0)$	33309.48	(0.05)	[71022]
	8 - 7					$(0,1^{U1},0)$	33326.08	(0.05)	[71022]
	8 - 7					$(0,2^{2},0)$	33385.00	(0.05)	[71022]
	9 - 8					$(0,1^{L1},0)$	37473.00	(0.05)	[71022]
	9 - 8					$(0,1^{U1},0)$	37491.82	(0.03)	[71022]
	9 - 8					$(0,2^{2},0)$	37558.10	(0.05)	[71022]

Table 20. Rotational constants and dipole moment for SCTe [54002][a].

Isotopic Species	B_{00^00} [b] (MHz)	α_2 (MHz)	q_v (MHz)
$SC^{130}Te$	1 559.9303(30)	3.2446(30)	0.6599(30)
$SC^{128}Te$	1 565.7022(30)	3.2551(30)	0.6649(30)
$SC^{126}Te$	1 571.6524(30)	3.2657(30)	0.6706(30)
$SC^{125}Te$	1 574.6925(30)	3.2712(30)	0.6728(30)
$SC^{124}Te$	1 577.7898(30)	3.2764(30)	0.6752(30)
$SC^{123}Te$	1 580.9261(30)	3.2818(30)	0.6776(30)
$SC^{122}Te$	1 584.1224(30)	3.2870(30)	0.6786(30)
μ_{SCTe} = 0.172(2) D			

[a] This work reports the observation of the $J=6\leftarrow5$, $J=7\leftarrow6$ and $J=8\leftarrow7$ transitions for the $(0,0^0,0)$, $(0,1^1,0)$ and $(0,2^2,0)$ states. However, observed frequencies are given only for the $J=8\leftarrow7$ transitions for the $(0,1^1,0)$ state.

[b] D_V=0.095 kHz was used for all isotopic species.

TABLE 20.1. The microwave spectrum of SCTe

Isotopic species	J' - J"	F'	F_1'	F"	F_1''	(ν_1,ν_2^l,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{32}S^{12}C^{130}Te$	8 - 7					$(0,1^{L1},0)$	25005.326	(0.04)	[54002]
	8 - 7					$(0,1^{U1},0)$	25015.884	(0.04)	[54002]
$^{32}S^{12}C^{128}Te$	8 - 7					$(0,1^{L1},0)$	25097.805	(0.04)	[54002]
	8 - 7					$(0,1^{U1},0)$	25108.444	(0.04)	[54002]
$^{32}S^{12}C^{126}Te$	8 - 7					$(0,1^{L1},0)$	25193.132	(0.04)	[54002]
	8 - 7					$(0,1^{U1},0)$	25203.861	(0.04)	[54002]
$^{32}S^{12}C^{125}Te$	8 - 7					$(0,1^{L1},0)$	25241.844	(0.04)	[54002]
	8 - 7					$(0,1^{U1},0)$	25252.608	(0.04)	[54002]
$^{32}S^{12}C^{124}Te$	8 - 7					$(0,1^{L1},0)$	25291.465	(0.04)	[54002]
	8 - 7					$(0,1^{U1},0)$	25302.268	(0.04)	[54002]
$^{32}S^{12}C^{123}Te$	8 - 7					$(0,1^{L1},0)$	25341.714	(0.04)	[54002]
	8 - 7					$(0,1^{U1},0)$	25352.555	(0.04)	[54002]
$^{32}S^{12}C^{122}Te$	8 - 7					$(0,1^{L1},0)$	25392.929	(0.04)	[54002]
	8 - 7					$(0,1^{U1},0)$	25403.788	(0.04)	[54002]

Table 21. Molecular parameters for HCC.

Parameter	$H^{12}C\ ^{12}C$	$H^{13}C^{12}C$	$H^{12}C^{13}C$	$D^{12}C^{12}C$
B_0-2D_0	43 674.37(10)	...	...	
γ	-62.57(13)	...	...	
b	40.24(43)	139(1)	863(1)	6.177
c	12.23(35)	52(2)	117(2)	1.877
Reference	[74002]	[74042]	[74042]	[74046]

TABLE 21.1. The microwave spectrum of HCC

Isotopic species	J' - J"	F_1'	F_1''	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$H^{12}C^{12}C$	3/2 - 1/2	2	1	(0,0,0)	87317.05	(0.10)	[74002]
	3/2 - 1/2	1	0	(0,0,0)	87328.70	(0.10)	[74002]
	1/2 - 1/2	1	1	(0,0,0)	87402.10	(0.10)	[74002]
	1/2 - 1/2	0	1	(0,0,0)	87407.23	(0.20)	[74002]

Table 21a. Molecular parameters for KrClF. [75034]

Parameter	$^{82}Kr^{35}Cl^{19}F$	$^{84}Kr^{35}Cl^{19}F$	$^{86}Kr^{35}Cl^{19}F$	$^{84}Kr^{37}Cl^{19}F$
B (MHz)	933.4239(50)	925.1859(50)	917.3176(50)	914.4371(50)
D_J (kHz)	a	1.86(20)	a	a
eqQ (MHz)	-141.521(20)	-141.519(20)	-141.517(20)	-111.544(20)
μ_a (D)		1.136(3)		

[a] The value of D_J determined for $^{84}Kr^{35}Cl^{19}F$ was used to determine B for the other isotopic species.

TABLE 21a.1. The microwave spectrum of KrClF

Isotopic species	J',K' - J'',K''	F	F_1'	F''	F_1''	(ν_1,ν_2^l,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{82}Kr^{35}Cl^{19}F$	3, 0 - 2, 0		3/2		5/2	$(0,0^0,0)$	5654.014	(0.01)	[75034]
	3, 0 - 2, 0		3/2		3/2	$(0,0^0,0)$	5628.472	(0.01)	[75034]
$^{84}Kr^{35}Cl^{19}F$	3, 0 - 2, 0		3/2		5/2	$(0,0^0,0)$	5604.586	(0.01)	[75034]
	3, 0 - 2, 0		3/2		3/2	$(0,0^0,0)$	5579.042	(0.01)	[75034]
	4, 0 - 3, 0		5/2		3/2	$(0,0^0,0)$	7397.978	(0.01)	[75034]
$^{86}Kr^{35}Cl^{19}F$	3, 0 - 2, 0		3/2		5/2	$(0,0^0,0)$	5557.376	(0.01)	[75034]
	3, 0 - 2, 0		3/2		3/2	$(0,0^0,0)$	5531.830	(0.01)	[75034]
$^{84}Kr^{37}Cl^{19}F$	3, 0 - 2, 0		3/2		5/2	$(0,0^0,0)$	5528.710	(0.01)	[75034]
	3, 0 - 2, 0		3/2		3/2	$(0,0^0,0)$	5508.620	(0.01)	[75034]

Table 22. Rotational, centrifugal distortion and hyperfine constants for $H^{16}O^{35}Cl$.

Watson's Determinable Parameters	Value[a] (MHz)
A"	613 375(600)[c]
B"	15 118.26(8)
C"	14 726.93(8)
τ_1	-5.335(21)
τ_2	-0.223(6)
τ_3[b]	196.(16)
τ_{aaaa}	0[c]
τ_{bbbb}	-0.119(6)
τ_{cccc}	-0.0950(68)
$\chi_{aa}(^{35}Cl)$	-121.942(23)
$\chi_{bb}(^{35}Cl)$	59.511(31)
Std. dev.	0.311
No. lines	20

[a] The uncertainties quoted are one standard deviation as estimated by the least squares fit. The number of significant figures quoted are necessary to reproduce the calculated transition frequencies within their standard deviations.

[b] Strictly speaking, τ_3 is not a determinable parameter, but is calculated from τ_1, τ_2, τ_{aaaa} and τ_{bbbb} using the planarity conditions.

[c] The A rotational constant was fixed at this value from infrared measurements [67026]. Since τ_{aaaa} was indeterminable it is fixed at zero.

Table 22.1. Molecular parameters for HOCl.

Parameter	$H^{16}O^{35}Cl$	$H^{16}O^{37}Cl$	$D^{16}O^{35}Cl$	$D^{16}O^{37}Cl$	$D^{18}O^{35}Cl$	Reference
A (GHz)	a	a	332.0(10)	a	...	[71023]
B (MHz)	15 117.50(15)	14 852.52(15)	14 299.00(15)	14 037.71(15)	13 407.70(15)	[71023]
C (MHz)	14 725.04(15)	14 473.54(15)	13 674.78(15)	13 435.51(15)	12 848.76(15)	[71023]
χ_{aa}(Cl) (MHz)	-121.93(3)[b]	-96.07(5)	-121.54(8)	-95.61(15)	-121.61(2)	[71023]
χ_{bb}(Cl) (MHz)	59.50(4)[b]	46.88(6)	59.09(9)	46.62(16)	59.23(3)	[71023]
μ_a (D)	0.367(8)	...	0.412(15)	...	...	[71024]
g_I(Cl) (μ_N)	0.5490(14)					[75012]
g_{aa} (μ_N)	0.6390(55)					[75012]
g_{bb} (μ_N)	-0.0752(9)					[75012]
g_{cc} (μ_N)	-0.0616(10)					[75012]

[a] From infrared measurements A(HOCl) = 613.38(60) GHz and A(DOCl) = 332.1(10). For $H^{16}O^{35}Cl$ the centrifugal distortion terms determined were D_J = 0.0267(2) MHz and D_{JK} = 1.251(9) MHz [71023].

[b] Reference [75012].

Additional reference: [69024].

TABLE 22.2. The microwave spectrum of HOCl

Isotopic species	$J'(K'_-,K'_+)$ – $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$H^{16}O^{35}Cl$	1(0, 1) – 0(0, 0)		3/2		3/2	(0,0,0)	29818.063	(0.01)	[75012]
	1(0, 1) – 0(0, 0)		5/2		3/2	(0,0,0)	29848.586	(0.01)	[75012]
	1(0, 1) – 0(0, 0)		1/2		3/2	(0,0,0)	29872.925	(0.01)	[75012]
	2(1, 2) – 1(1, 1)		5/2		3/2	(0,0,0)	59265.229	(0.01)	[75012]
	2(1, 2) – 1(1, 1)		3/2		3/2	(0,0,0)	59276.366	(0.01)	[75012]
	2(1, 2) – 1(1, 1)		5/2		5/2	(0,0,0)	59280.108	(0.01)	[75012]
	2(1, 2) – 1(1, 1)		7/2		5/2	(0,0,0)	59295.709	(0.01)	[75012]
	2(1, 2) – 1(1, 1)		3/2		1/2	(0,0,0)	59303.141	(0.01)	[75012]
	2(1, 2) – 1(1, 1)		1/2		1/2	(0,0,0)	59318.759	(0.01)	[75012]
	2(0, 2) – 1(0, 1)		5/2		5/2	(0,0,0)	59656.181	(0.01)	[75012]
	2(0, 2) – 1(0, 1)		3/2		3/2	(0,0,0)	59708.463	(0.01)	[75012]
	2(1, 1) – 1(1, 0)		5/2		3/2	(0,0,0)	60047.144	(0.01)	[75012]
	2(1, 1) – 1(1, 0)		3/2		3/2	(0,0,0)	60057.764	(0.01)	[75012]
	2(1, 1) – 1(1, 0)		5/2		5/2	(0,0,0)	60062.733	(0.01)	[75012]
	2(1, 1) – 1(1, 0)		7/2		5/2	(0,0,0)	60077.657	(0.01)	[75012]
	2(1, 1) – 1(1, 0)		3/2		1/2	(0,0,0)	60085.880	(0.01)	[75012]
	2(1, 1) – 1(1, 0)		1/2		1/2	(0,0,0)	60100.719	(0.01)	[75012]
	3(1, 3) – 2(1, 2)					(0,0,0)	88929.96	(0.10)	[71023]
	3(2, 2) – 2(2, 1)					(0,0,0)	89494.79	(0.10)	[71023]
	3(2, 1) – 2(2, 0)					(0,0,0)	89495.62	(0.10)	[71023]
	3(0, 3) – 2(0, 2)					(0,0,0)	89524.00	(0.10)	[71023]
	3(1, 2) – 2(1, 1)					(0,0,0)	90104.26	(0.10)	[71023]
	4(0, 4) – 3(0, 3)					(0,0,0)	119361.44	(0.15)	[71023]
	5(1, 5) – 4(1, 4)					(0,0,0)	148209.22	(0.20)	[71023]
	5(2, 4) – 4(2, 3)					(0,0,0)	149148.80	(0.20)	[71023]
	5(2, 3) – 4(2, 2)					(0,0,0)	149152.50	(0.20)	[71023]
	5(0, 5) – 4(0, 4)					(0,0,0)	149195.55	(0.20)	[71023]
	5(1, 4) – 4(1, 3)					(0,0,0)	150164.12	(0.20)	[71023]
	6(2, 5) – 5(2, 4)					(0,0,0)	178971.36	(0.40)	[71023]
	6(2, 4) – 5(2, 3)					(0,0,0)	178978.08	(0.40)	[71023]
	6(0, 6) – 5(0, 5)					(0,0,0)	179025.31	(0.40)	[71023]
	6(1, 5) – 5(1, 4)					(0,0,0)	180188.59	(0.40)	[71023]
$H^{16}O^{37}Cl$	1(0, 1) – 0(0, 0)		3/2		3/2	(0,0,0)	29303.86	(0.05)	[69024]
	1(0, 1) – 0(0, 0)		5/2		3/2	(0,0,0)	29328.01	(0.05)	[69024]
	1(0, 1) – 0(0, 0)		1/2		3/2	(0,0,0)	29347.80	(0.05)	[69024]
	2(1, 2) – 1(1, 1)		5/2		3/2	(0,0,0)	58245.28	(0.06)	[71023]
	2(1, 2) – 1(1, 1)		3/2		3/2	(0,0,0)	58254.07	(0.06)	[71023]

TABLE 22.2. The microwave spectrum of HOCl—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$H^{16}O^{37}Cl$	2(1, 2) - 1(1, 1)		5/2		5/2	(0,0,0)	58256.99	(0.06)	[71023]
	2(1, 2) - 1(1, 1)		7/2		5/2	(0,0,0)	58269.30	(0.06)	[71023]
	2(1, 2) - 1(1, 1)		3/2		1/2	(0,0,0)	58275.15	(0.06)	[71023]
	2(1, 2) - 1(1, 1)		1/2		1/2	(0,0,0)	58287.44	(0.06)	[71023]
	2(1, 1) - 1(1, 0)		5/2		3/2	(0,0,0)	59000.30	(0.06)	[71023]
	2(1, 1) - 1(1, 0)		3/2		3/2	(0,0,0)	59008.66	(0.06)	[71023]
	2(1, 1) - 1(1, 0)		5/2		5/2	(0,0,0)	59012.56	(0.06)	[71023]
	2(1, 1) - 1(1, 0)		7/2		5/2	(0,0,0)	59024.38	(0.06)	[71023]
	2(1, 1) - 1(1, 0)		3/2		1/2	(0,0,0)	59030.81	(0.06)	[71023]
	2(1, 1) - 1(1, 0)		1/2		1/2	(0,0,0)	59042.51	(0.06)	[71023]
$D^{16}O^{35}Cl$	1(0, 1) - 0(0, 0)		3/2		3/2	(0,0,0)	27949.41	(0.05)	[69024]
	1(0, 1) - 0(0, 0)		5/2		3/2	(0,0,0)	27979.79	(0.05)	[69024]
	1(0, 1) - 0(0, 0)		1/2		3/2	(0,0,0)	28004.05	(0.05)	[69024]
	2(1, 2) - 1(1, 1)		5/2		3/2	(0,0,0)	55297.86	(0.06)	[71023]
	2(1, 2) - 1(1, 1)		3/2		3/2	(0,0,0)	55308.99	(0.06)	[71023]
	2(1, 2) - 1(1, 1)		5/2		5/2	(0,0,0)	55312.61	(0.06)	[71023]
	2(1, 2) - 1(1, 1)		7/2		5/2	(0,0,0)	55328.23	(0.06)	[71023]
	2(1, 2) - 1(1, 1)		3/2		1/2	(0,0,0)	55335.56	(0.06)	[71023]
	2(1, 2) - 1(1, 1)		1/2		1/2	(0,0,0)	55351.13	(0.06)	[71023]
	2(1, 1) - 1(1, 0)		5/2		3/2	(0,0,0)	56543.99	(0.06)	[71023]
	2(1, 1) - 1(1, 0)		3/2		3/2	(0,0,0)	56554.57	(0.06)	[71023]
	2(1, 1) - 1(1, 0)		5/2		5/2	(0,0,0)	56559.57	(0.06)	[71023]
	2(1, 1) - 1(1, 0)		7/2		5/2	(0,0,0)	56574.46	(0.06)	[71023]
	2(1, 1) - 1(1, 0)		3/2		1/2	(0,0,0)	56582.72	(0.06)	[71023]
	2(1, 1) - 1(1, 0)		1/2		1/2	(0,0,0)	56597.46	(0.06)	[71023]
	6(2, 5) - 5(2, 4)					(0,0,0)	167783.18	(0.40)	[71023]
	6(2, 4) - 5(2, 3)					(0,0,0)	167815.11	(0.40)	[71023]
$D^{16}O^{37}Cl$	1(0, 1) - 0(0, 0)		3/2		3/2	(0,0,0)	27453.87	(0.05)	[69024]
	1(0, 1) - 0(0, 0)		5/2		3/2	(0,0,0)	27477.98	(0.05)	[69024]
	1(0, 1) - 0(0, 0)		1/2		3/2	(0,0,0)	27497.21	(0.05)	[69024]
	2(1, 2) - 1(1, 1)		5/2		3/2	(0,0,0)	54323.80	(0.06)	[71023]
	2(1, 2) - 1(1, 1)		3/2		3/2	(0,0,0)	54332.69	(0.06)	[71023]
	2(1, 2) - 1(1, 1)		5/2		5/2	(0,0,0)	54335.57	(0.06)	[71023]
	2(1, 2) - 1(1, 1)		7/2		5/2	(0,0,0)	54347.80	(0.06)	[71023]
	2(1, 2) - 1(1, 1)		3/2		1/2	(0,0,0)	54353.67	(0.06)	[71023]
	2(1, 2) - 1(1, 1)		1/2		1/2	(0,0,0)	54365.95	(0.06)	[71023]
	2(1, 1) - 1(1, 0)		5/2		3/2	(0,0,0)	55526.04	(0.06)	[71023]
	2(1, 1) - 1(1, 0)		3/2		3/2	(0,0,0)	55534.40	(0.06)	[71023]
	2(1, 1) - 1(1, 0)		5/2		5/2	(0,0,0)	55538.35	(0.06)	[71023]
	2(1, 1) - 1(1, 0)		7/2		5/2	(0,0,0)	55550.04	(0.06)	[71023]
	2(1, 1) - 1(1, 0)		3/2		1/2	(0,0,0)	55556.41	(0.06)	[71023]
	2(1, 1) - 1(1, 0)		1/2		1/2	(0,0,0)	55567.94	(0.06)	[71023]
$D^{18}O^{35}Cl$	2(1, 2) - 1(1, 1)		5/2		3/2	(0,0,0)	51928.60	(0.06)	[71023]
	2(1, 2) - 1(1, 1)		3/2		3/2	(0,0,0)	51939.71	(0.06)	[71023]
	2(1, 2) - 1(1, 1)		5/2		5/2	(0,0,0)	51943.39	(0.06)	[71023]
	2(1, 2) - 1(1, 1)		7/2		5/2	(0,0,0)	51959.02	(0.06)	[71023]
	2(1, 2) - 1(1, 1)		3/2		1/2	(0,0,0)	51966.38	(0.06)	[71023]
	2(1, 2) - 1(1, 1)		1/2		1/2	(0,0,0)	51981.97	(0.06)	[71023]
	2(0, 2) - 1(0, 1)					(0,0,0)	52511.50	(0.06)	[71023]
	2(1, 1) - 1(1, 0)		5/2		3/2	(0,0,0)	53044.23	(0.06)	[71023]
	2(1, 1) - 1(1, 0)		3/2		3/2	(0,0,0)	53054.77	(0.06)	[71023]
	2(1, 1) - 1(1, 0)		5/2		5/2	(0,0,0)	53059.81	(0.06)	[71023]
	2(1, 1) - 1(1, 0)		7/2		5/2	(0,0,0)	53074.64	(0.06)	[71023]
	2(1, 1) - 1(1, 0)		3/2		1/2	(0,0,0)	53082.86	(0.06)	[71023]
	2(1, 1) - 1(1, 0)		1/2		1/2	(0,0,0)	53097.67	(0.06)	[71023]

Table 23. Rotational, centrifugal distortion and hyperfine constants for $^{35}ClNO$ and $^{37}ClNO$.

Watson's Determinable Parameters	$^{35}Cl^{14}N^{16}O$ Value[a] (MHz)	$^{37}Cl^{14}N^{16}O$ Value[a] (MHz)	Derived Parameters (assuming planarity conditions)	$^{35}Cl^{14}N^{16}O$ Value[a] (MHz)	$^{37}Cl^{14}N^{16}O$ Value[a] (MHz)
A''	87 374.608(96)	87 207(66)[c]	A'	87 374.596(96)	87 207(66)
B''	5 737.6537(53)	5 601.217(33)	B'	5 737.757(11)	5 601.18(25)
C''	5 376.2712(55)	5 255.947(34)	C'	5 376.261(16)	5 256.08(26)
τ_1	0.1605(6)	0.1566(35)	τ'_{bbcc}	-0.02471(14)	-0.0246(11)
τ_2	-0.01106(24)	-0.0124(28)	τ'_{ccaa}	0.206(28)	
τ_3[b]	7.01(3)	6.59(88)	τ'_{aabb}	-0.021(28)	
τ_{aaaa}	-17.23(13)	0[c]	$\tau_{aabb}(1)$	0.310(32)	
τ_{bbbb}	-0.029426(40)	-0.02750(121)	$\tau_{aabb}(2)$	0.239(16)	
τ_{cccc}	-0.021446(107)	-0.02040(95)	$\tau_{aabb}(3)$	0.239(16)	
$\chi_{aa}(Cl)$	-49.69(33)	-39.02(37)	$\tau_{abab}(1)$	-0.166(30)	
$\chi_{bb}(Cl)$	29.96(53)	23.47(57)	$\tau_{abab}(2)$	-0.099(15)	
$\chi_{cc}(Cl)$	19.73(53)	15.55(57)	$\tau_{abab}(3)$	-0.094(18)	
Std. dev.	0.197	0.350	$\Delta\tau$	$-4.8(3.2)\times10^{-4}$	0.0016(36)
No. lines	44	34			

[a] The uncertainties quoted are one standard deviation as estimated by the least squares fit. The number of significant figures quoted are necessary to reproduce the calculated transition frequencies within their standard deviations.

[b] Strictly speaking, τ_3 is not a determinable parameter, but is calculated from τ_1, τ_2, τ_{aaaa} and τ_{bbbb} using the planarity conditions.

[c] Since A'' and τ_{aaaa} are directly correlated, τ_{aaaa} had to be fixed at zero in this analysis.

Table 23.1. Rotational constants for the ground and vibrationally excited states of ClNO.

Isotopic Species	Vib. State v_1 v_2 v_3	A (MHz)	B (MHz)	C (MHz)	Reference[a]
$^{35}Cl^{14}N^{16}O$	0 0 0	87 374.43(3)	5 737.72(1)	5 376.27(1)	[75010]
	0 1 0	88 147(46)	5 715.70(2)	5 348.16(2)	[75010]
	0 0 1	87 879.64(30)	5 710.53(5)	5 349.19(3)	[75010]
$^{37}Cl^{14}N^{16}O$	0 0 0	---	5 601.25(4)	5 255.99(4)	[65007]
$^{35}Cl^{14}N^{18}O$	0 0 0	---	5 439.31(40)	5 103.17(40)	[61005]

[a] Additional references: [50015], [61004], and [75014].

Table 23.2. Hyperfine constants and dipole moment of ClNO [65007][a].

Isotopic Species	$\chi_{aa}(Cl)$ (MHz)	$\chi_{bb}(Cl)$ (MHz)	$\chi_{aa}(N)$ (MHz)	$\chi_{bb}(N)$ (MHz)	μ_a (D)
$^{35}Cl^{14}N^{16}O$	-49.18(35)	29.46(20)	1.0(4)	-4.8(2)	1.28(4)[b]
$^{37}Cl^{14}N^{16}O$	-38.89(40)	22.97(30)	1.0(4)	-4.8(2)	
$^{35}Cl^{14}N^{18}O$	-48.8[c]				

[a] The values in the table are taken from this reference unless otherwise indicated.

[b] Reference [51005].

[c] Reference [61005].

TABLE 23.3. The microwave spectrum of ClNO

Isotopic species	$J'(K'_-,K'_+)$ – $J''(K''_-,K''_+)$	F'	F_1'	F''	F_1''	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{35}Cl^{14}N^{16}O$	1(0, 1) – 0(0, 0)					(0,0,1)	11059.70	(0.05)	[75010]
	1(0, 1) – 0(0, 0)					(0,1,0)	11063.82	(0.05)	[75010]
	1(0, 1) – 0(0, 0)		3/2		3/2	(0,0,0)	11104.21	(0.03)	[65007]
	1(0, 1) – 0(0, 0)		5/2		3/2	(0,0,0)	11116.47	(0.03)	[65007]
	1(0, 1) – 0(0, 0)		1/2		3/2	(0,0,0)	11126.26	(0.03)	[65007]
	20(1,19) – 19(2,18)					(0,0,0)	13344.85	(0.05)	[75010]
	17(2,16) – 18(1,17)					(0,0,0)	15452.88	(0.05)	[75010]
	2(1, 2) – 1(1, 1)					(0,0,1)	21758.23	(0.05)	[75010]
	2(1, 2) – 1(1, 1)	5/2	5/2	3/2	3/2	(0,0,0)	21855.87	(0.03)	[65007]
	2(1, 2) – 1(1, 1)	7/2	5/2	5/2	3/2	(0,0,0)	21857.47	(0.03)	[65007]
	2(1, 2) – 1(1, 1)	3/2	5/2	1/2	3/2	(0,0,0)	21858.24	(0.03)	[65007]
	2(1, 2) – 1(1, 1)	3/2	3/2	3/2	3/2	(0,0,0)	21859.97	(0.03)	[65007]
	2(1, 2) – 1(1, 1)	5/2	3/2	5/2	3/2	(0,0,0)	21861.00	(0.03)	[65007]
	2(1, 2) – 1(1, 1)	7/2	5/2	7/2	5/2	(0,0,0)	21864.38	(0.03)	[65007]
	2(1, 2) – 1(1, 1)	5/2	5/2	5/2	5/2	(0,0,0)	21865.00	(0.03)	[65007]
	2(1, 2) – 1(1, 1)	9/2	7/2	7/2	5/2	(0,0,0)	21869.65	(0.03)	[65007]
	2(1, 2) – 1(1, 1)		3/2		1/2	(0,0,0)	21874.26	(0.03)	[65007]
	2(1, 2) – 1(1, 1)		1/2		1/2	(0,0,0)	21879.18	(0.03)	[65007]
	2(0, 2) – 1(0, 1)		3/2		1/2	(0,0,1)	22106.31	(0.20)	[51005]
	2(0, 2) – 1(0, 1)		5/2		5/2	(0,0,1)	22106.31	(0.20)	[51005]
	2(0, 2) – 1(0, 1)		5/2		3/2	(0,0,1)	22118.93	(0.10)	[51005]
	2(0, 2) – 1(0, 1)		7/2		5/2	(0,0,1)	22118.93	(0.10)	[51005]
	2(0, 2) – 1(0, 1)		3/2		3/2	(0,0,1)	22126.81	(0.20)	[51005]
	2(0, 2) – 1(0, 1)		5/2		5/2	(0,0,0)	22215.08	(0.10)	[51005]
	2(0, 2) – 1(0, 1)		3/2		1/2	(0,0,0)	22215.08	(0.10)	[51005]
	2(0, 2) – 1(0, 1)		5/2		3/2	(0,0,0)	22227.37	(0.10)	[51005]
	2(0, 2) – 1(0, 1)		7/2		5/2	(0,0,0)	22227.37	(0.10)	[51005]
	2(0, 2) – 1(0, 1)		3/2		3/2	(0,0,0)	22236.45	(0.10)	[51005]
	2(1, 1) – 1(1, 0)		5/2		3/2	(0,0,1)	22471.6	(0.30)	[51005]
	2(1, 1) – 1(1, 0)		3/2		3/2	(0,0,1)	22476.2	(0.30)	[51005]
	2(1, 1) – 1(1, 0)		5/2		5/2	(0,0,1)	22476.2	(0.30)	[51005]
	2(1, 1) – 1(1, 0)		7/2		5/2	(0,0,1)	22483.7	(0.30)	[51005]
	2(1, 1) – 1(1, 0)		3/2		1/2	(0,0,1)	22483.7	(0.30)	[51005]
	2(1, 1) – 1(1, 0)	3/2	5/2	1/2	3/2	(0,0,0)	22578.87	(0.03)	[65007]
	2(1, 1) – 1(1, 0)	7/2	5/2	5/2	3/2	(0,0,0)	22579.82	(0.03)	[65007]
	2(1, 1) – 1(1, 0)	5/2	5/2	3/2	3/2	(0,0,0)	22580.87	(0.03)	[65007]
	2(1, 1) – 1(1, 0)	9/2	7/2	7/2	5/2	(0,0,0)	22592.27	(0.03)	[65007]
	2(1, 1) – 1(1, 0)	7/2	7/2	5/2	5/2	(0,0,0)	22592.87	(0.03)	[65007]
	2(1, 1) – 1(1, 0)		3/2		1/2	(0,0,0)	22594.45	(0.03)	[65007]
	2(1, 1) – 1(1, 0)		1/2		1/2	(0,0,0)	22602.01	(0.03)	[65007]
	9(0, 9) – 8(1, 8)					(0,0,0)	24355.32	(0.05)	[75010]
	21(1,20) – 20(2,19)					(0,0,0)	27956.94	(0.05)	[75010]
	16(2,15) – 17(1,16)					(0,0,0)	29630.44	(0.05)	[75010]
	3(1, 3) – 2(1, 2)					(0,0,1)	32636.40	(0.05)	[75010]
	3(1, 3) – 2(1, 2)					(0,1,0)	32639.52	(0.05)	[75010]
	3(0, 3) – 2(0, 2)					(0,0,1)	33173.66	(0.05)	[75010]
	3(1, 2) – 2(1, 1)					(0,0,1)	33719.94	(0.05)	[75010]
	3(1, 2) – 2(1, 1)					(0,1,0)	33742.14	(0.05)	[75010]
	10(0,10) – 9(1, 9)					(0,0,1)	35842.66	(0.05)	[75010]
	3(1, 3) – 4(0, 4)					(0,0,0)	36292.56	(0.05)	[75010]
	10(0,10) – 9(1, 9)					(0,0,0)	36923.53	(0.05)	[75010]
	3(1, 3) – 4(0, 4)					(0,0,1)	37047.15	(0.05)	[75010]
	15(2,14) – 16(1,15)					(0,0,0)	43655.62	(0.05)	[75010]
	14(2,13) – 15(1,14)					(0,0,0)	57525.10	(0.05)	[75010]
	4(1, 3) – 4(0, 4)					(0,0,0)	83635.88	(0.05)	[75010]
	5(1, 4) – 5(0, 5)					(0,0,0)	84558.29	(0.05)	[75010]
	6(1, 5) – 6(0, 6)					(0,0,0)	85675.04	(0.05)	[75010]
	8(1, 8) – 7(1, 7)					(0,0,0)	87431.86	(0.20)	[62018]
	8(0, 8) – 7(0, 7)					(0,0,0)	88798.72	(0.20)	[62018]
	8(2, 7) – 7(2, 6)					(0,0,0)	88888.52	(0.20)	[62018]
	8(2, 6) – 7(2, 5)					(0,0,0)	88988.56	(0.20)	[62018]
	8(1, 7) – 7(1, 6)					(0,0,0)	90320.40	(0.20)	[62018]
	10(1, 9) – 10(0,10)					(0,0,0)	92200.78	(0.05)	[75010]
	1(1, 1) – 0(0, 0)					(0,0,0)	92746.50	(0.05)	[75010]
	9(1, 9) – 8(1, 8)					(0,0,0)	98350.06	(0.20)	[62018]

TABLE 23.3. The microwave spectrum of ClNO—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{35}Cl^{14}N^{16}O$	9(2, 8) - 8(2, 7)					(0,0,0)	99990.06	(0.20)	[62018]
	9(6, 4) - 8(6, 3)					(0,0,0)	100052.27	(0.20)	[62018]
	9(6, 3) - 8(6, 2)					(0,0,0)	100052.27	(0.20)	[62018]
	9(7, 3) - 8(7, 2)					(0,0,0)	100064.64	(0.20)	[62018]
	9(7, 2) - 8(7, 1)					(0,0,0)	100064.64	(0.20)	[62018]
	9(8, 2) - 8(8, 1)					(0,0,0)	100079.27	(0.20)	[62018]
	9(8, 1) - 8(8, 0)					(0,0,0)	100079.27	(0.20)	[62018]
	9(2, 7) - 8(2, 6)					(0,0,0)	100133.59	(0.20)	[62018]
	9(1, 8) - 8(1, 7)					(0,0,0)	101598.50	(0.20)	[62018]
	10(1,10) - 9(1, 9)					(0,0,0)	109264.40	(0.20)	[62018]
	10(0,10) - 9(0, 9)					(0,0,0)	110918.30	(0.20)	[62018]
	10(2, 9) - 9(2, 8)					(0,0,0)	111089.48	(0.20)	[62018]
	10(6, 5) - 9(6, 4)					(0,0,0)	111165.33	(0.20)	[62018]
	10(6, 4) - 9(6, 3)					(0,0,0)	111165.33	(0.20)	[62018]
	10(7, 4) - 9(7, 3)					(0,0,0)	111178.90	(0.20)	[62018]
	10(7, 3) - 9(7, 2)					(0,0,0)	111178.90	(0.20)	[62018]
	10(8, 3) - 9(8, 2)					(0,0,0)	111194.97	(0.20)	[62018]
	10(8, 2) - 9(8, 1)					(0,0,0)	111194.97	(0.20)	[62018]
	10(2, 8) - 9(2, 7)					(0,0,0)	111286.13	(0.20)	[62018]
	10(1, 9) - 9(1, 8)					(0,0,0)	112872.20	(0.20)	[62018]
	12(1,12) - 11(1,11)					(0,0,0)	131080.00	(0.25)	[66012]
	12(2,11) - 11(2,10)					(0,1,0)	132673.83	(0.05)	[75010]
	12(2,10) - 11(2, 9)					(0,1,0)	133021.15	(0.05)	[75010]
	12(2,11) - 11(2,10)					(0,0,0)	133276.96	(0.10)	[75010]
	12(3,10) - 11(3, 9)					(0,0,0)	133380.76	(0.10)	[75010]
	12(3, 9) - 11(3, 8)					(0,0,0)	133385.67	(0.10)	[75010]
	12(2,10) - 11(2, 9)					(0,0,0)	133616.32	(0.10)	[75010]
	12(1,11) - 11(1,10)					(0,0,0)	135404.88	(0.25)	[66012]
	13(2,12) - 12(2,11)					(0,0,0)	144364.43	(0.10)	[75010]
	13(9, 5) - 12(9, 4)					(0,0,0)	144556.90	(0.25)	[66012]
	13(9, 4) - 12(9, 3)					(0,0,0)	144556.90	(0.25)	[66012]
	13(10, 4) - 12(10, 3)					(0,0,0)	144582.74	(0.25)	[66012]
	13(10, 3) - 12(10, 2)					(0,0,0)	144582.74	(0.25)	[66012]
	13(2,11) - 12(2,10)					(0,0,0)	144795.31	(0.10)	[75010]
	13(1,12) - 12(1,11)					(0,0,0)	146662.61	(0.25)	[66012]
	18(1,18) - 17(1,17)					(0,0,0)	196399.58	(0.40)	[66012]
$^{37}Cl^{14}N^{16}O$	1(0, 1) - 0(0, 0)		3/2		3/2	(0,0,0)	10849.42	(0.03)	[65007]
	1(0, 1) - 0(0, 0)		5/2		3/2	(0,0,0)	10859.10	(0.03)	[65007]
	1(0, 1) - 0(0, 0)		1/2		3/2	(0,0,0)	10866.82	(0.03)	[65007]
	2(1, 2) - 1(1, 1)	5/2	5/2	3/2	3/2	(0,0,0)	21360.28	(0.03)	[65007]
	2(1, 2) - 1(1, 1)	7/2	5/2	5/2	3/2	(0,0,0)	21361.95	(0.03)	[65007]
	2(1, 2) - 1(1, 1)	9/2	7/2	7/2	5/2	(0,0,0)	21371.49	(0.03)	[65007]
	2(1, 2) - 1(1, 1)		3/2		1/2	(0,0,0)	21375.13	(0.03)	[65007]
	2(1, 2) - 1(1, 1)		1/2		1/2	(0,0,0)	21379.11	(0.03)	[65007]
	2(0, 2) - 1(0, 1)		5/2		5/2	(0,0,0)	21703.77	(0.10)	[51005]
	2(0, 2) - 1(0, 1)		3/2		1/2	(0,0,0)	21703.77	(0.10)	[51005]
	2(0, 2) - 1(0, 1)		5/2		3/2	(0,0,0)	21713.25	(0.10)	[51005]
	2(0, 2) - 1(0, 1)		7/2		5/2	(0,0,0)	21713.25	(0.10)	[51005]
	2(0, 2) - 1(0, 1)		3/2		3/2	(0,0,0)	21719.68	(0.20)	[51005]
	2(1, 1) - 1(1, 0)	7/2	5/2	5/2	3/2	(0,0,0)	22052.07	(0.03)	[65007]
	2(1, 1) - 1(1, 0)	5/2	5/2	3/2	3/2	(0,0,0)	22052.92	(0.03)	[65007]
	2(1, 1) - 1(1, 0)	9/2	7/2	7/2	5/2	(0,0,0)	22061.87	(0.03)	[65007]
	2(1, 1) - 1(1, 0)		3/2		1/2	(0,0,0)	22063.66	(0.03)	[65007]
	2(1, 1) - 1(1, 0)		1/2		1/2	(0,0,0)	22069.83	(0.03)	[65007]
	8(1, 7) - 7(1, 6)					(0,0,0)	88204.20	(0.20)	[62018]
	9(1, 9) - 8(1, 8)					(0,0,0)	96114.77	(0.20)	[62018]
	9(2, 8) - 8(2, 7)					(0,0,0)	97681.97	(0.20)	[62018]
	9(5, 5) - 8(5, 4)					(0,0,0)	97730.94	(0.20)	[62018]
	9(5, 4) - 8(5, 3)					(0,0,0)	97730.94	(0.20)	[62018]
	9(6, 4) - 8(6, 3)					(0,0,0)	97740.60	(0.20)	[62018]
	9(6, 3) - 8(6, 2)					(0,0,0)	97740.60	(0.20)	[62018]
	9(7, 3) - 8(7, 2)					(0,0,0)	97753.00	(0.20)	[62018]
	9(7, 2) - 8(7, 1)					(0,0,0)	97753.00	(0.20)	[62018]
	9(1, 8) - 8(1, 7)					(0,0,0)	99218.76	(0.20)	[62018]
	10(1,10) - 9(1, 9)					(0,0,0)	106781.56	(0.20)	[62018]

TABLE 23.3. The microwave spectrum of ClNO—Continued

Isotopic species	$J'(K'_-,K'_+)$ – $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{37}Cl^{14}N^{16}O$	10(5, 6) – 9(5, 5)					(0,0,0)	108586.82	(0.20)	[62018]
	10(5, 5) – 9(5, 4)					(0,0,0)	108586.82	(0.20)	[62018]
	10(6, 5) – 9(6, 4)					(0,0,0)	108597.08	(0.20)	[62018]
	10(6, 4) – 9(6, 3)					(0,0,0)	108597.08	(0.20)	[62018]
	10(7, 4) – 9(7, 3)					(0,0,0)	108610.30	(0.20)	[62018]
	10(7, 3) – 9(7, 2)					(0,0,0)	108610.30	(0.20)	[62018]
	10(8, 3) – 9(8, 2)					(0,0,0)	108626.05	(0.20)	[62018]
	10(8, 2) – 9(8, 1)					(0,0,0)	108626.05	(0.20)	[62018]
	10(1, 9) – 9(1, 8)					(0,0,0)	110229.19	(0.20)	[62018]
	11(6, 6) – 10(6, 5)					(0,0,0)	119452.51	(0.25)	[62018]
	11(6, 5) – 10(6, 4)					(0,0,0)	119452.51	(0.25)	[62018]
	11(7, 5) – 10(7, 4)					(0,0,0)	119466.88	(0.25)	[62018]
	11(7, 4) – 10(7, 3)					(0,0,0)	119466.88	(0.25)	[62018]
	11(8, 4) – 10(8, 3)					(0,0,0)	119484.08	(0.25)	[62018]
	11(8, 3) – 10(8, 2)					(0,0,0)	119484.08	(0.25)	[62018]
	14(1,14) – 13(1,13)					(0,0,0)	149406.94	(0.30)	[66012]
	14(0,14) – 13(0,13)					(0,0,0)	151443.76	(0.30)	[66012]
	14(1,13) – 13(1,12)					(0,0,0)	154221.52	(0.30)	[66012]
	15(0,15) – 14(0,14)					(0,0,0)	162174.37	(0.30)	[66012]
	15(1,15) – 14(1,14)					(0,0,0)	160051.15	(0.30)	[66012]
$^{35}Cl^{14}N^{18}O$	1(0, 1) – 0(0, 0)		3/2		3/2	(0,0,0)	10532.72	(0.10)	[61005]
	1(0, 1) – 0(0, 0)		5/2		3/2	(0,0,0)	10544.88	(0.10)	[61005]
	3(1, 3) – 2(1, 2)		7/2		5/2	(0,0,0)	31121.14	(0.20)	[61005]
	3(1, 3) – 2(1, 2)		5/2		3/2	(0,0,0)	31121.14	(0.20)	[61005]
	3(1, 3) – 2(1, 2)		9/2		7/2	(0,0,0)	31123.80	(0.20)	[61005]
	3(1, 3) – 2(1, 2)		5/2		5/2	(0,0,0)	31123.80	(0.20)	[61005]
	3(1, 3) – 2(1, 2)		3/2		1/2	(0,0,0)	31123.80	(0.20)	[61005]
	3(0, 3) – 2(0, 2)		7/2		7/2	(0,0,0)	31611.34	(0.20)	[61005]
	3(0, 3) – 2(0, 2)		3/2		5/2	(0,0,0)	31620.48	(0.20)	[61005]
	3(0, 3) – 2(0, 2)		3/2		1/2	(0,0,0)	31620.48	(0.20)	[61005]
	3(0, 3) – 2(0, 2)		9/2		7/2	(0,0,0)	31623.50	(0.20)	[61005]
	3(0, 3) – 2(0, 2)		7/2		5/2	(0,0,0)	31623.50	(0.20)	[61005]
	3(0, 3) – 2(0, 2)		5/2		5/2	(0,0,0)	31628.97	(0.20)	[61005]
	3(0, 3) – 2(0, 2)		3/2		3/2	(0,0,0)	31632.28	(0.20)	[61005]
	3(1, 2) – 2(1, 1)		7/2		5/2	(0,0,0)	32129.17	(0.20)	[61005]
	3(1, 2) – 2(1, 1)		5/2		3/2	(0,0,0)	32129.17	(0.20)	[61005]
	3(1, 2) – 2(1, 1)		9/2		7/2	(0,0,0)	32132.36	(0.20)	[61005]
	3(2, 1) – 2(2, 0)		5/2		5/2	(0,0,0)	31623.50	(0.20)	[61005]
	3(2, 1) – 2(2, 0)		3/2		5/2	(0,0,0)	31623.50	(0.20)	[61005]
	3(2, 1) – 2(2, 0)		5/2		3/2	(0,0,0)	31632.28	(0.20)	[61005]
	3(2, 1) – 2(2, 0)		3/2		3/2	(0,0,0)	31632.28	(0.20)	[61005]
	3(2, 1) – 2(2, 0)		7/2		5/2	(0,0,0)	31632.28	(0.20)	[61005]

Table 24. Rotational and centrifugal distortion constants for $^{14}N^{32}S^{35}Cl$.

Watson's Determinable Parameters	Value[a] this work (MHz)	Value [72045]
A"	41 723.36(14)	41 723.34(16)
B"	4 114.1091(238)	4 114.154(26)
C"	3 738.5576(225)	3 738.605(21)
τ_1	0.1986(314)	....
τ_2	$0.9526(2940)\times10^{-2}$	....
τ_3[b]	0.9(2)	....
τ_{aaaa}	-7.071(284)	-6.99(30)
τ_{bbbb}	-0.01074(110)	-0.0110(13)
τ_{cccc}	$-5.358(1010)\times10^{-3}$	....
Std. dev.	0.364[c]	
No. lines	28	
Derived Parameters (assuming planarity conditions)		
A'	41 723.36(14)	
B'	4 114.140(34)	
C'	3 738.630(50)	
τ'_{bbcc}	-0.00772(92)	
τ'_{ccaa}	0.061(53)	
τ'_{aabb}	0.145(69)	
$\tau_{aabb}(1)$	0.144(62)	
$\tau_{aabb}(2)$	0.183(20)	0.176(14)
$\tau_{aabb}(3)$	0.183(20)	
$\tau_{abab}(1)$	0.0008(638)	
$\tau_{abab}(2)$	-0.0356(95)	-0.0334(68)
$\tau_{abab}(3)$	-0.0389(153)	
$\Delta\tau$	$0.54(105)\times10^{-3}$	

[a] The uncertainties quoted are one standard deviation as estimated by the least squares fit. The number of significant figures quoted are necessary to reproduce the calculated transition frequencies within their standard deviations.

[b] Strictly speaking, τ_3 is not a determinable parameter, but is calculated from τ_1, τ_2, τ_{aaaa} and τ_{bbbb} using the planarity conditions.

[c] Convergence was relatively slow and the $5_{1,4}-5_{0,5}$ deviates by -0.87 MHz as found in [72045].

Table 24.1. Rotational constants, hyperfine constants and electric dipole moment for NSCl [70021].

Isotopic Species	Vib. State v_1 v_2 v_3	A (MHz)	B (MHz)	C (MHz)	χ_{aa} (Cl) (MHz)	χ_{bb} (Cl) (MHz)	χ_{cc} (Cl) (MHz)
$^{14}N^{32}S^{35}Cl$	0 0 0	41 723.36[a]	4 114.109[a]	3 738.558[a]	-39.1	23.8	15.3
	0 1 0	41 835.87	4 097.62	3 722.47			
	0 0 1	42 436.12	4 104.81	3 726.52			
$^{14}N^{32}S^{37}Cl$	0 0 0	41 623.10	3 997.51	3 641.10			
$^{14}N^{34}S^{35}Cl$	0 0 0	40 583.07	4 079.15	3 700.26			
$^{15}N^{32}S^{35}Cl$	0 0 0	40 355.96	4 019.65	3 649.36	-38.51	23.51	15.00

Electric dipole moment for $^{15}N^{32}S^{35}Cl$ [72045]:

μ_a = 0.5645(85) D; μ_b = 1.747(35) D

[a] See Table 24 for centrifugal distortion analysis.

TABLE 24.2. The microwave spectrum of NSCl

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(v_1,v_2,v_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{14}N^{32}S^{35}Cl$	6(0, 6) - 5(1, 5)					(0,0,0)	11958.30	(0.20)	[72045]
	19(2,17) - 20(1,20)					(0,0,0)	12877.96	(0.20)	[72045]
	2(1, 2) - 3(0, 3)					(0,0,0)	13687.89	(0.20)	[72045]
	18(2,16) - 19(1,19)					(0,0,0)	13994.59	(0.20)	[72045]
	10(2, 9) - 11(1,10)					(0,0,0)	14923.31	(0.20)	[72045]
	14(1,13) - 13(2,12)					(0,0,0)	15490.03	(0.20)	[72045]
	17(2,15) - 18(1,18)					(0,0,0)	15665.16	(0.20)	[72045]
	16(2,14) - 17(1,17)					(0,0,0)	17872.57	(0.20)	[72045]
	15(2,13) - 16(1,16)					(0,0,0)	20594.13	(0.20)	[72045]
	7(0, 7) - 6(1, 6)					(0,0,0)	20801.36	(0.20)	[72045]
	1(1, 1) - 2(0, 2)					(0,0,0)	21904.86	(0.20)	[72045]
	14(2,12) - 15(1,15)					(0,0,0)	23807.70	(0.20)	[72045]
	9(2, 8) - 10(1, 9)					(0,0,0)	24744.92	(0.20)	[72045]
	15(1,14) - 14(2,13)					(0,0,0)	25920.70	(0.20)	[72045]
	13(2,11) - 14(1,14)					(0,0,0)	27486.13	(0.20)	[72045]
	8(0, 8) - 7(1, 7)					(0,0,0)	29768.26	(0.20)	[72045]
	12(2,10) - 13(1,13)					(0,0,0)	31601.97	(0.20)	[72045]
	1(1, 0) - 1(0, 1)					(0,0,0)	37983.1	(0.20)	[70021]
	3(1, 2) - 3(0, 3)					(0,1,0)	38063.51	(0.30)	[70021]
	1(1, 0) - 1(0, 1)					(0,1,0)	38113.5	(0.30)	[70021]
	2(1, 1) - 2(0, 2)					(0,0,0)	38361.72	(0.20)	[70021]
	2(1, 1) - 2(0, 2)					(0,1,0)	38491.68	(0.30)	[70021]
	1(1, 0) - 1(0, 1)					(0,0,1)	38710.1	(0.50)	[70021]
	3(1, 2) - 3(0, 3)					(0,0,0)	38934.40	(0.20)	[70021]
	3(1, 2) - 3(0, 3)					(0,0,1)	39667.20	(0.50)	[70021]
	4(1, 3) - 4(0, 4)					(0,0,0)	39708.73	(0.20)	[70021]
	4(1, 3) - 4(0, 4)					(0,1,0)	39836.42	(0.30)	[70021]
	2(1, 1) - 2(0, 2)					(0,0,2)	39851.5	(0.50)	[70021]
	3(1, 2) - 3(0, 3)					(0,0,2)	40432.7	(0.50)	[70021]
	4(1, 3) - 4(0, 4)					(0,0,1)	40446.28	(0.50)	[70021]
	5(1, 4) - 5(0, 5)					(0,0,0)	40690.41	(0.20)	[70021]
	5(1, 4) - 5(0, 5)					(0,1,0)	40817.81	(0.30)	[70021]
	5(1, 4) - 5(0, 5)					(0,2,0)	40945.2	(0.50)	[70021]
	5(1, 4) - 5(0, 5)					(0,0,1)	41434.95	(0.50)	[70021]
	6(1, 5) - 6(0, 6)					(0,0,0)	41893.52	(0.20)	[70021]
	6(1, 5) - 6(0, 6)					(0,1,0)	42017.41	(0.30)	[70021]
	6(1, 5) - 6(0, 6)					(0,2,0)	42144.6	(0.50)	[70021]
	6(1, 5) - 6(0, 6)					(0,0,1)	42643.33	(0.50)	[70021]
	7(1, 6) - 7(0, 7)					(0,0,0)	43327.0	(0.20)	[70021]
	8(1, 7) - 8(0, 8)					(0,0,0)	45005.0	(0.20)	[70021]

TABLE 24.2. The microwave spectrum of NSCl—Continued

Isotopic species	$J'(K'_-,K'_+)$ – $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{14}N^{32}S^{35}Cl$	1(1, 1) – 0(0, 0)					(0,0,0)	45460.22	(0.20)	[70021]
	1(1, 1) – 0(0, 0)					(0,1,0)	45558.33	(0.30)	[70021]
	1(1, 1) – 0(0, 0)					(0,0,1)	46162.64	(0.50)	[70021]
	2(1, 2) – 1(0, 1)					(0,0,0)	52937.9	(0.20)	[70021]
	2(1, 2) – 1(0, 1)					(0,1,0)	53003.4	(0.30)	[70021]
	3(1, 3) – 2(0, 2)					(0,0,0)	60228.4	(0.20)	[70021]
$^{14}N^{32}S^{37}Cl$	1(1, 1) – 2(0, 2)					(0,0,0)	22349.7	(0.20)	[70021]
	2(1, 1) – 2(0, 2)					(0,0,0)	38340.96	(0.20)	[70021]
	3(1, 2) – 3(0, 3)					(0,0,0)	38883.77	(0.20)	[70021]
	4(1, 3) – 4(0, 4)					(0,0,0)	39617.16	(0.20)	[70021]
	5(1, 4) – 5(0, 5)					(0,0,0)	40546.83	(0.20)	[70021]
	6(1, 5) – 6(0, 6)					(0,0,0)	41683.50	(0.20)	[70021]
	7(1, 6) – 7(0, 7)					(0,0,0)	43037.7	(0.20)	[70021]
	8(1, 7) – 8(0, 8)					(0,0,0)	44620.9	(0.20)	[70021]
	1(1, 1) – 0(0, 0)					(0,0,0)	45264.20	(0.20)	[70021]
	2(1, 2) – 1(0, 1)					(0,0,0)	52546.4	(0.20)	[70021]
	3(1, 3) – 2(0, 2)					(0,0,0)	59651.8	(0.20)	[70021]
$^{14}N^{34}S^{35}Cl$	1(1, 0) – 1(0, 1)					(0,0,0)	36886.0	(0.30)	[70021]
	2(1, 1) – 2(0, 2)					(0,0,0)	37264.42	(0.30)	[70021]
	3(1, 2) – 3(0, 3)					(0,0,0)	37842.35	(0.30)	[70021]
	4(1, 3) – 4(0, 4)					(0,0,0)	38624.08	(0.30)	[70021]
	7(1, 6) – 7(0, 7)					(0,0,0)	42282.5	(0.30)	[70021]
	8(1, 7) – 8(0, 8)					(0,0,0)	43982.2	(0.30)	[70021]
	1(1, 1) – 0(0, 0)					(0,0,0)	44283.33	(0.30)	[70021]
$^{15}N^{32}S^{35}Cl$	1(1, 1) – 2(0, 2)					(0,0,0)	21001.94	(0.20)	[70021]
	1(1, 0) – 1(0, 1)		1/2		1/2	(0,0,0)	36693.34	(0.10)	[70021]
	1(1, 0) – 1(0, 1)		3/2		1/2	(0,0,0)	36699.75	(0.10)	[70021]
	1(1, 0) – 1(0, 1)		5/2		5/2	(0,0,0)	36704.00	(0.10)	[70021]
	1(1, 0) – 1(0, 1)		3/2		5/2	(0,0,0)	36707.80	(0.10)	[70021]
	1(1, 0) – 1(0, 1)		1/2		3/2	(0,0,0)	36710.90	(0.10)	[70021]
	1(1, 0) – 1(0, 1)		5/2		3/2	(0,0,0)	36713.60	(0.10)	[70021]
	1(1, 0) – 1(0, 1)		3/2		3/2	(0,0,0)	36717.49	(0.10)	[70021]
	2(1, 1) – 2(0, 2)		3/2		1/2	(0,0,0)	37070.32	(0.10)	[70021]
	2(1, 1) – 2(0, 2)		5/2		7/2	(0,0,0)	37072.92	(0.10)	[70021]
	2(1, 1) – 2(0, 2)		5/2		3/2	(0,0,0)	37075.83	(0.10)	[70021]
	2(1, 1) – 2(0, 2)		7/2		7/2	(0,0,0)	37078.83	(0.10)	[70021]
	2(1, 1) – 2(0, 2)		3/2		3/2	(0,0,0)	37079.90	(0.10)	[70021]
	2(1, 1) – 2(0, 2)		5/2		5/2	(0,0,0)	37082.59	(0.10)	[70021]
	2(1, 1) – 2(0, 2)		1/2		3/2	(0,0,0)	37085.77	(0.10)	[70021]
	2(1, 1) – 2(0, 2)		3/2		5/2	(0,0,0)	37086.85	(0.10)	[70021]
	2(1, 1) – 2(0, 2)		7/2		5/2	(0,0,0)	37088.55	(0.10)	[70021]
	3(1, 2) – 3(0, 3)		5/2		3/2	(0,0,0)	37635.40	(0.10)	[70021]
	3(1, 2) – 3(0, 3)		7/2		9/2	(0,0,0)	37636.03	(0.10)	[70021]
	3(1, 2) – 3(0, 3)		7/2		5/2	(0,0,0)	37641.09	(0.10)	[70021]
	3(1, 2) – 3(0, 3)		3/2		3/2	(0,0,0)	37643.66	(0.10)	[70021]
	3(1, 2) – 3(0, 3)		9/2		9/2	(0,0,0)	37644.24	(0.10)	[70021]
	3(1, 2) – 3(0, 3)		5/2		5/2	(0,0,0)	37645.01	(0.10)	[70021]
	3(1, 2) – 3(0, 3)		7/2		7/2	(0,0,0)	37645.61	(0.10)	[70021]
	3(1, 2) – 3(0, 3)		5/2		7/2	(0,0,0)	37649.44	(0.10)	[70021]
	3(1, 2) – 3(0, 3)		3/2		5/2	(0,0,0)	37653.29	(0.10)	[70021]
	3(1, 2) – 3(0, 3)		9/2		7/2	(0,0,0)	37653.90	(0.10)	[70021]
	5(1, 4) – 5(0, 5)					(0,0,0)	39377.21	(0.20)	[70021]
	6(1, 5) – 6(0, 6)					(0,0,0)	40563.54	(0.20)	[70021]
	7(1, 6) – 7(0, 7)					(0,0,0)	41987.25	(0.20)	[70021]
	1(1, 1) – 0(0, 0)		1/2		3/2	(0,0,0)	43999.36	(0.10)	[70021]
	1(1, 1) – 0(0, 0)		5/2		3/2	(0,0,0)	44004.15	(0.10)	[70021]
	1(1, 1) – 0(0, 0)		3/2		3/2	(0,0,0)	44010.10	(0.10)	[70021]
	2(1, 2) – 1(0, 1)		3/2		1/2	(0,0,0)	51294.70	(0.10)	[70021]
	2(1, 2) – 1(0, 1)		5/2		5/2	(0,0,0)	51299.40	(0.10)	[70021]
	2(1, 2) – 1(0, 1)		7/2		5/2	(0,0,0)	51303.20	(0.10)	[70021]
	2(1, 2) – 1(0, 1)		5/2		3/2	(0,0,0)	51309.10	(0.10)	[70021]
	2(1, 2) – 1(0, 1)		3/2		3/2	(0,0,0)	51311.84	(0.10)	[70021]
	3(1, 3) – 2(0, 2)		3/2		1/2	(0,0,0)	58414.00	(0.10)	[70021]
	3(1, 3) – 2(0, 2)		9/2		7/2	(0,0,0)	58417.70	(0.10)	[70021]
	3(1, 3) – 2(0, 2)		7/2		5/2	(0,0,0)	58421.40	(0.10)	[70021]
	3(1, 3) – 2(0, 2)		5/2		5/2	(0,0,0)	58424.08	(0.10)	[70021]

Table 25. Molecular parameters for ClO_2 (MHz).

Parameter	$^{16}O^{35}Cl^{16}O$ (0,0,0)	$^{16}O^{35}Cl^{16}O$ (0,1,0)	$^{16}O^{37}Cl^{16}O$	$^{16}O^{35}Cl^{18}O$
Rotation				
A	52 079.5	53 078.9(20)	50 736.37	50 580.9
B	9 952.23	9 943.58(6)	9 953.03	9 379.6
C	8 333.99	8 310.30(60)	8 299.07	7 891.7
[Ref.]	[62007][a]	[70022]	[62007][a]	[62005]
Spin-rotation				
A_s	-1 387.1(4)	-1 375.2(4)	-1 352.3	-1 341.8
B_s	-216.7(2)	-217.4(2)	-216.7	-202.4
C_s	4.4(2)	4.1(2)	4.6	4.3
[Ref.]	[70022]	[70022]	[62005]	[62005]
Hyperfine Structure				
O_s	-533.6		-521.4	-513.3
$(aa)_s$	-855.0		-830.9	-828.5
$(bb)_s$	316.9		304.7	310.9
$(cc)_s$	538.1		526.2	517.6
O_I	46.21		38.48	
$(aa)_I$	-77.87		-64.87	
$(bb)_I$	-83.09		-69.02	
$(cc)_I$	160.96		133.89	
$(aa)_Q$	-8.65		-6.82	
$(bb)_Q$	0.38		0.44	
$(cc)_Q$	8.27		6.38	
[Ref.]	[62005]		[62005]	[62005]
Electric dipole moment				
μ_b (D)	1.784(10)			
[Ref.]	[62008]			

[a] See Table 25.1 for centrifugal distortion analysis.

Additional references: [62003], [62004], [62006], [62009], [71025].

Table 25.1. Rotational and centrifugal distortion constants for ClO_2 (MHz).

Watson's Determinable Parameters	$^{35}ClO_2$ Present work[a]	$^{35}ClO_2$ Pillai and Curl [62007][c]	$^{37}ClO_2$ Pillai and Curl [62007]
A''	52 080.852(469)	52 079.5	50 736.37
B''	9 952.4807(1186)	9 952.23	9 953.03
C''	8 333.9733(936)	8 333.99	8 299.07
τ_1	0.37729(11044)		
τ_2	0.03098(1774)		
τ_3[b]	0.77(35)		
τ_{aaaa}	-7.7740(963)	-7.4308	-7.0525
τ_{bbbb}	-0.052405(7226)	-0.05151	-0.05151
τ_{cccc}	-0.01365(468)		
Std. dev.	0.825	2.5	0.4
No. lines fit	18		
Derived Parameters (assuming planarity conditions)			
A'	52 080.84(46)		
B'	9 952.53(11)		
C'	8 334.12(9)		
τ'_{bbcc}	-0.0258(63)		
τ'_{ccaa}	0.100(31)		
τ'_{aabb}	0.303(73)		
$\tau_{aabb}(1)$	0.429(48)		
$\tau_{aabb}(2)$	0.481(36)	0.3924	0.3824
$\tau_{aabb}(3)$	0.481(36)		
$\tau_{abab}(1)$	-0.063(13)		
$\tau_{abab}(2)$	-0.108(33)	-0.06051	-0.06001
$\tau_{abab}(3)$	-0.115(37)		
$\Delta\tau$	0.00190(96)		

[a] The uncertainties quoted are one standard deviation as estimated by the least squares fit. The number of significant figures quoted are necessary to reporduce the calculated transition frequencies within their standard

[b] Strictly speaking, τ_3 is not a determinable parameter, but is calculated from τ_1, τ_2, τ_{aaaa} and τ_{bbbb} using the planarity conditions.

[c] Combined infrared and microwave fit. See least-squares method of [62007] for comparison to present results.

TABLE 25.2. The microwave spectrum of ClO_2

Isotopic species	$N'(K'_-,K'_+)$ – $N''(K''_-,K''_+)$	J'	F'	J''	F''	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{35}Cl^{16}O$	11(2, 9) – 10(3, 8)	21/2	9	19/2	8	(0,0,0)	7438.2	(0.20)	[62007]
	11(3, 8) – 12(2,11)	23/2	13	25/2	14	(0,0,0)	7449.0	(0.20)	[62007]
	11(2, 9) – 10(3, 8)	21/2	10	19/2	9	(0,0,0)	7457.1	(0.20)	[62007]
	11(3, 8) – 12(2,11)	23/2	12	25/2	13	(0,0,0)	7469.2	(0.20)	[62007]
	11(2, 9) – 10(3, 8)	21/2	11	19/2	10	(0,0,0)	7476.2	(0.20)	[62007]
	11(3, 8) – 12(2,11)	23/2	11	25/2	12	(0,0,0)	7483.6	(0.20)	[62007]
	11(3, 8) – 12(2,11)	23/2	10	25/2	11	(0,0,0)	7493.8	(0.20)	[62007]
	11(2, 9) – 10(3, 8)	21/2	12	19/2	11	(0,0,0)	7494.9	(0.20)	[62007]
	11(2, 9) – 10(3, 8)	23/2	10	21/2	9	(0,0,0)	7672.3	(0.20)	[62007]
	11(3, 8) – 12(2,11)	21/2	9	23/2	10	(0,0,0)	8214.3	(0.20)	[62007]
	11(3, 8) – 12(2,11)	21/2	10	23/2	11	(0,0,0)	8235.3	(0.20)	[62007]
	11(3, 8) – 12(2,11)	21/2	11	23/2	12	(0,0,0)	8253.7	(0.20)	[62007]
	11(3, 8) – 12(2,11)	21/2	12	23/2	13	(0,0,0)	8268.6	(0.20)	[62007]
	14(4,11) – 15(3,12)	29/2	13	31/2	14	(0,0,0)	10558.4	(0.20)	[62007]
	14(4,11) – 15(3,12)	29/2	14	31/2	15	(0,0,0)	10565.2	(0.20)	[62007]
	14(4,11) – 15(3,12)	29/2	15	31/2	16	(0,0,0)	10572.8	(0.20)	[62007]
	14(4,11) – 15(3,12)	29/2	16	31/2	17	(0,0,0)	10581.5	(0.20)	[62007]
	28(7,22) – 29(6,23)	57/2	27	59/2	28	(0,0,0)	10767.2	(0.20)	[62007]
	28(7,22) – 29(6,23)	57/2	28	59/2	29	(0,0,0)	10768.9	(0.20)	[62007]
	28(7,22) – 29(6,23)	57/2	29	59/2	30	(0,0,0)	10770.7	(0.20)	[62007]
	28(7,22) – 29(6,23)	57/2	30	59/2	31	(0,0,0)	10771.9	(0.20)	[62007]
	14(4,11) – 15(3,12)	27/2	15	29/2	16	(0,0,0)	10868.7	(0.20)	[62007]
	14(4,11) – 15(3,12)	27/2	14	29/2	15	(0,0,0)	10877.8	(0.20)	[62007]
	14(4,11) – 15(3,12)	27/2	13	29/2	14	(0,0,0)	10887.1	(0.20)	[62007]
	14(4,11) – 15(3,12)	27/2	12	29/2	13	(0,0,0)	10896.2	(0.20)	[62007]
	28(7,22) – 29(6,23)	55/2	29	57/2	30	(0,0,0)	11179.3	(0.20)	[62007]
	28(7,22) – 29(6,23)	55/2	28	57/2	29	(0,0,0)	11181.2	(0.20)	[62007]
	28(7,22) – 29(6,23)	55/2	27	57/2	28	(0,0,0)	11183.0	(0.20)	[62007]
	28(7,22) – 29(6,23)	55/2	26	57/2	27	(0,0,0)	11184.5	(0.20)	[62007]
	13(2,11) – 14(1,14)	27/2	15	29/2	16	(0,0,0)	12742.7	(0.20)	[62007]
	3(0, 3) – 2(1, 2)	5/2	1	3/2	0	(0,1,0)	12765.25	(0.20)	[70022]
	3(0, 3) – 2(1, 2)	5/2	2	3/2	1	(0,1,0)	12771.25	(0.20)	[70022]
	3(0, 3) – 2(1, 2)	5/2	3	3/2	2	(0,1,0)	12807.72	(0.20)	[70022]
	13(2,11) – 14(1,14)	27/2	14	29/2	15	(0,0,0)	12822.4	(0.20)	[62007]
	11(3, 8) – 12(2,11)	23/2	13	25/2	14	(0,1,0)	12835.7	(0.20)	[70022]
	11(3, 8) – 12(2,11)	23/2	12	25/2	13	(0,1,0)	12855.3	(0.20)	[70022]
	3(0, 3) – 2(1, 2)	5/2	4	3/2	3	(0,1,0)	12866.92	(0.20)	[70022]
	11(3, 8) – 12(2,11)	23/2	11	25/2	12	(0,1,0)	12869.40	(0.20)	[70022]
	11(3, 8) – 12(2,11)	23/2	10	25/2	11	(0,1,0)	12880.0	(0.20)	[70022]
	13(2,11) – 14(1,14)	27/2	13	29/2	14	(0,0,0)	12883.5	(0.20)	[62007]
	13(2,11) – 14(1,14)	27/2	12	29/2	13	(0,0,0)	12929.4	(0.20)	[62007]
	3(0, 3) – 2(1, 2)	7/2	5	5/2	4	(0,1,0)	13138.45	(0.20)	[70022]
	3(0, 3) – 2(1, 2)	7/2	4	5/2	3	(0,1,0)	13153.6	(0.20)	[70022]
	3(0, 3) – 2(1, 2)	7/2	3	5/2	2	(0,1,0)	13163.4	(0.20)	[70022]
	3(0, 3) – 2(1, 2)	7/2	2	5/2	1	(0,1,0)	13169.5	(0.20)	[70022]
	11(3, 8) – 12(2,11)	21/2	9	23/2	10	(0,1,0)	13591.8	(0.20)	[70022]
	11(3, 8) – 12(2,11)	21/2	10	23/2	11	(0,1,0)	13612.5	(0.20)	[70022]
	11(3, 8) – 12(2,11)	21/2	11	23/2	12	(0,1,0)	13630.6	(0.20)	[70022]
	11(3, 8) – 12(2,11)	21/2	12	23/2	13	(0,1,0)	13645.3	(0.20)	[70022]
	3(0, 3) – 2(1, 2)	5/2	1	3/2	0	(0,0,0)	13852.05	(0.20)	[61006]
	3(0, 3) – 2(1, 2)	5/2	2	3/2	1	(0,0,0)	13858.45	(0.20)	[61006]
	3(0, 3) – 2(1, 2)	5/2	3	3/2	2	(0,0,0)	13894.5	(0.20)	[61006]
	3(0, 3) – 2(1, 2)	5/2	4	3/2	3	(0,0,0)	13953.6	(0.20)	[61006]
	3(0, 3) – 2(1, 2)	7/2	5	5/2	4	(0,0,0)	14231.6	(0.20)	[61006]
	3(0, 3) – 2(1, 2)	7/2	4	5/2	3	(0,0,0)	14246.7	(0.20)	[61006]
	3(0, 3) – 2(1, 2)	7/2	3	5/2	2	(0,0,0)	14256.4	(0.20)	[61006]
	3(0, 3) – 2(1, 2)	7/2	2	5/2	1	(0,0,0)	14262.5	(0.20)	[61006]
	13(2,11) – 14(1,14)	25/2	11	27/2	12	(0,0,0)	14549.5	(0.20)	[62007]
	13(2,11) – 14(1,14)	25/2	12	27/2	13	(0,0,0)	14630.9	(0.20)	[62007]
	13(2,11) – 14(1,14)	25/2	13	27/2	14	(0,0,0)	14706.4	(0.20)	[62007]
	13(2,11) – 14(1,14)	25/2	14	27/2	15	(0,0,0)	14770.3	(0.20)	[62007]
	14(2,13) – 13(3,10)	27/2	15	25/2	14	(0,0,0)	16522.4	(0.20)	[62007]
	14(2,13) – 13(3,10)	27/2	14	25/2	13	(0,0,0)	16542.1	(0.20)	[62007]
	14(2,13) – 13(3,10)	27/2	13	25/2	12	(0,0,0)	16566.7	(0.20)	[62007]
	14(2,13) – 13(3,10)	27/2	12	25/2	11	(0,0,0)	16592.7	(0.20)	[62007]

TABLE 25.2. The microwave spectrum of ClO_2—Continued

Isotopic species	$N'(K'_-,K'_+)$ - $N''(K''_-,K''_+)$	J'	F'	J''	F''	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{35}Cl^{16}O$	13(2,11) - 14(1,14)	27/2	15	29/2	16	(0,1,0)	17040.11	(0.20)	[70022]
	13(2,11) - 14(1,14)	27/2	14	29/2	15	(0,1,0)	17120.55	(0.20)	[70022]
	13(2,11) - 14(1,14)	27/2	13	29/2	14	(0,1,0)	17180.35	(0.20)	[70022]
	13(2,11) - 14(1,14)	27/2	12	29/2	13	(0,1,0)	17225.88	(0.20)	[70022]
	21(4,17) - 20(5,16)	41/2	19	39/2	18	(0,0,0)	17325.0	(0.20)	[62007]
	21(4,17) - 20(5,16)	41/2	20	39/2	19	(0,0,0)	17331.6	(0.20)	[62007]
	21(4,17) - 20(5,16)	41/2	21	39/2	20	(0,0,0)	17338.2	(0.20)	[62007]
	21(4,17) - 20(5,16)	41/2	22	39/2	21	(0,0,0)	17344.7	(0.20)	[62007]
	14(2,13) - 13(3,10)	29/2	13	27/2	12	(0,0,0)	17379.6	(0.20)	[62007]
	14(2,13) - 13(3,10)	29/2	14	27/2	13	(0,0,0)	17393.8	(0.20)	[62007]
	14(2,13) - 13(3,10)	29/2	15	27/2	14	(0,0,0)	17413.2	(0.20)	[62007]
	14(2,13) - 13(3,10)	29/2	16	27/2	15	(0,0,0)	17438.7	(0.20)	[62007]
	21(4,17) - 20(5,16)	43/2	23	41/2	22	(0,0,0)	17577.4	(0.20)	[62007]
	21(4,17) - 20(5,16)	43/2	22	41/2	21	(0,0,0)	17583.8	(0.20)	[62007]
	21(4,17) - 20(5,16)	43/2	21	41/2	20	(0,0,0)	17589.5	(0.20)	[62007]
	21(4,17) - 20(5,16)	43/2	20	41/2	19	(0,0,0)	17594.7	(0.20)	[62007]
	7(1, 6) - 6(2, 5)	13/2	5	11/2	4	(0,1,0)	17633.2	(0.20)	[70022]
	7(1, 6) - 6(2, 5)	13/2	6	11/2	5	(0,1,0)	17658.80	(0.20)	[70022]
	7(1, 6) - 6(2, 5)	13/2	7	11/2	6	(0,1,0)	17687.45	(0.20)	[70022]
	7(1, 6) - 6(2, 5)	13/2	8	11/2	7	(0,1,0)	17716.2	(0.20)	[70022]
	7(1, 6) - 6(2, 5)	15/2	9	13/2	8	(0,1,0)	17794.8	(0.20)	[70022]
	7(1, 6) - 6(2, 5)	15/2	8	13/2	7	(0,1,0)	17818.95	(0.20)	[70022]
	7(1, 6) - 6(2, 5)	15/2	7	13/2	6	(0,1,0)	17838.2	(0.20)	[70022]
	7(1, 6) - 6(2, 5)	15/2	6	13/2	5	(0,1,0)	17853.14	(0.20)	[70022]
	14(4,11) - 15(3,12)	29/2	13	31/2	14	(0,1,0)	18283.78	(0.20)	[70022]
	14(4,11) - 15(3,12)	29/2	14	31/2	15	(0,1,0)	18290.36	(0.20)	[70022]
	14(4,11) - 15(3,12)	29/2	15	31/2	16	(0,1,0)	18298.0	(0.20)	[70022]
	14(4,11) - 15(3,12)	29/2	16	31/2	17	(0,1,0)	18306.1	(0.20)	[70022]
	18(3,16) - 17(4,13)	35/2	19	33/2	18	(0,1,0)	18306.10	(0.20)	[70022]
	18(3,16) - 17(4,13)	35/2	18	33/2	17	(0,1,0)	18311.28	(0.20)	[70022]
	18(3,16) - 17(4,13)	35/2	17	33/2	16	(0,1,0)	18318.80	(0.20)	[70022]
	18(3,16) - 17(4,13)	35/2	16	33/2	15	(0,1,0)	18327.47	(0.20)	[70022]
	14(4,11) - 15(3,12)	27/2	15	29/2	16	(0,1,0)	18590.35	(0.20)	[70022]
	14(4,11) - 15(3,12)	27/2	14	29/2	15	(0,1,0)	18599.45	(0.20)	[70022]
	14(4,11) - 15(3,12)	27/2	13	29/2	14	(0,1,0)	18608.4	(0.20)	[70022]
	14(4,11) - 15(3,12)	27/2	12	29/2	13	(0,1,0)	18617.36	(0.20)	[70022]
	13(2,11) - 14(1,14)	25/2	11	27/2	12	(0,1,0)	18843.39	(0.20)	[70022]
	18(3,16) - 17(4,13)	37/2	17	35/2	16	(0,1,0)	18887.72	(0.20)	[70022]
	18(3,16) - 17(4,13)	37/2	18	35/2	17	(0,1,0)	18891.86	(0.20)	[70022]
	18(3,16) - 17(4,13)	37/2	19	35/2	18	(0,1,0)	18898.00	(0.20)	[70022]
	18(3,16) - 17(4,13)	37/2	20	35/2	19	(0,1,0)	18906.46	(0.20)	[70022]
	13(2,11) - 14(1,14)	25/2	12	27/2	13	(0,1,0)	18925.43	(0.20)	[70022]
	13(2,11) - 14(1,14)	25/2	13	27/2	14	(0,1,0)	18999.60	(0.20)	[70022]
	13(2,11) - 14(1,14)	25/2	14	27/2	15	(0,1,0)	19063.52	(0.20)	[70022]
	7(1, 6) - 6(2, 5)	13/2	5	11/2	4	(0,0,0)	20688.0	(0.20)	[62005]
	7(1, 6) - 6(2, 5)	13/2	6	11/2	5	(0,0,0)	20713.3	(0.20)	[62005]
	7(1, 6) - 6(2, 5)	13/2	7	11/2	6	(0,0,0)	20741.8	(0.20)	[62005]
	7(1, 6) - 6(2, 5)	13/2	8	11/2	7	(0,0,0)	20770.6	(0.20)	[62005]
	7(1, 6) - 6(2, 5)	15/2	9	13/2	8	(0,0,0)	20857.2	(0.20)	[62005]
	7(1, 6) - 6(2, 5)	15/2	8	13/2	7	(0,0,0)	20881.2	(0.20)	[62005]
	7(1, 6) - 6(2, 5)	15/2	7	13/2	6	(0,0,0)	20900.6	(0.20)	[62005]
	7(1, 6) - 6(2, 5)	15/2	6	13/2	5	(0,0,0)	20915.9	(0.20)	[62005]
	4(2, 3) - 5(1, 4)	9/2	3	11/2	4	(0,0,0)	25261.0	(0.20)	[61006]
	4(2, 3) - 5(1, 4)	9/2	4	11/2	5	(0,0,0)	25274.6	(0.20)	[61006]
	4(2, 3) - 5(1, 4)	9/2	5	11/2	6	(0,0,0)	25290.1	(0.20)	[61006]
	4(2, 3) - 5(1, 4)	9/2	6	11/2	7	(0,0,0)	25306.7	(0.20)	[61006]
	18(3,16) - 17(4,13)	35/2	19	33/2	18	(0,0,0)	25745.7	(0.20)	[62007]
	18(3,16) - 17(4,13)	35/2	18	33/2	17	(0,0,0)	25751.1	(0.20)	[62007]
	18(3,16) - 17(4,13)	35/2	17	33/2	16	(0,0,0)	25758.5	(0.20)	[62007]
	18(3,16) - 17(4,13)	35/2	16	33/2	15	(0,0,0)	25767.4	(0.20)	[62007]
	4(2, 3) - 5(1, 4)	7/2	5	9/2	6	(0,0,0)	25798.5	(0.20)	[61006]
	4(2, 3) - 5(1, 4)	7/2	4	9/2	5	(0,0,0)	25828.1	(0.20)	[61006]
	4(2, 3) - 5(1, 4)	7/2	3	9/2	4	(0,0,0)	25852.7	(0.20)	[61006]
	4(2, 3) - 5(1, 4)	7/2	2	9/2	3	(0,0,0)	25870.1	(0.20)	[61006]
	18(5,14) - 19(4,15)	37/2	17	39/2	18	(0,0,0)	26239.4	(0.20)	[62007]

TABLE 25.2. The microwave spectrum of ClO_2—Continued

Isotopic species	$N'(K'_-,K'_+)$ - $N''(K''_-,K''_+)$	J'	F'	J''	F''	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{35}Cl^{16}O$	18(5,14) - 19(4,15)	37/2	18	39/2	19	(0,0,0)	26242.6	(0.20)	[62007]
	18(5,14) - 19(4,15)	37/2	19	39/2	20	(0,0,0)	26246.1	(0.20)	[62007]
	18(5,14) - 19(4,15)	37/2	20	39/2	21	(0,0,0)	26249.4	(0.20)	[62007]
	18(3,16) - 17(4,13)	37/2	17	35/2	16	(0,0,0)	26337.6	(0.20)	[62007]
	18(3,16) - 17(4,13)	37/2	18	35/2	17	(0,0,0)	26341.9	(0.20)	[62007]
	18(3,16) - 17(4,13)	37/2	19	35/2	18	(0,0,0)	26348.2	(0.20)	[62007]
	18(3,16) - 17(4,13)	37/2	20	35/2	19	(0,0,0)	26356.8	(0.20)	[62007]
	18(5,14) - 19(4,15)	35/2	19	37/2	20	(0,0,0)	26657.1	(0.20)	[62007]
	18(5,14) - 19(4,15)	35/2	18	37/2	19	(0,0,0)	26661.3	(0.20)	[62007]
	18(5,14) - 19(4,15)	35/2	17	37/2	18	(0,0,0)	26665.1	(0.20)	[62007]
	18(5,14) - 19(4,15)	35/2	16	37/2	17	(0,0,0)	26668.4	(0.20)	[62007]
	4(2, 3) - 5(1, 4)	9/2	3	11/2	4	(0,1,0)	28359.4	(0.20)	[70022]
	4(2, 3) - 5(1, 4)	9/2	4	11/2	5	(0,1,0)	28373.1	(0.20)	[70022]
	4(2, 3) - 5(1, 4)	9/2	5	11/2	6	(0,1,0)	28388.5	(0.20)	[70022]
	4(2, 3) - 5(1, 4)	9/2	6	11/2	7	(0,1,0)	28405.2	(0.20)	[70022]
	4(2, 3) - 5(1, 4)	7/2	5	9/2	6	(0,1,0)	28886.1	(0.20)	[70022]
	4(2, 3) - 5(1, 4)	7/2	4	9/2	5	(0,1,0)	28915.9	(0.20)	[70022]
	4(2, 3) - 5(1, 4)	7/2	3	9/2	4	(0,1,0)	28940.2	(0.20)	[70022]
	4(2, 3) - 5(1, 4)	7/2	2	9/2	3	(0,1,0)	28957.9	(0.20)	[70022]
	16(2,15) - 15(3,12)	31/2	17	29/2	16	(0,0,0)	34372.7	(0.20)	[62007]
	16(2,15) - 15(3,12)	31/2	16	29/2	15	(0,0,0)	34398.6	(0.20)	[62007]
	16(2,15) - 15(3,12)	31/2	15	29/2	14	(0,0,0)	34429.2	(0.20)	[62007]
	16(2,15) - 15(3,12)	31/2	14	29/2	13	(0,0,0)	34463.4	(0.20)	[62007]
	16(2,15) - 15(3,12)	33/2	15	31/2	14	(0,0,0)	35399.6	(0.20)	[62007]
	16(2,15) - 15(3,12)	33/2	16	31/2	15	(0,0,0)	35418.8	(0.20)	[62007]
	16(2,15) - 15(3,12)	33/2	17	31/2	16	(0,0,0)	35444.0	(0.20)	[62007]
	16(2,15) - 15(3,12)	33/2	18	31/2	17	(0,0,0)	35477.4	(0.20)	[62007]
	17(3,14) - 16(4,13)	33/2	15	31/2	14	(0,0,0)	37167.6	(0.20)	[62007]
	17(3,14) - 16(4,13)	33/2	16	31/2	15	(0,0,0)	37182.2	(0.20)	[62007]
	17(3,14) - 16(4,13)	33/2	17	31/2	16	(0,0,0)	37196.1	(0.20)	[62007]
	17(3,14) - 16(4,13)	33/2	18	31/2	17	(0,0,0)	37208.8	(0.20)	[62007]
	17(3,14) - 16(4,13)	35/2	19	33/2	18	(0,0,0)	37253.6	(0.20)	[62007]
	17(3,14) - 16(4,13)	35/2	18	33/2	17	(0,0,0)	37268.0	(0.20)	[62007]
	17(3,14) - 16(4,13)	35/2	17	33/2	16	(0,0,0)	37279.3	(0.20)	[62007]
	17(3,14) - 16(4,13)	35/2	16	33/2	15	(0,0,0)	37289.2	(0.20)	[62007]
	1(1, 0) - 1(0, 1)	3/2	0	1/2	1	(0,0,0)	43112.78	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	3/2	1	1/2	1	(0,0,0)	43124.95	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	3/2	2	1/2	1	(0,0,0)	43140.30	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	3/2	2	1/2	2	(0,0,0)	43274.56	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	3/2	3	1/2	2	(0,0,0)	43285.5	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	3/2	2	3/2	3	(0,0,0)	43338.16	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	3/2	3	3/2	3	(0,0,0)	43348.60	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	3/2	1	3/2	2	(0,0,0)	43398.08	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	3/2	2	3/2	2	(0,0,0)	43413.60	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	3/2	0	3/2	1	(0,0,0)	43416.10	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	3/2	3	3/2	2	(0,0,0)	43423.60	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	3/2	1	3/2	1	(0,0,0)	43428.72	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	3/2	2	3/2	1	(0,0,0)	43444.10	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	3/2	2	1/2	1	(0,1,0)	44165.48	(0.20)	[70022]
	1(1, 0) - 1(0, 1)	1/2	1	1/2	1	(0,0,0)	44242.08	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	3/2	3	1/2	2	(0,1,0)	44310.20	(0.20)	[70022]
	1(1, 0) - 1(0, 1)	3/2	2	3/2	3	(0,1,0)	44363.31	(0.20)	[70022]
	1(1, 0) - 1(0, 1)	3/2	3	3/2	3	(0,1,0)	44373.93	(0.20)	[70022]
	1(1, 0) - 1(0, 1)	1/2	1	1/2	2	(0,0,0)	44376.00	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	3/2	1	3/2	2	(0,1,0)	44423.97	(0.20)	[70022]
	1(1, 0) - 1(0, 1)	1/2	2	1/2	1	(0,0,0)	44429.74	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	3/2	2	3/2	2	(0,1,0)	44439.28	(0.20)	[70022]
	1(1, 0) - 1(0, 1)	3/2	3	3/2	2	(0,1,0)	44449.50	(0.20)	[70022]
	1(1, 0) - 1(0, 1)	3/2	2	3/2	1	(0,1,0)	44469.50	(0.20)	[70022]
	1(1, 0) - 1(0, 1)	1/2	1	3/2	2	(0,0,0)	44515.28	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	1/2	1	3/2	1	(0,0,0)	44545.80	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	1/2	2	1/2	2	(0,0,0)	44564.10	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	1/2	2	3/2	3	(0,0,0)	44627.20	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	1/2	2	3/2	2	(0,0,0)	44703.00	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	1/2	1	1/2	1	(0,1,0)	45258.06	(0.20)	[70022]

TABLE 25.2. The microwave spectrum of ClO_2—Continued

Isotopic species	$N'(K'_-,K'_+)$ - $N''(K''_-,K''_+)$	J'	F'	J''	F''	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{35}Cl^{16}O$	1(1, 0) - 1(0, 1)	1/2	1	1/2	2	(0,1,0)	45392.14	(0.20)	[70022]
	1(1, 0) - 1(0, 1)	1/2	2	1/2	1	(0,1,0)	45445.76	(0.20)	[70022]
	1(1, 0) - 1(0, 1)	1/2	1	3/2	1	(0,1,0)	45563.86	(0.20)	[70022]
	1(1, 0) - 1(0, 1)	1/2	2	1/2	2	(0,1,0)	45579.80	(0.20)	[70022]
	1(1, 0) - 1(0, 1)	1/2	2	3/2	3	(0,1,0)	45644.10	(0.20)	[70022]
	3(1, 2) - 3(0, 3)	7/2	5	7/2	5	(0,0,0)	47697.2	(0.20)	[61006]
	3(1, 2) - 3(0, 3)	7/2	4	7/2	4	(0,0,0)	47739.8	(0.20)	[61006]
	3(1, 2) - 3(0, 3)	7/2	3	7/2	3	(0,0,0)	47764.6	(0.20)	[61006]
	3(1, 2) - 3(0, 3)	7/2	2	7/2	2	(0,0,0)	47778.2	(0.20)	[61006]
	3(1, 2) - 3(0, 3)	5/2	1	5/2	1	(0,0,0)	48232.10	(0.20)	[61006]
	3(1, 2) - 3(0, 3)	5/2	2	5/2	2	(0,0,0)	48276.60	(0.20)	[61006]
	3(1, 2) - 3(0, 3)	5/2	3	5/2	3	(0,0,0)	48336.0	(0.20)	[61006]
	3(1, 2) - 3(0, 3)	5/2	4	5/2	4	(0,0,0)	48398.20	(0.20)	[61006]
	5(0, 5) - 4(1, 4)	9/2	3	7/2	2	(0,0,0)	55055.8	(0.20)	[62007]
	5(0, 5) - 4(1, 4)	9/2	4	7/2	3	(0,0,0)	55075.2	(0.20)	[62007]
	5(0, 5) - 4(1, 4)	11/2	7	9/2	6	(0,0,0)	55090.6	(0.20)	[62007]
	5(0, 5) - 4(1, 4)	9/2	5	7/2	4	(0,0,0)	55104.6	(0.20)	[62007]
	5(0, 5) - 4(1, 4)	11/2	6	9/2	5	(0,0,0)	55113.0	(0.20)	[62007]
	5(0, 5) - 4(1, 4)	11/2	5	9/2	4	(0,0,0)	55126.8	(0.20)	[62007]
	5(0, 5) - 4(1, 4)	11/2	4	9/2	3	(0,0,0)	55135.8	(0.20)	[62007]
	5(0, 5) - 4(1, 4)	9/2	6	7/2	5	(0,0,0)	55138.8	(0.20)	[62007]
	5(1, 4) - 5(0, 5)	11/2	7	11/2	7	(0,0,0)	56011.6	(0.20)	[62007]
	5(1, 4) - 5(0, 5)	11/2	6	11/2	6	(0,0,0)	56053.8	(0.20)	[62007]
	5(1, 4) - 5(0, 5)	11/2	5	11/2	5	(0,0,0)	56085.4	(0.20)	[62007]
	5(1, 4) - 5(0, 5)	11/2	4	11/2	4	(0,0,0)	56103.6	(0.20)	[62007]
	5(1, 4) - 5(0, 5)	9/2	3	9/2	3	(0,0,0)	56576.9	(0.20)	[62007]
	5(1, 4) - 5(0, 5)	9/2	4	9/2	4	(0,0,0)	56623.6	(0.20)	[62007]
	5(1, 4) - 5(0, 5)	9/2	5	9/2	5	(0,0,0)	56674.6	(0.20)	[62007]
	5(1, 4) - 5(0, 5)	9/2	6	9/2	6	(0,0,0)	56723.0	(0.20)	[62007]
$^{16}O^{37}Cl^{16}O$	11(2, 9) - 10(3, 8)	21/2	9	19/2	8	(0,0,0)	15002.8	(0.20)	[62007]
	11(2, 9) - 10(3, 8)	21/2	10	19/2	9	(0,0,0)	15019.1	(0.20)	[62007]
	11(2, 9) - 10(3, 8)	21/2	11	19/2	10	(0,0,0)	15035.1	(0.20)	[62007]
	11(2, 9) - 10(3, 8)	21/2	12	19/2	11	(0,0,0)	15051.1	(0.20)	[62007]
	3(0, 3) - 2(1, 2)	5/2	1	3/2	0	(0,0,0)	15131.8	(0.20)	[61006]
	3(0, 3) - 2(1, 2)	5/2	2	3/2	1	(0,0,0)	15136.9	(0.20)	[61006]
	11(2, 9) - 10(3, 8)	23/2	13	21/2	12	(0,0,0)	15161.9	(0.20)	[62007]
	3(0, 3) - 2(1, 2)	5/2	3	3/2	2	(0,0,0)	15166.8	(0.20)	[61006]
	11(2, 9) - 10(3, 8)	23/2	12	21/2	11	(0,0,0)	15177.1	(0.20)	[62007]
	11(2, 9) - 10(3, 8)	23/2	11	21/2	10	(0,0,0)	15189.9	(0.20)	[62007]
	11(2, 9) - 10(3, 8)	23/2	10	21/2	9	(0,0,0)	15200.4	(0.20)	[62007]
	3(0, 3) - 2(1, 2)	5/2	4	3/2	3	(0,0,0)	15215.3	(0.20)	[61006]
	3(0, 3) - 2(1, 2)	7/2	5	5/2	4	(0,0,0)	15486.3	(0.20)	[61006]
	3(0, 3) - 2(1, 2)	7/2	4	5/2	3	(0,0,0)	15499.2	(0.20)	[61006]
	3(0, 3) - 2(1, 2)	7/2	3	5/2	2	(0,0,0)	15507.4	(0.20)	[61006]
	3(0, 3) - 2(1, 2)	7/2	2	5/2	1	(0,0,0)	15512.4	(0.20)	[61006]
	14(2,13) - 13(3,10)	27/2	15	25/2	14	(0,0,0)	20643.6	(0.20)	[62007]
	14(2,13) - 13(3,10)	27/2	14	25/2	13	(0,0,0)	20661.4	(0.20)	[62007]
	14(2,13) - 13(3,10)	27/2	13	25/2	12	(0,0,0)	20682.2	(0.20)	[62007]
	14(2,13) - 13(3,10)	27/2	12	25/2	11	(0,0,0)	20705.5	(0.20)	[62007]
	4(2, 3) - 5(1, 4)	9/2	3	11/2	4	(0,0,0)	21226.3	(0.20)	[61006]
	4(2, 3) - 5(1, 4)	9/2	4	11/2	5	(0,0,0)	21237.5	(0.20)	[61006]
	4(2, 3) - 5(1, 4)	9/2	5	11/2	6	(0,0,0)	21250.4	(0.20)	[61006]
	4(2, 3) - 5(1, 4)	9/2	6	11/2	7	(0,0,0)	21264.3	(0.20)	[61006]
	14(2,13) - 13(3,10)	29/2	13	27/2	12	(0,0,0)	21509.9	(0.20)	[62007]
	14(2,13) - 13(3,10)	29/2	14	27/2	13	(0,0,0)	21522.6	(0.20)	[62007]
	14(2,13) - 13(3,10)	29/2	15	27/2	14	(0,0,0)	21539.8	(0.20)	[62007]
	14(2,13) - 13(3,10)	29/2	16	27/2	15	(0,0,0)	21561.8	(0.20)	[62007]
	4(2, 3) - 5(1, 4)	7/2	5	9/2	6	(0,0,0)	21739.2	(0.20)	[61006]
	4(2, 3) - 5(1, 4)	7/2	4	9/2	5	(0,0,0)	21764.2	(0.20)	[61006]
	4(2, 3) - 5(1, 4)	7/2	3	9/2	4	(0,0,0)	21784.1	(0.20)	[61006]
	4(2, 3) - 5(1, 4)	7/2	2	9/2	3	(0,0,0)	21797.7	(0.20)	[61006]
	7(1, 6) - 6(2, 5)	13/2	5	11/2	4	(0,0,0)	24856.0	(0.20)	[62005]
	7(1, 6) - 6(2, 5)	13/2	6	11/2	5	(0,0,0)	24876.8	(0.20)	[62005]
	7(1, 6) - 6(2, 5)	13/2	7	11/2	6	(0,0,0)	24898.5	(0.20)	[62005]
	7(1, 6) - 6(2, 5)	13/2	8	11/2	7	(0,0,0)	24924.6	(0.20)	[62005]

TABLE 25.2. The microwave spectrum of ClO_2—Continued

Isotopic species	$N'(K'_-,K'_+)$ - $N''(K''_-,K''_+)$	J'	F'	J''	F''	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{37}Cl^{16}O$	7(1, 6) - 6(2, 5)	15/2	9	13/2	8	(0,0,0)	25006.3	(0.20)	[62005]
	7(1, 6) - 6(2, 5)	15/2	8	13/2	7	(0,0,0)	25026.1	(0.20)	[62005]
	7(1, 6) - 6(2, 5)	15/2	7	13/2	6	(0,0,0)	25041.0	(0.20)	[62005]
	7(1, 6) - 6(2, 5)	15/2	6	13/2	5	(0,0,0)	25054.7	(0.20)	[62005]
	1(1, 0) - 1(0, 1)	3/2	2	1/2	1	(0,0,0)	41856.53	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	3/2	2	1/2	2	(0,0,0)	41968.48	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	3/2	3	1/2	2	(0,0,0)	41977.60	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	3/2	2	3/2	3	(0,0,0)	42047.54	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	3/2	3	3/2	3	(0,0,0)	42055.84	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	3/2	1	3/2	2	(0,0,0)	42096.40	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	3/2	2	3/2	2	(0,0,0)	42109.20	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	3/2	0	3/2	1	(0,0,0)	42112.40	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	3/2	3	3/2	2	(0,0,0)	42117.52	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	3/2	2	3/2	1	(0,0,0)	42135.12	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	1/2	1	1/2	1	(0,0,0)	42948.50	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	1/2	1	1/2	2	(0,0,0)	43060.24	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	1/2	2	1/2	1	(0,0,0)	43104.18	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	1/2	1	3/2	2	(0,0,0)	43201.54	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	1/2	2	1/2	2	(0,0,0)	43215.84	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	1/2	1	3/2	1	(0,0,0)	43227.26	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	1/2	2	3/2	3	(0,0,0)	43294.8	(0.20)	[61006]
	3(1, 2) - 3(0, 3)	7/2	5	7/2	5	(0,0,0)	46503.6	(0.20)	[61006]
	3(1, 2) - 3(0, 3)	7/2	4	7/2	4	(0,0,0)	46539.0	(0.20)	[61006]
	3(1, 2) - 3(0, 3)	7/2	3	7/2	3	(0,0,0)	46560.0	(0.20)	[61006]
	3(1, 2) - 3(0, 3)	7/2	2	7/2	2	(0,0,0)	46571.0	(0.20)	[61006]
	3(1, 2) - 3(0, 3)	5/2	1	5/2	1	(0,0,0)	47037.0	(0.20)	[61006]
	3(1, 2) - 3(0, 3)	5/2	2	5/2	2	(0,0,0)	47074.4	(0.20)	[61006]
	3(1, 2) - 3(0, 3)	5/2	3	5/2	3	(0,0,0)	47122.6	(0.20)	[61006]
	3(1, 2) - 3(0, 3)	5/2	4	5/2	4	(0,0,0)	47175.7	(0.20)	[61006]
$^{16}O^{35}Cl^{18}O$	3(0, 3) - 2(1, 2)	5/2	1	3/2	0	(0,0,0)	11633.8	(0.20)	[62005]
	3(0, 3) - 2(1, 2)	5/2	2	3/2	1	(0,0,0)	11640.1	(0.20)	[62005]
	3(0, 3) - 2(1, 2)	5/2	3	3/2	2	(0,0,0)	11677.5	(0.20)	[62005]
	3(0, 3) - 2(1, 2)	5/2	4	3/2	3	(0,0,0)	11736.2	(0.20)	[62005]
	3(0, 3) - 2(1, 2)	7/2	5	5/2	4	(0,0,0)	12011.4	(0.20)	[62005]
	3(0, 3) - 2(1, 2)	7/2	4	5/2	3	(0,0,0)	12026.6	(0.20)	[62005]
	3(0, 3) - 2(1, 2)	7/2	2	5/2	1	(0,0,0)	12042.7	(0.20)	[62005]
	7(1, 6) - 6(2, 5)	13/2	5	11/2	4	(0,0,0)	14855.6	(0.20)	[62005]
	7(1, 6) - 6(2, 5)	13/2	6	11/2	5	(0,0,0)	14881.2	(0.20)	[62005]
	7(1, 6) - 6(2, 5)	13/2	7	11/2	6	(0,0,0)	14910.0	(0.20)	[62005]
	7(1, 6) - 6(2, 5)	13/2	8	11/2	7	(0,0,0)	14939.1	(0.20)	[62005]
	7(1, 6) - 6(2, 5)	15/2	8	13/2	7	(0,0,0)	15059.2	(0.20)	[62005]
	7(1, 6) - 6(2, 5)	15/2	7	13/2	6	(0,0,0)	15078.4	(0.20)	[62005]
	7(1, 6) - 6(2, 5)	15/2	6	13/2	5	(0,0,0)	15093.6	(0.20)	[62005]
	4(2, 3) - 5(1, 4)	9/2	3	11/2	4	(0,0,0)	28308.2	(0.20)	[62005]
	4(2, 3) - 5(1, 4)	9/2	4	11/2	5	(0,0,0)	28322.1	(0.20)	[62005]
	4(2, 3) - 5(1, 4)	9/2	5	11/2	6	(0,0,0)	28337.4	(0.20)	[62005]
	4(2, 3) - 5(1, 4)	9/2	6	11/2	7	(0,0,0)	28354.2	(0.20)	[62005]
	4(2, 3) - 5(1, 4)	7/2	5	9/2	6	(0,0,0)	28843.6	(0.20)	[62005]
	4(2, 3) - 5(1, 4)	7/2	4	9/2	5	(0,0,0)	28873.7	(0.20)	[62005]
	4(2, 3) - 5(1, 4)	7/2	3	9/2	4	(0,0,0)	28897.9	(0.20)	[62005]

Table 26. Rotational and centrifugal distortion constants for Cl_2O from reanalysis.[a]

Watson's Determinable Parameters	$^{35}Cl_2{}^{16}O$ (MHz)	$^{35}Cl_2{}^{16}O^{37}Cl$ (MHz)	$^{37}Cl_2{}^{16}O$ (MHz)
A"	42 046.328(61)	41 833.98(41)	41 620.40(80)
B"	3 683.03984(600)	3 583.0699(444)	3 484.164(93)
C"	3 381.85254(544)	3 296.0476(348)	3 210.952(77)
τ_1	0.143297(3273)	0.12743(5018)	0.1879(1033)
τ_2	0.0051229(3016)	0.003648(4590)	0.009535(9390)
τ_3[b]	1.05(2)	1.1(3)	0.79(54)
τ_{aaaa}	-5.4748(491)	-5.388(748)	-5.993(1420)
τ_{bbbb}	-0.00870721(9427)	-0.0087947(15065)	-0.006321(3012)
τ_{cccc}	-0.0051090(801)	-0.005297(1270)	-0.00446(261)
Std. dev.	0.178	0.756	1.393
No. lines fit	47	25	22
Derived Parameters (assuming planarity conditions)			
A'	42 046.325(61)	41 833.98(41)	
B'	3 683.074(6)	3 583.101(41)	
C'	3 381.894(5)	3 296.084(34)	
τ'_{bbcc}	-0.00655(9)	-0.0067(14)	
τ'_{ccaa}	0.06768(10)	0.062(14)	
τ'_{aabb}	0.0822(22)	0.072(35)	
$\tau_{aabb}(1)$	0.1227(15)	0.113(22)	
$\tau_{aabb}(2)$	0.1215(13)	0.117(20)	
$\tau_{aabb}(3)$	0.1215(13)	0.117(20)	
$\tau_{abab}(1)$	-0.0203(4)	-0.0204(70)	
$\tau_{abab}(2)$	-0.0191(6)	-0.0237(87)	
$\tau_{abab}(3)$	-0.0191(6)	-0.0239(90)	
$\Delta\tau$	$-0.134(31)\times10^{-4}$	$0.38(54)\times10^{-4}$	

[a] The uncertainites quoted are one standard deviation as estimated by the least squares fit. The number of significant figures quoted are necessary to reproduce the calculated transition frequencies within their standard deviations.

[b] Strictly speaking, τ_3 is not a determinable parameter, but is calculated from τ_1, τ_2, τ_{aaaa} and τ_{bbbb} using the planarity conditions.

Table 26.1. Molecular parameters for Cl_2O.

Parameter	$^{35}Cl^{16}O^{35}Cl$ (MHz)	$^{35}Cl^{16}O^{37}Cl$ (MHz)	$^{37}Cl^{16}O^{37}Cl$ (MHz)	Reference
A	42 046.398(86)	41 834.021(410)	41 620.951(300)	[66015]
B	3 683.0827(84)	3 583.1034(420)	3 484.2521(320)	[66015]
C	3 381.9006(77)	3 296.0896(340)	3 210.9984(270)	[66015]
τ_{aaaa}	-5.38885(6400)	-5.48314(72000)	-6.30056(57000)	[66015]
τ_{bbbb}	-0.0090962(1400)	-0.0085944(15000)	-0.0057625(12000)	[66015]
τ_{aabb}	0.114583(2200)	0.117148(21000)	0.157657(23000)	[66015]
τ_{abab}	-0.0188015(6200)	-0.0202994(69000)	-0.0191993(28000)	[66015]
χ_{aa} (Cl)	-71.45		-56.31[a]	[62010]
χ_{bb} (Cl)	6.86		5.41[a]	[62010]
χ_{cc} (Cl)	64.59		50.90[a]	[62010]

[a] Calculated from the ratio $^{35}Q/^{37}Q$ = 1.2688. See [66015].

Additional references: [59002] and [62003].

TABLE 26.2. The microwave spectrum of Cl_2O

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	F'	ϵ'	F''	ϵ''	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{35}Cl^{16}O^{35}Cl$	3(1, 3) - 4(0, 4)					(0,0,0)	9375.26	(*0.10)	[66015]
	12(2,11) - 13(1,12)					(0,0,0)	10358.50	(*0.10)	[66015]
	34(2,33) - 33(3,30)					(0,0,0)	13126.50	(*0.10)	[66015]
	23(2,21) - 24(1,24)					(0,0,0)	13212.50	(*0.10)	[66015]
	24(2,22) - 25(1,25)					(0,0,0)	13399.00	(*0.10)	[66015]
	22(2,20) - 23(1,23)					(0,0,0)	13496.80	(*0.10)	[66015]
	7(0, 7) - 6(1, 6)					(0,0,0)	13904.25	(*0.10)	[66015]
	25(2,23) - 26(1,26)					(0,0,0)	14051.83	(*0.10)	[66015]
	26(3,23) - 27(2,26)					(0,0,0)	14882.16	(*0.10)	[66015]
	20(2,18) - 21(1,21)					(0,0,0)	15428.55	(*0.10)	[66015]
	22(3,20) - 23(2,21)					(0,0,0)	15668.00	(*0.10)	[66015]
	33(4,30) - 34(3,31)					(0,0,0)	15699.10	(*0.10)	[66015]
	35(4,31) - 36(3,34)					(0,0,0)	16540.33	(*0.10)	[66015]
	27(2,25) - 28(1,28)					(0,0,0)	16767.40	(*0.10)	[66015]
	2(1, 2) - 3(0, 3)					(0,0,0)	16874.90	(*0.10)	[66015]
	19(2,17) - 20(1,20)					(0,0,0)	17058.95	(*0.10)	[66015]
	16(1,15) - 15(2,14)					(0,0,0)	17171.35	(*0.10)	[66015]
	36(2,35) - 35(3,32)					(0,0,0)	17906.50	(*0.10)	[66015]
	18(2,16) - 19(1,19)					(0,0,0)	19116.05	(*0.10)	[66015]
	11(2,10) - 12(1,11)					(0,0,0)	19282.68	(*0.10)	[66015]
	29(2,27) - 30(1,30)					(0,0,0)	21348.08	(*0.10)	[66015]
	17(2,15) - 18(1,18)					(0,0,0)	21583.45	(*0.10)	[66015]
	38(3,35) - 37(4,34)					(0,0,0)	21734.45	(*0.10)	[66015]
	8(0, 8) - 7(1, 7)					(0,0,0)	21896.25	(*0.10)	[66015]
	27(2,25) - 26(3,24)					(0,0,0)	22820.20	(*0.10)	[66015]
	34(4,30) - 35(3,33)					(0,0,0)	23048.28	(*0.10)	[66015]
	1(1, 1) - 2(0, 2)					(0,0,0)	24233.79	(*0.10)	[66015]
	30(2,28) - 31(1,31)					(0,0,0)	24324.66	(*0.10)	[66015]
	16(2,14) - 17(1,17)					(0,0,0)	24444.74	(*0.10)	[66015]
	32(4,29) - 33(3,30)					(0,0,0)	24543.60	(*0.10)	[66015]

TABLE 26.2. The microwave spectrum of Cl_2O—Continued

Isotopic species	$J'(K'_-,K'_+)$ – $J''(K''_-,K''_+)$	F'	ϵ'	F''	ϵ''	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{35}Cl^{16}O^{35}Cl$	21(3,19) – 22(2,20)					(0,0,0)	24796.70	(*0.10)	[66015]
	24(3,21) – 25(2,24)	24	2	25	2	(0,0,0)	25399.53	(0.10)	[62010]
	24(3,21) – 25(2,24)					(0,0,0)	25402.90	(*0.10)	[66015]
	24(3,21) – 25(2,24)	26	2	27	2	(0,0,0)	25402.94	(0.10)	[62010]
	24(3,21) – 25(2,24)	24	0	25	0	(0,0,0)	25406.35	(0.10)	[62010]
	17(1,16) – 16(2,15)	17	1	16	1	(0,0,0)	26575.2	(0.10)	[62010]
	17(1,16) – 16(2,15)	18	1	17	1	(0,0,0)	26580.9	(0.10)	[62010]
	17(1,16) – 16(2,15)	16	3	15	3	(0,0,0)	26580.9	(0.10)	[62010]
	17(1,16) – 16(2,15)					(0,0,0)	26581.00	(*0.10)	[66015]
	17(1,16) – 16(2,15)	17	3	16	3	(0,0,0)	26587.2	(0.10)	[62010]
	15(2,13) – 16(1,16)					(0,0,0)	27682.00	(*0.10)	[66015]
	31(2,29) – 32(1,32)					(0,0,0)	27748.30	(*0.10)	[66015]
	10(2, 9) – 11(1,10)	11	3	12	3	(0,0,0)	28072.16	(0.10)	[62010]
	10(2, 9) – 11(1,10)	10	3	11	3	(0,0,0)	28073.35	(0.10)	[62010]
	10(2, 9) – 11(1,10)	9	3	10	3	(0,0,0)	28073.35	(0.10)	[62010]
	10(2, 9) – 11(1,10)	12	3	13	3	(0,0,0)	28076.76	(0.10)	[62010]
	10(2, 9) – 11(1,10)					(0,0,0)	28078.35	(*0.10)	[66015]
	10(2, 9) – 11(1,10)	9	3	10	3	(0,0,0)	28078.56	(0.10)	[62010]
	10(2, 9) – 11(1,10)	11	1	12	1	(0,0,0)	28078.56	(0.10)	[62010]
	10(2, 9) – 11(1,10)	8	3	9	3	(0,0,0)	28080.28	(0.10)	[62010]
	10(2, 9) – 11(1,10)	10	1	11	1	(0,0,0)	28083.75	(0.10)	[62010]
	10(2, 9) – 11(1,10)	7	3	8	3	(0,0,0)	28084.74	(0.10)	[62010]
	33(4,29) – 34(3,32)					(0,0,0)	29658.99	(*0.10)	[66015]
	9(0, 9) – 8(1, 8)	6	3	5	3	(0,0,0)	29980.5	(0.10)	[62010]
	9(0, 9) – 8(1, 8)	9	1	8	1	(0,0,0)	29982.1	(0.10)	[62010]
	9(0, 9) – 8(1, 8)	12	3	11	3	(0,0,0)	29983.1	(0.10)	[62010]
	9(0, 9) – 8(1, 8)	10	1	9	1	(0,0,0)	29987.0	(0.10)	[62010]
	9(0, 9) – 8(1, 8)	8	3	7	3	(0,0,0)	29987.0	(0.10)	[62010]
	9(0, 9) – 8(1, 8)					(0,0,0)	29987.30	(*0.10)	[66015]
	9(0, 9) – 8(1, 8)	11	3	10	3	(0,0,0)	29989.4	(0.10)	[62010]
	9(0, 9) – 8(1, 8)	8	3	7	3	(0,0,0)	29991.6	(0.10)	[62010]
	9(0, 9) – 8(1, 8)	9	3	8	3	(0,0,0)	29992.7	(0.10)	[62010]
	9(0, 9) – 8(1, 8)	10	3	9	3	(0,0,0)	29994.1	(0.10)	[62010]
	23(3,20) – 24(2,23)					(0,0,0)	30980.95	(*0.10)	[66015]
	14(2,12) – 15(1,15)					(0,0,0)	31274.67	(*0.10)	[66015]
	13(2,11) – 14(1,14)	10	3	11	3	(0,0,0)	35190.95	(0.10)	[62010]
	13(2,11) – 14(1,14)	11	3	12	3	(0,0,0)	35200.66	(0.10)	[62010]
	13(2,11) – 14(1,14)	14	1	15	1	(0,0,0)	35202.77	(0.10)	[62010]
	13(2,11) – 14(1,14)	12	3	13	3	(0,0,0)	35202.77	(0.10)	[62010]
	13(2,11) – 14(1,14)					(0,0,0)	35202.90	(*0.10)	[66015]
	13(2,11) – 14(1,14)	15	3	16	3	(0,0,0)	35204.82	(0.10)	[62010]
	13(2,11) – 14(1,14)	12	3	13	3	(0,0,0)	35212.77	(0.10)	[62010]
	18(1,17) – 17(2,16)	18	2	17	2	(0,0,0)	36094.36	(0.10)	[62010]
	18(1,17) – 17(2,16)					(0,0,0)	36100.45	(*0.10)	[66015]
	18(1,17) – 17(2,16)	20	2	19	2	(0,0,0)	36100.46	(0.10)	[62010]
	18(1,17) – 17(2,16)	18	0	17	0	(0,0,0)	36106.56	(0.10)	[62010]
	32(4,28) – 33(3,31)					(0,0,0)	36359.50	(*0.10)	[66015]
	9(2, 8) – 10(1, 9)	9	2	10	2	(0,0,0)	36734.45	(0.10)	[62010]
	9(2, 8) – 10(1, 9)	11	2	12	2	(0,0,0)	36739.68	(0.10)	[62010]
	9(2, 8) – 10(1, 9)					(0,0,0)	36739.68	(*0.10)	[62010]
	22(3,19) – 23(2,22)	22	2	23	2	(0,0,0)	36743.00	(0.10)	[62010]
	9(2, 8) – 10(1, 9)	9	0	10	0	(0,0,0)	36744.91	(0.10)	[62010]
	22(3,19) – 23(2,22)					(0,0,0)	36745.02	(*0.10)	[66015]
	22(3,19) – 23(2,22)	24	2	25	2	(0,0,0)	36746.02	(0.10)	[62010]
	22(3,19) – 23(2,22)	22	0	23	0	(0,0,0)	36749.04	(0.10)	[62010]
	10(0,10) – 9(1, 9)	10	2	9	2	(0,0,0)	38159.95	(0.10)	[62010]
	10(0,10) – 9(1, 9)	12	2	11	2	(0,0,0)	38165.30	(0.10)	[62010]
	10(0,10) – 9(1, 9)					(0,0,0)	38165.30	(*0.10)	[62010]
	10(0,10) – 9(1, 9)	10	0	9	0	(0,0,0)	38170.65	(0.10)	[62010]
	1(1, 0) – 1(0, 1)	2	1	1	1	(0,0,0)	38635.78	(0.10)	[62010]
	1(1, 0) – 1(0, 1)	1	1	1	1	(0,0,0)	38635.78	(0.10)	[62010]
	1(1, 0) – 1(0, 1)	4	3	4	3	(0,0,0)	38649.45	(0.10)	[62010]
	1(1, 0) – 1(0, 1)	3	3	2	1	(0,0,0)	38656.30	(0.10)	[62010]
	1(1, 0) – 1(0, 1)	2	3	1	1	(0,0,0)	38659.44	(0.10)	[62010]

TABLE 26.2. The microwave spectrum of Cl_2O—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	F'	ϵ'	F''	ϵ''	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{35}Cl^{16}O^{35}Cl$	1(1, 0) - 1(0, 1)	2	1	3	3	(0,0,0)	38661.00	(0.10)	[62010]
	1(1, 0) - 1(0, 1)	1	1	2	3	(0,0,0)	38661.00	(0.10)	[62010]
	1(1, 0) - 1(0, 1)					(0,0,0)	38663.02	(*0.10)	[62010]
	1(1, 0) - 1(0, 1)	3	3	4	3	(0,0,0)	38675.09	(0.10)	[62010]
	1(1, 0) - 1(0, 1)	4	3	3	3	(0,0,0)	38678.09	(0.10)	[62010]
	1(1, 0) - 1(0, 1)	2	3	2	3	(0,0,0)	38686.52	(0.10)	[62010]
	1(1, 0) - 1(0, 1)	3	3	2	3	(0,0,0)	38694.43	(0.10)	[62010]
	1(1, 0) - 1(0, 1)	2	3	3	3	(0,0,0)	38694.43	(0.10)	[62010]
	2(1, 1) - 2(0, 2)	3	2	2	2	(0,0,0)	38947.12	(0.10)	[62010]
	2(1, 1) - 2(0, 2)	1	2	2	2	(0,0,0)	38947.12	(0.10)	[62010]
	2(1, 1) - 2(0, 2)	2	2	2	2	(0,0,0)	38948.98	(0.10)	[62010]
	2(1, 1) - 2(0, 2)	2	0	1	2	(0,0,0)	38964.53	(0.10)	[62010]
	2(1, 1) - 2(0, 2)	2	0	3	2	(0,0,0)	38964.53	(0.10)	[62010]
	2(1, 1) - 2(0, 2)					(0,0,0)	38966.26	(*0.10)	[66015]
	2(1, 1) - 2(0, 2)	4	2	4	2	(0,0,0)	38966.29	(0.10)	[62010]
	2(1, 1) - 2(0, 2)	3	2	3	2	(0,0,0)	38966.29	(0.10)	[62010]
	2(1, 1) - 2(0, 2)	2	0	2	0	(0,0,0)	38983.65	(0.10)	[62010]
	2(1, 1) - 2(0, 2)	1	2	2	0	(0,0,0)	38985.47	(0.10)	[62010]
	2(1, 1) - 2(0, 2)	3	2	2	0	(0,0,0)	38985.47	(0.10)	[62010]
	3(1, 2) - 3(0, 3)	2	3	1	3	(0,0,0)	39406.50	(0.10)	[62010]
	3(1, 2) - 3(0, 3)	4	1	3	1	(0,0,0)	39406.50	(0.10)	[62010]
	3(1, 2) - 3(0, 3)	5	3	6	3	(0,0,0)	39408.03	(0.10)	[62010]
	3(1, 2) - 3(0, 3)	2	3	3	1	(0,0,0)	39409.46	(0.10)	[62010]
	3(1, 2) - 3(0, 3)	3	1	3	1	(0,0,0)	39412.14	(0.10)	[62010]
	3(1, 2) - 3(0, 3)	0	3	1	3	(0,0,0)	39412.14	(0.10)	[62010]
	3(1, 2) - 3(0, 3)	6	3	6	3	(0,0,0)	39416.36	(0.10)	[62010]
	3(1, 2) - 3(0, 3)	5	3	4	1	(0,0,0)	39418.40	(0.10)	[62010]
	3(1, 2) - 3(0, 3)	4	1	4	1	(0,0,0)	39422.61	(0.10)	[62010]
	3(1, 2) - 3(0, 3)					(0,0,0)	39424.30	(*0.10)	[66015]
	3(1, 2) - 3(0, 3)	1	3	2	3	(0,0,0)	39425.92	(0.10)	[62010]
	3(1, 2) - 3(0, 3)	4	3	3	3	(0,0,0)	39425.92	(0.10)	[62010]
	3(1, 2) - 3(0, 3)	3	1	4	1	(0,0,0)	39428.66	(0.10)	[62010]
	3(1, 2) - 3(0, 3)	4	3	5	3	(0,0,0)	39428.66	(0.10)	[62010]
	3(1, 2) - 3(0, 3)	3	3	3	3	(0,0,0)	39430.00	(0.10)	[62010]
	3(1, 2) - 3(0, 3)	5	3	5	3	(0,0,0)	39432.14	(0.10)	[62010]
	3(1, 2) - 3(0, 3)	2	1	2	1	(0,0,0)	39432.78	(0.10)	[62010]
	12(2,10) - 13(1,13)	12	2	13	2	(0,0,0)	39435.66	(0.10)	[62010]
	3(1, 2) - 3(0, 3)	4	1	5	3	(0,0,0)	39437.30	(0.10)	[62010]
	3(1, 2) - 3(0, 3)	2	3	3	3	(0,0,0)	39437.30	(0.10)	[62010]
	3(1, 2) - 3(0, 3)	4	3	4	3	(0,0,0)	39438.70	(0.10)	[62010]
	3(1, 2) - 3(0, 3)	5	3	4	3	(0,0,0)	39440.42	(0.10)	[62010]
	3(1, 2) - 3(0, 3)	6	3	5	3	(0,0,0)	39440.42	(0.10)	[62010]
	3(1, 2) - 3(0, 3)	3	3	4	3	(0,0,0)	39443.04	(0.10)	[62010]
	12(2,10) - 13(1,13)					(0,0,0)	39446.28	(*0.10)	[62010]
	12(2,10) - 13(1,13)	14	2	15	2	(0,0,0)	39446.28	(0.10)	[62010]
	12(2,10) - 13(1,13)	12	0	13	0	(0,0,0)	39456.90	(0.10)	[62010]
	4(1, 3) - 4(0, 4)	5	2	4	2	(0,0,0)	40022.64	(0.10)	[62010]
	4(1, 3) - 4(0, 4)	3	2	4	2	(0,0,0)	40022.64	(0.10)	[62010]
	4(1, 3) - 4(0, 4)	4	2	4	2	(0,0,0)	40030.56	(0.10)	[62010]
	4(1, 3) - 4(0, 4)	4	0	3	2	(0,0,0)	40032.76	(0.10)	[62010]
	4(1, 3) - 4(0, 4)	4	0	5	2	(0,0,0)	40032.76	(0.10)	[62010]
	4(1, 3) - 4(0, 4)	6	2	6	2	(0,0,0)	40040.96	(0.10)	[62010]
	4(1, 3) - 4(0, 4)	5	2	5	2	(0,0,0)	40040.96	(0.10)	[62010]
	4(1, 3) - 4(0, 4)					(0,0,0)	40041.11	(*0.10)	[66015]
	4(1, 3) - 4(0, 4)	4	2	3	2	(0,0,0)	40049.20	(0.10)	[62010]
	4(1, 3) - 4(0, 4)	4	2	5	2	(0,0,0)	40049.20	(0.10)	[62010]
	4(1, 3) - 4(0, 4)	4	0	4	0	(0,0,0)	40051.18	(0.10)	[62010]
	4(1, 3) - 4(0, 4)	3	2	4	0	(0,0,0)	40059.51	(0.10)	[62010]
	4(1, 3) - 4(0, 4)	5	2	4	0	(0,0,0)	40059.51	(0.10)	[62010]
	12(1,11) - 12(0,12)					(0,0,0)	51567.60	(*0.10)	[66015]
$^{37}Cl^{16}O^{35}Cl$	3(1, 3) - 4(0, 4)					(0,0,0)	10039.36	(*0.10)	[66015]
	26(2,24) - 27(1,27)					(0,0,0)	14559.31	(*0.10)	[66015]
	21(2,19) - 22(1,22)					(0,0,0)	14850.40	(*0.10)	[66015]
	36(2,35) - 35(3,32)					(0,0,0)	15872.95	(*0.10)	[66015]

TABLE 26.2. The microwave spectrum of Cl_2O—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	F'	ϵ'	F''	ϵ''	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{37}Cl^{16}O^{35}Cl$	2(1, 2) - 3(0, 3)					(0,0,0)	17333.48	(*0.10)	[66015]
	19(2,17) - 20(1,20)					(0,0,0)	17988.00	(*0.10)	[66015]
	8(0, 8) - 7(1, 7)					(0,0,0)	20360.40	(*0.10)	[66015]
	11(2,10) - 12(1,11)					(0,0,0)	21681.60	(*0.10)	[66015]
	17(2,15) - 18(1,18)					(0,0,0)	22720.70	(*0.10)	[66015]
	17(1,16) - 16(2,15)					(0,0,0)	22791.00	(*0.10)	[66015]
	1(1, 1) - 2(0, 2)					(0,0,0)	24492.76	(*0.10)	[66015]
	16(2,14) - 17(1,17)					(0,0,0)	25646.70	(*0.10)	[66015]
	9(0, 9) - 8(1, 8)					(0,0,0)	28223.40	(*0.10)	[66015]
	24(3,21) - 25(2,24)					(0,0,0)	28578.10	(*0.10)	[66015]
	15(2,13) - 16(1,16)					(0,0,0)	28925.20	(*0.10)	[66015]
	10(2, 9) - 11(1,10)					(0,0,0)	30211.60	(*0.10)	[66015]
	18(1,17) - 17(2,16)					(0,0,0)	32020.60	(*0.10)	[66015]
	23(3,20) - 24(2,23)					(0,0,0)	34109.00	(*0.10)	[66015]
	10(0,10) - 9(1, 9)					(0,0,0)	36173.00	(*0.10)	[66015]
	13(2,11) - 14(1,14)					(0,0,0)	36460.00	(*0.10)	[66015]
	1(1, 0) - 1(0, 1)					(0,0,0)	38536.80	(*0.10)	[66015]
	9(2, 8) - 10(1, 9)					(0,0,0)	38617.40	(*0.10)	[66015]
	2(1, 1) - 2(0, 2)					(0,0,0)	38825.50	(*0.10)	[66015]
	3(1, 2) - 3(0, 3)					(0,0,0)	39261.90	(*0.10)	[66015]
	4(1, 3) - 4(0, 4)					(0,0,0)	39849.10	(*0.10)	[66015]
$^{37}Cl^{16}O^{37}Cl$	27(3,24) - 28(2,27)					(0,0,0)	16414.65	(*0.10)	[66015]
	20(2,18) - 21(1,21)					(0,0,0)	17088.50	(*0.10)	[66015]
	2(1, 2) - 3(0, 3)					(0,0,0)	17782.50	(*0.10)	[66015]
	8(0, 8) - 7(1, 7)					(0,0,0)	18844.35	(*0.10)	[66015]
	17(1,16) - 16(2,15)					(0,0,0)	19063.40	(*0.10)	[66015]
	26(3,23) - 27(2,26)					(0,0,0)	21337.93	(*0.10)	[66015]
	1(1, 1) - 2(0, 2)					(0,0,0)	24746.16	(*0.10)	[66015]
	25(3,22) - 26(2,25)					(0,0,0)	26461.50	(*0.10)	[66015]
	9(0, 9) - 8(1, 8)					(0,0,0)	26483.00	(*0.10)	[66015]
	16(2,14) - 17(1,17)					(0,0,0)	26895.00	(*0.10)	[66015]
	18(1,17) - 17(2,16)					(0,0,0)	28007.65	(*0.10)	[66015]
	24(3,21) - 25(2,24)					(0,0,0)	31767.35	(*0.10)	[66015]
	10(2, 9) - 11(1,10)					(0,0,0)	32309.00	(*0.10)	[66015]
	21(3,19) - 22(2,20)					(0,0,0)	33679.40	(*0.10)	[66015]
	14(2,12) - 15(1,15)					(0,0,0)	33812.70	(*0.10)	[66015]
	10(0,10) - 9(1, 9)					(0,0,0)	34207.80	(*0.10)	[66015]
$^{37}Cl^{16}O^{37}Cl$	19(1,18) - 18(2,17)					(0,0,0)	37050.97	(*0.10)	[66015]
	23(3,20) - 24(2,23)					(0,0,0)	37241.25	(*0.10)	[66015]
	13(2,11) - 14(1,14)					(0,0,0)	37723.00	(*0.10)	[66015]
	2(1, 1) - 2(0, 2)					(0,0,0)	38683.76	(*0.10)	[66015]
	3(1, 2) - 3(0, 3)					(0,0,0)	39098.80	(*0.10)	[66015]
	4(1, 3) - 4(0, 4)					(0,0,0)	39657.28	(*0.10)	[66015]
	9(2, 8) - 10(1, 9)					(0,0,0)	40458.00	(*0.10)	[66015]

*Hypothetical unsplit rotational transition frequency.

Table 27. Molecular parameters for $^{35}Cl_2{}^{32}S$ [76030][a].

Parameter	Value (MHz)
A	14 613.36
B	2 920.93
C	2 430.74
χ_{aa} (Cl)	-38.98(10)
χ_{bb} (Cl)	- 8.87(10)
χ_{cc} (Cl)	47.95(10)
$\|\chi_{ab}\|$ (Cl)	64(10)
μ	0.36(1) D

[a] The actual transition frequencies were not reported in this work. The hypothetical center frequencies derived from the measurements are given in the following table. The hyperfine splittings for several transitions are given in [76030].

TABLE 27.1. The microwave spectrum of Cl_2S

Isotopic species	$J'(K'_-,K'_+)$ – $J''(K''_-,K''_+)$	F'	ϵ'	F''	ϵ''	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{35}Cl^{32}S^{35}Cl$	4(0, 4) – 3(1, 3)					(0,0,0)	10722.4	(*0.5)	[76030]
	3(2, 2) – 4(1, 3)					(0,0,0)	11995.8	(*0.5)	[76030]
	2(1, 1) – 2(0, 2)	2	2	2	2	(0,0,0)	12674.99	(0.05)	[76030]
	2(1, 1) – 2(0, 2)	1	2	2	2	(0,0,0)	12677.25	(0.05)	[76030]
	2(1, 1) – 2(0, 2)					(0,0,0)	12687.96	(*0.10)	[76030]
	2(1, 1) – 2(0, 2)	1	2	2	0	(0,0,0)	12698.68	(0.05)	[76030]
	2(1, 1) – 2(0, 2)	2	0	2	0	(0,0,0)	12701.23	(0.05)	[76030]
	4(1, 3) – 4(0, 4)					(0,0,0)	14573.26	(*0.10)	[76030]
	1(1, 1) – 0(0, 0)	1	0	0	0	(0,0,0)	17041.34	(0.05)	[76030]
	1(1, 1) – 0(0, 0)					(0,0,0)	17044.17	(*0.10)	[76030]
	1(1, 1) – 0(0, 0)	1	2	2	2	(0,0,0)	17046.96	(0.05)	[76030]
	3(1, 3) – 2(0, 2)	3	0	2	0	(0,0,0)	26523.56	(0.05)	[76030]
	3(1, 3) – 2(0, 2)					(0,0,0)	26527.85	(*0.10)	[76030]
	3(1, 3) – 2(0, 2)	3	2	2	2	(0,0,0)	26532.17	(0.05)	[76030]
	4(2, 2) – 4(1, 3)	4	2	4	2	(0,0,0)	33606.24	(0.05)	[76030]
	4(2, 2) – 4(1, 3)					(0,0,0)	33615.96	(*0.10)	[76030]
	4(2, 2) – 4(1, 3)	4	0	4	0	(0,0,0)	33625.81	(0.05)	[76030]

*Hypothetical unsplit rotational transition frequency.

Table 28. Rotational constants and electric dipole moment of CsOH [67011].

Vib. State v_1 v_2^{ℓ} v_3	$^{133}Cs^{16}OH$ B_v (MHz)	q_v (MHz)	$^{133}Cs^{16}OD$ B_v (MHz)	q_v (MHz)
0 0^0 0	5 501.08(10)		4 996.83(10)	
0 1^1 0	5 484.07(10)	7.90	4 994.81(10)	7.59
0 2^0 0	5 472.43(10)		4 995.64(10)	
0 2^2 0	5 465.97(10)		4 992.40(10)	
0 3^1 0	5 460.65(10)	8.19	4 996.32(10)	8.20
0 3^3 0	5 443.54(10)		...	
0 4^0 0	5 454.4(3)		5 000.06(10)	
0 4^2 0	5 447.95(10)		4 996.65(10)	
0 6^2 0	5 438.65(10)		5 005.78(10)	
0 0^0 1	5 467.90(10)		4 967.57(10)	
0 1^1 1	5 451.0(3)	8.82	4 965.29(10)	7.88
0 2^0 1	5 438.35(10)		...	
0 2^2 1	5 436.63(10)		4 962.73(10)	
0 3^1 1	5 427.0(3)	8.67	...	
0 4^2 1	5 417.0(3)		4 967.18(10)	
0 0^0 2	5 434.50(10)		...	
0 1^1 2	5 417.64(10)	9.49	...	
0 2^0 2	5 404.5(3)		...	
0 2^2 2	5 406.36(10)		...	
0 4^2 2	5 386.62(10)		...	
0 0^0 3	5 401.04(10)		...	
0 2^2 3	5 375.6(3)		...	

Electric dipole moment: μ = 7.1(5) D

Additional references: [66016] and [69025].

TABLE 28.1. The microwave spectrum of CsOH

Isotopic species	J' - J''	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{133}Cs^{16}OH$	2 - 1					$(0,1^{L1},2)$	21652.	(1.0)	[67011]
	2 - 1					$(0,1^{U1},2)$	21689.6	(0.3)	[67011]
	2 - 1					$(0,3^{U1},1)$	21743.	(1.0)	[67011]
	2 - 1					$(0,1^{L1},1)$	21786.6	(0.3)	[67011]
	2 - 1					$(0,3^{L1},0)$	21809.7	(0.3)	[67011]
	2 - 1					$(0,1^{U1},1)$	21821.0	(0.3)	[67011]
	2 - 1					$(0,0^{0},1)$	21871.8	(0.3)	[67011]
	2 - 1					$(0,3^{U1},0)$	21875.3	(0.3)	[67011]
	2 - 1					$(0,2^{0},0)$	21889.7	(0.3)	[67011]
	2 - 1					$(0,1^{L1},0)$	21920.6	(0.3)	[67011]
	2 - 1					$(0,1^{U1},0)$	21952.1	(0.3)	[67011]
	2 - 1					$(0,0^{0},0)$	22004.4	(0.3)	[67011]
	3 - 2					$(0,2^{2},3)$	32253.8	(0.3)	[67011]
	3 - 2					$(0,4^{2},2)$	32320.1	(0.3)	[67011]
	3 - 2					$(0,0^{0},3)$	32406.2	(0.3)	[67011]
	3 - 2					$(0,2^{0},2)$	32427.	(1.0)	[67011]
	3 - 2					$(0,2^{2},2)$	32438.4	(0.3)	[67011]
	3 - 2					$(0,1^{L1},2)$	32477.2	(0.3)	[67011]
	3 - 2					$(0,4^{2},1)$	32504.	(1.0)	[67011]
	3 - 2					$(0,1^{U1},2)$	32534.7	(0.3)	[67011]
	3 - 2					$(0,0^{0},2)$	32607.5	(0.3)	[67011]
	3 - 2					$(0,3^{U1},1)$	32614.	(1.0)	[67011]
	3 - 2					$(0,2^{2},1)$	32619.8	(0.3)	[67011]
	3 - 2					$(0,2^{0},1)$	32630.1	(0.3)	[67011]
	3 - 2					$(0,6^{2},0)$	32631.8	(0.3)	[67011]
	3 - 2					$(0,1^{L1},1)$	32678.6	(0.3)	[67011]
	3 - 2					$(0,4^{2},0)$	32687.8	(0.3)	[67011]
	3 - 2					$(0,3^{L1},0)$	32715.5	(0.3)	[67011]
	3 - 2					$(0,4^{0},0)$	32726.5	(0.3)	[67011]
	3 - 2					$(0,1^{U1},1)$	32733.0	(0.3)	[67011]
	3 - 2					$(0,2^{2},0)$	32795.8	(0.3)	[67011]
	3 - 2					$(0,0^{0},1)$	32807.0	(0.3)	[67011]
	3 - 2					$(0,3^{U1},0)$	32813.	(1.0)	[67011]
	3 - 2					$(0,2^{0},0)$	32834.6	(0.3)	[67011]
	3 - 2					$(0,1^{L1},0)$	32880.7	(0.3)	[67011]
	3 - 2					$(0,1^{U1},0)$	32928.1	(0.3)	[67011]
	3 - 2					$(0,0^{0},0)$	33006.6	(0.3)	[67011]
	4 - 3					$(0,4^{2},2)$	43092.6	(0.3)	[67011]
	4 - 3					$(0,2^{2},2)$	43250.6	(0.3)	[67011]
	4 - 3					$(0,4^{2},1)$	43336.2	(0.3)	[67011]
	4 - 3					$(0,3^{L1},1)$	43346.4	(0.3)	[67011]
	4 - 3					$(0,1^{U1},2)$	43378.4	(0.3)	[67011]
	4 - 3					$(0,0^{0},2)$	43475.4	(0.3)	[67011]
	4 - 3					$(0,3^{U1},1)$	43483.6	(0.3)	[67011]
	4 - 3					$(0,2^{2},1)$	43492.7	(0.3)	[67011]
	4 - 3					$(0,6^{2},0)$	43509.3	(0.3)	[67011]
	4 - 3					$(0,3^{3},0)$	43548.3	(0.3)	[67011]
	4 - 3					$(0,4^{2},0)$	43583.	(1.0)	[67011]
	4 - 3					$(0,2^{2},0)$	43728.1	(0.3)	[67011]
	4 - 3					$(0,1^{L1},0)$	43840.3	(0.3)	[67011]
	4 - 3					$(0,1^{U1},0)$	43904.2	(0.3)	[67011]
	4 - 3					$(0,0^{0},0)$	44008.2	(0.3)	[67011]
$^{133}Cs^{16}OD$	3 - 2					$(0,1^{L1},1)$	29768.1	(0.3)	[67011]
	3 - 2					$(0,2^{2},1)$	29776.4	(0.3)	[67011]
	3 - 2					$(0,4^{2},1)$	29803.1	(0.3)	[67011]
	3 - 2					$(0,0^{0},1)$	29805.4	(0.3)	[67011]
	3 - 2					$(0,1^{U1},1)$	29815.4	(0.3)	[67011]
	3 - 2					$(0,3^{L1},0)$	29928.8	(0.3)	[67011]
	3 - 2					$(0,1^{L1},0)$	29946.1	(0.3)	[67011]
	3 - 2					$(0,2^{2},0)$	29954.4	(0.3)	[67011]
	3 - 2					$(0,2^{0},0)$	29973.8	(0.3)	[67011]
	3 - 2					$(0,4^{2},0)$	29979.9	(0.3)	[67011]
	3 - 2					$(0,0^{0},0)$	29981.0	(0.3)	[67011]
	3 - 2					$(0,1^{U1},0)$	29991.6	(0.3)	[67011]
	3 - 2					$(0,4^{0},0)$	30000.3	(0.3)	[67011]
	3 - 2					$(0,3^{U1},0)$	30027.2	(0.3)	[67011]
	3 - 2					$(0,6^{2},0)$	30034.7	(0.3)	[67011]

Table 29. Rotational and centrifugal distortion constants for HOF and DOF from the present analysis.

Watson's Determinable Parameters	$H^{16}O^{19}F$ Value[a] (MHz)	$D^{16}O^{19}F$ Value[a] (MHz)
A"	585 631.428(159)	316 096.061(45)
B"	26 760.6692(120)	25 593.2238(30)
C"	25 515.0321(95)	23 589.5489(27)
τ_1	-10.7853(20)	-7.884041(1459)
τ_2	-0.7634757(4589)	-0.7570956(1334)
τ_3[b]	202.79(20)	65.172(9)
τ_{aaaa}	-340.301(393)	-106.496(29)
τ_{bbbb}	-0.4112447(2611)	-0.3632766(463)
τ_{cccc}	-0.3422286(5482)	-0.2683925(417)
Std. dev.	0.150	0.074
No. lines fit	46	40
Derived Parameters (assuming planarity conditions)		
A'	585 631.24(16)	316 095.907(44)
B'	26 760.264(53)	25 593.117(3)
C'	25 510.233(50)	23 585.868(3)
τ'_{bbcc}	-0.37640(30)	-0.30817(5)
τ'_{ccaa}	-0.810(113)	-0.2135(26)
τ'_{aabb}	-9.599(112)	-7.3623(28)
$\tau_{aabb}(1)$	-0.1267(1236)	0.4806(32)
$\tau_{aabb}(2)$	0.864(99)	0.1504(15)
$\tau_{aabb}(3)$	0.864(99)	0.1504(15)
$\tau_{abab}(1)$	-4.74(12)	-3.921(3)
$\tau_{abab}(2)$	-5.67(10)	-3.6137(13)
$\tau_{abab}(3)$	-5.73(10)	-3.5897(15)
$\Delta\tau$	0.00369(80)	-0.003327(40)

[a] The uncertainties quoted are one standard deviation as estimated by the least squares fit. The number of significant figures quoted are necessary to reproduce the calculated transition frequencies within their standard deviations.

[b] Strictly speaking, τ_3 is not a determinable parameter, but is calculated from τ_1, τ_2, τ_{aaaa} and τ_{bbbb} using the planarity conditions.

Table 29.1. Molecular parameters for HOF including rotational analysis of Pearson and Kim [72030].

Parameter	$H^{16}O^{19}F$ Value	$D^{16}O^{19}F$ Value	Reference
$\tilde{A}$ (MHz)	585 631.20(14)	316 096.02(6)	[72030]
$\tilde{B}$ (MHz)	26 760.31(12)	25 593.91(1)	[72030]
$\tilde{C}$ (MHz)	25 510.19(12)	23 585.28(1)	[72030]
Δ_J (MHz)	0.09414(9)	0.07904(3)	[72030]
Δ_{JK} (MHz)	2.4146(6)	1.7349(9)	[72030]
Δ_K (MHz)	82.52(8)	24.82(1)	[72030]
δ_J (MHz)	0.00432(1)	0.00593(1)	[72030]
δ_K (MHz)	1.12(6)	1.183(2)	[72030]
g_{aa} (μ_N)	0.642(1)	...	[73034]
g_{bb} (μ_N)	-0.119(1)	...	[73034]
g_{cc} (μ_N)	-0.061(1)	...	[73034]
$2\chi_{aa}-\chi_{bb}-\chi_{cc}$ [a]	-19.6(6)	...	[73034]
$2\chi_{bb}-\chi_{aa}-\chi_{cc}$ [a]	12.8(12)	...	[73034]
μ_a (D)	0.37(10)	0.28(10)	[73034]
μ_b (D)	2.20(10)	2.22(10)	[73034]

[a] In units erg/G^2·mole.

TABLE 29.2. The microwave spectrum of HOF

Isotopic species	$J'(K'_-,K'_+)$ – $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$H^{16}O^{19}F$	1(0, 1) – 0(0, 0)	(0,0,0)	52269.90	(0.10)	[73034]
	29(1,28) – 28(2,27)	(0,0,0)	94950.89	(0.10)	[72030]
	2(1, 2) – 1(1, 1)	(0,0,0)	103282.89	(0.10)	[72029]
	2(0, 2) – 1(0, 1)	(0,0,0)	104536.04	(0.10)	[72029]
	2(1, 1) – 1(1, 0)	(0,0,0)	105773.90	(0.10)	[72029]
	12(0,12) – 11(1,11)	(0,0,0)	106813.55	(0.10)	[72030]
	25(2,24) – 26(1,25)	(0,0,0)	108883.87	(0.10)	[72030]
	7(1, 7) – 8(0, 8)	(0,0,0)	124258.04	(0.10)	[72030]
	3(1, 3) – 2(1, 2)	(0,0,0)	154917.58	(0.10)	[72029]
	3(2, 2) – 2(2, 1)	(0,0,0)	156743.33	(0.10)	[72029]
	3(2, 1) – 2(2, 0)	(0,0,0)	156751.52	(0.10)	[72029]
	3(0, 3) – 2(0, 2)	(0,0,0)	156793.28	(0.10)	[72029]
	3(1, 2) – 2(1, 1)	(0,0,0)	158653.68	(0.10)	[72029]
	30(1,29) – 29(2,28)	(0,0,0)	163736.51	(0.10)	[72030]
	13(0,13) – 12(1,12)	(0,0,0)	165802.04	(0.10)	[72030]
	24(2,23) – 25(1,24)	(0,0,0)	175942.38	(0.10)	[72030]
	6(1, 6) – 7(0, 7)	(0,0,0)	180705.86	(0.10)	[72030]
	4(1, 4) – 3(1, 3)	(0,0,0)	206544.46	(0.10)	[72029]
	4(3, 1) – 3(3, 0)	(0,0,0)	208887.97	(0.10)	[72029]
	4(3, 2) – 3(3, 1)	(0,0,0)	208887.97	(0.10)	[72029]
	4(2, 3) – 3(2, 2)	(0,0,0)	208978.97	(0.10)	[72029]
	4(2, 2) – 3(2, 1)	(0,0,0)	208999.69	(0.10)	[72029]
	4(0, 4) – 3(0, 3)	(0,0,0)	209037.37	(0.10)	[72029]
	4(1, 3) – 3(1, 2)	(0,0,0)	211524.86	(0.10)	[72029]
	14(0,14) – 13(1,13)	(0,0,0)	225233.63	(0.10)	[72030]

TABLE 29.2. The microwave spectrum of HOF—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$H^{16}O^{19}F$	31(1,30) - 30(2,29)	(0,0,0)	232917.67	(0.10)	[72030]
	5(1, 5) - 6(0, 6)	(0,0,0)	236591.22	(0.10)	[72030]
	23(2,22) - 24(1,23)	(0,0,0)	242536.36	(0.10)	[72030]
	5(1, 5) - 4(1, 4)	(0,0,0)	258160.52	(0.10)	[72029]
	5(4, 1) - 4(4, 0)	(0,0,0)	260923.69	(0.10)	[72029]
	5(4, 2) - 4(4, 1)	(0,0,0)	260923.69	(0.10)	[72029]
	5(3, 2) - 4(3, 1)	(0,0,0)	261095.04	(0.10)	[72029]
	5(3, 3) - 4(3, 2)	(0,0,0)	261095.04	(0.10)	[72029]
	5(2, 4) - 4(2, 3)	(0,0,0)	261204.37	(0.10)	[72029]
	5(2, 3) - 4(2, 2)	(0,0,0)	261245.65	(0.10)	[72029]
	5(0, 5) - 4(0, 4)	(0,0,0)	261264.22	(0.10)	[72029]
	5(1, 4) - 4(1, 3)	(0,0,0)	264384.57	(0.10)	[72029]
	4(1, 4) - 5(0, 5)	(0,0,0)	291900.02	(0.10)	[72030]
	7(1, 7) - 6(1, 6)	(0,0,0)	361349.55	(0.10)	[72030]
	7(4, 3) - 6(4, 2)	(0,0,0)	365234.08	(0.10)	[72030]
	7(4, 4) - 6(4, 3)	(0,0,0)	365234.08	(0.10)	[72030]
	7(3, 4) - 6(3, 3)	(0,0,0)	365477.52	(0.10)	[72030]
	7(3, 5) - 6(3, 4)	(0,0,0)	365477.52	(0.10)	[72030]
	7(2, 6) - 6(2, 5)	(0,0,0)	365613.80	(0.10)	[72030]
	7(0, 7) - 6(0, 6)	(0,0,0)	365648.94	(0.10)	[72030]
	7(2, 5) - 6(2, 4)	(0,0,0)	365729.34	(0.10)	[72030]
	7(1, 6) - 6(1, 5)	(0,0,0)	370057.77	(0.10)	[72030]
$D^{16}O^{19}F$	13(2,12) - 14(1,13)	(0,0,0)	83295.86	(0.10)	[72030]
	3(1, 3) - 4(0, 4)	(0,0,0)	88902.62	(0.10)	[72030]
	2(1, 2) - 1(1, 1)	(0,0,0)	96345.03	(0.10)	[72029]
	2(0, 2) - 1(0, 1)	(0,0,0)	98345.17	(0.10)	[72029]
	2(1, 1) - 1(1, 0)	(0,0,0)	100352.02	(0.10)	[72029]
	17(1,16) - 16(2,15)	(0,0,0)	108937.41	(0.10)	[72030]
	24(3,22) - 25(2,23)	(0,0,0)	111131.50	(0.10)	[72030]
	8(0, 8) - 7(1, 7)	(0,0,0)	128047.08	(0.10)	[72030]
	21(2,19) - 22(1,22)	(0,0,0)	139673.64	(0.10)	[72030]
	2(1, 2) - 3(0, 3)	(0,0,0)	140988.80	(0.10)	[72030]
	3(1, 3) - 2(1, 2)	(0,0,0)	144506.79	(0.10)	[72029]
	12(2,11) - 13(1,12)	(0,0,0)	145762.26	(0.10)	[72030]
	3(2, 2) - 2(2, 1)	(0,0,0)	147486.81	(0.10)	[72029]
	3(0, 3) - 2(0, 2)	(0,0,0)	147487.39	(0.10)	[72029]
	3(2, 1) - 2(2, 0)	(0,0,0)	147527.87	(0.10)	[72029]
	3(1, 2) - 2(1, 1)	(0,0,0)	150516.64	(0.10)	[72029]
	18(1,17) - 17(2,16)	(0,0,0)	174522.93	(0.10)	[72030]
	23(3,21) - 24(2,22)	(0,0,0)	175337.20	(0.10)	[72030]
$D^{16}O^{19}F$	18(2,16) - 19(1,19)	(0,0,0)	183556.01	(0.10)	[72030]
	9(0, 9) - 8(1, 8)	(0,0,0)	184160.19	(0.10)	[72030]
	1(1, 1) - 2(0, 2)	(0,0,0)	192131.16	(0.10)	[72030]
	4(1, 4) - 3(1, 3)	(0,0,0)	192655.95	(0.10)	[72029]
	4(3, 1) - 3(3, 0)	(0,0,0)	196591.10	(0.10)	[72029]
	4(3, 2) - 3(3, 1)	(0,0,0)	196591.10	(0.10)	[72029]
	4(0, 4) - 3(0, 3)	(0,0,0)	196592.94	(0.10)	[72029]
	4(2, 3) - 3(2, 2)	(0,0,0)	196632.50	(0.10)	[72029]
	4(2, 2) - 3(2, 1)	(0,0,0)	196735.30	(0.10)	[72029]
	4(1, 3) - 3(1, 2)	(0,0,0)	200667.41	(0.10)	[72029]
	17(2,15) - 18(1,18)	(0,0,0)	203476.50	(0.10)	[72030]
	11(2,10) - 12(1,11)	(0,0,0)	207378.37	(0.10)	[72030]
	22(3,20) - 23(2,21)	(0,0,0)	238274.90	(0.10)	[72030]
	5(1, 5) - 4(1, 4)	(0,0,0)	240787.74	(0.10)	[72029]
	19(1,18) - 18(2,17)	(0,0,0)	240802.69	(0.10)	[72030]
	10(0,10) - 9(1, 9)	(0,0,0)	240887.33	(0.10)	[72030]
	5(4, 1) - 4(4, 0)	(0,0,0)	245600.09	(0.10)	[72029]
	5(4, 2) - 4(4, 1)	(0,0,0)	245600.09	(0.10)	[72029]
	5(0, 5) - 4(0, 4)	(0,0,0)	245650.09	(0.10)	[72029]
	5(3, 2) - 4(3, 1)	(0,0,0)	245734.60	(0.10)	[72029]
	5(3, 3) - 4(3, 2)	(0,0,0)	245734.60	(0.10)	[72029]
	5(2, 4) - 4(2, 3)	(0,0,0)	245764.01	(0.10)	[72029]
	5(2, 3) - 4(2, 2)	(0,0,0)	245969.50	(0.10)	[72029]
	5(1, 4) - 4(1, 3)	(0,0,0)	250799.63	(0.10)	[72029]

Table 30. Rotational and centrifugal distortion constants for $^{19}F^{14}N^{16}O$.

Watson's Determinable Parameters	Present Value[a] (MHz)	Cook [65010] (MHz)
A"	95 189.827(78)	
B"	11 844.074(9)	
C"	10 508.393(8)	
τ_1	-0.095170(2681)	
τ_2	-0.060646(411)	
τ_3[b]	6.93(2)	
τ_{aaaa}	-15.771(49)	-15.586926
τ_{bbbb}	-0.100443(258)	-0.099630
τ_{cccc}	-0.056918(201)	-0.056554
H_J	$0.3669(1494)\times10^{-6}$	
H_{JK}	$-0.8311(7102)\times10^{-5}$	2.339×10^{-6}
H_{KJ}	$-0.152(243)\times10^{-4}$	-4.946×10^{-5}
H_K	$0.158(40)\times10^{-2}$	
h_J[c]	$-0.128(88)\times10^{-6}$	
h_{JK}	$0.2545(1300)\times10^{-4}$	
h_K	$-0.1219(586)\times10^{-2}$	
Std. dev.	0.244	
No. lines fit	90	
Derived Parameters (assuming planarity conditions)		
A'	95 189.790(78)	95 189.77
B'	11 844.137(8)	11 844.12
C'	10 508.320(8)	10 508.31
τ'_{bbcc}	-0.07437(24)	-0.07367
τ'_{ccaa}	0.1266(33)	0.1402
τ'_{aabb}	-0.1474(33)	
$\tau_{aabb}(1)$	0.4087(40)	
$\tau_{aabb}(2)$	0.4258(69)	0.418629
$\tau_{aabb}(3)$	0.4258(69)	
$\tau_{abab}(1)$	-0.2780(34)	
$\tau_{abab}(2)$	-0.2935(61)	-0.289581
$\tau_{abab}(3)$	-0.2952(69)	
$\Delta\tau$	$0.34(16)\times10^{-3}$	

[a] The uncertainties quoted are one standard deviation as estimated by the least squares fit. The number of significant figures quoted are necessary to reproduce the calculated transition frequencies within their standard deviations.

[b] Strictly speaking, τ_3 is not a determinable parameter, but is calculated from τ_1, τ_2, τ_{aaaa} and τ_{bbbb} using the planarity conditions.

[c] Watson uses $2h_J$ for this parameter.

Table 30.1. Molecular parameters for FNO [69026][a].

Parameter	$^{19}F^{14}N^{16}O$	$^{19}F^{14}N^{18}O$	$^{19}F^{15}N^{16}O$
A	95 189.67(81)	92 667.47(170)	90 828.51(170)
B	11 844.065(74)	11 253.92(11)	11 825.33(11)
C	10 508.259(79)	10 012.07(15)	10 437.62(15)
χ_{aa}	1.69(5)		
χ_{bb}	-4.83(5)		
χ_{cc}	3.14(5)		
μ_a	1.70[b]		
μ_b	0.62[b]		

[a] The values in the table are taken from this reference unless otherwise indicated.

[b] Reference [51007].

TABLE 30.2. The microwave spectrum of FNO

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F_1'	F''	F_1''	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{19}F^{14}N^{16}O$	10(2, 8) - 10(2, 9)		9		9	(0,0,0)	7705.75	(0.10)	[69026]
	10(2, 8) - 10(2, 9)		11		11	(0,0,0)	7705.75	(0.10)	[69026]
	10(2, 8) - 10(2, 9)		10		10	(0,0,0)	7706.38	(0.10)	[69026]
	3(1, 2) - 3(1, 3)		2		2	(0,0,0)	8011.65	(0.10)	[69026]
	3(1, 2) - 3(1, 3)		4		4	(0,0,0)	8012.57	(0.10)	[69026]
	3(1, 2) - 3(1, 3)		3		3	(0,0,0)	8015.24	(0.10)	[69026]
	19(3,16) - 19(3,17)		20		20	(0,0,0)	8358.91	(0.10)	[69026]
	19(3,16) - 19(3,17)		18		18	(0,0,0)	8358.91	(0.10)	[69026]
	19(3,16) - 20(2,19)		20		21	(0,0,0)	8498.69	(0.10)	[69026]
	19(3,16) - 20(2,19)		18		19	(0,0,0)	8498.69	(0.10)	[69026]
	29(4,25) - 29(4,26)					(0,0,0)	9067.21	(0.20)	[65010]
	4(0, 3) - 3(1, 3)		5		4	(0,0,0)	9172.07	(0.10)	[69026]
	4(0, 3) - 3(1, 3)		4		3	(0,0,0)	9173.81	(0.10)	[69026]
	11(2, 9) - 11(2,10)		12		12	(0,0,0)	11030.97	(0.10)	[69026]
	11(2, 9) - 11(2,10)		10		10	(0,0,0)	11030.97	(0.10)	[69026]
	11(2, 9) - 11(2,10)		11		11	(0,0,0)	11031.53	(0.10)	[69026]
	20(3,17) - 20(3,18)		21		21	(0,0,0)	11176.12	(0.10)	[69026]
	20(3,17) - 20(3,18)		19		19	(0,0,0)	11176.12	(0.10)	[69026]
	22(3,19) - 22(3,20)					(0,0,0)	19037.01	(0.20)	[65010]
	23(4,20) - 24(3,21)					(0,0,0)	19254.47	(0.20)	[65010]
	5(1, 4) - 5(1, 5)		4		4	(0,0,0)	20026.02	(0.10)	[69026]
	5(1, 4) - 5(1, 5)		6		6	(0,0,0)	20026.36	(0.10)	[69026]
	5(1, 4) - 5(1, 5)		5		5	(0,0,0)	20029.48	(0.10)	[69026]
	13(2,11) - 13(2,12)		14		14	(0,0,0)	20537.84	(0.10)	[69026]
	13(2,11) - 13(2,12)		12		12	(0,0,0)	20537.84	(0.10)	[69026]
	13(2,11) - 13(2,12)		13		13	(0,0,0)	20539.80	(0.10)	[69026]
	1(0, 1) - 0(0, 0)		0		1	(0,0,0)	22351.58	(0.03)	[66017]
	1(0, 1) - 0(0, 0)		2		1	(0,0,0)	22352.321	(1E-3)	[74011]
	1(0, 1) - 0(0, 0)		1		1	(0,0,0)	22352.824	(1E-3)	[74011]
	18(3,15) - 19(2,18)		19		20	(0,0,0)	23936.75	(0.10)	[69026]
	18(3,15) - 19(2,18)		17		18	(0,0,0)	23936.75	(0.10)	[69026]
	23(3,20) - 23(3,21)					(0,0,0)	24303.85	(0.20)	[65010]
	14(2,12) - 14(2,13)		15		15	(0,0,0)	26937.74	(0.10)	[69026]
	14(2,12) - 14(2,13)		13		13	(0,0,0)	26937.74	(0.10)	[69026]
	14(2,12) - 14(2,13)		14		14	(0,0,0)	26938.34	(0.10)	[69026]
	14(2,12) - 15(1,15)		15		16	(0,0,0)	27633.86	(0.10)	[69026]
	14(2,12) - 15(1,15)		13		14	(0,0,0)	27633.86	(0.10)	[69026]

TABLE 30.2. The microwave spectrum of FNO—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{19}F^{14}N^{16}O$	14(2,12) - 15(1,15)		14		15	(0,0,0)	27636.83	(0.10)	[69026]
	6(1, 5) - 6(1, 6)		5		5	(0,0,0)	28028.96	(0.10)	[69026]
	6(1, 5) - 6(1, 6)		6		6	(0,0,0)	28032.23	(0.10)	[69026]
	28(3,26) - 27(4,23)					(0,0,0)	28782.53	(0.20)	[65010]
	31(5,26) - 32(4,29)					(0,0,0)	28861.04	(0.20)	[65010]
	18(2,16) - 17(3,15)		19		18	(0,0,0)	29327.18	(0.10)	[69026]
	18(2,16) - 17(3,15)		17		16	(0,0,0)	29327.18	(0.10)	[69026]
	24(4,20) - 25(3,23)					(0,0,0)	30530.62	(0.20)	[65010]
	15(3,13) - 16(2,14)		15		16	(0,0,0)	30637.22	(0.10)	[69026]
	15(3,13) - 16(2,14)		16		17	(0,0,0)	30638.22	(0.10)	[69026]
	15(3,13) - 16(2,14)		14		15	(0,0,0)	30638.22	(0.10)	[69026]
	13(2,11) - 14(1,14)					(0,0,0)	32849.70	(0.20)	[65010]
	5(0, 5) - 4(1, 4)		6		5	(0,0,0)	33903.92	(0.10)	[69026]
	5(0, 5) - 4(1, 4)		5		4	(0,0,0)	33905.05	(0.10)	[69026]
	15(2,13) - 15(2,14)		16		16	(0,0,0)	34558.47	(0.10)	[69026]
	15(2,13) - 15(2,14)		14		14	(0,0,0)	34558.47	(0.10)	[69026]
	15(2,13) - 15(2,14)		15		15	(0,0,0)	34560.37	(0.10)	[69026]
	30(5,26) - 31(4,27)					(0,0,0)	36014.79	(0.20)	[65010]
	11(1,10) - 10(2, 9)		12		11	(0,0,0)	36043.69	(0.10)	[69026]
	11(1,10) - 10(2, 9)		10		9	(0,0,0)	36043.69	(0.10)	[69026]
	11(1,10) - 10(2, 9)		11		10	(0,0,0)	36045.26	(0.10)	[69026]
	7(1, 6) - 7(1, 7)		6		6	(0,0,0)	37356.31	(0.10)	[69026]
	7(1, 6) - 7(1, 7)		7		7	(0,0,0)	37360.00	(0.10)	[69026]
	1(1, 1) - 2(0, 2)					(0,0,0)	38653.49	(0.20)	[65010]
	26(3,23) - 25(4,22)					(0,0,0)	39544.56	(0.20)	[65010]
	12(2,10) - 13(1,13)					(0,0,0)	39947.80	(0.20)	[65010]
	2(1, 2) - 1(1, 1)		2		2	(0,0,0)	43367.81	(0.03)	[66017]
	2(1, 2) - 1(1, 1)		3		2	(0,0,0)	43368.89	(0.03)	[66017]
	2(1, 2) - 1(1, 1)		2		1	(0,0,0)	43368.89	(0.40)	[66017]
	2(1, 2) - 1(1, 1)		1		1	(0,0,0)	43370.91	(0.03)	[66017]
	2(1, 1) - 1(1, 0)		1		1	(0,0,0)	46037.91	(0.03)	[66017]
	2(1, 1) - 1(1, 0)		3		2	(0,0,0)	46039.84	(0.03)	[66017]
	2(1, 1) - 1(1, 0)		1		0	(0,0,0)	46039.84	(0.40)	[66017]
	2(1, 1) - 1(1, 0)		2		1	(0,0,0)	46040.45	(0.03)	[66017]
	2(1, 1) - 1(1, 0)		2		2	(0,0,0)	46041.41	(0.03)	[66017]
	29(5,25) - 30(4,26)					(0,0,0)	62306.76	(0.20)	[65010]
	12(1,11) - 11(2,10)					(0,0,0)	65669.32	(0.20)	[65010]
	27(3,24) - 26(4,23)					(0,0,0)	70398.42	(0.20)	[65010]
	9(2, 7) - 10(1,10)					(0,0,0)	71453.11	(0.20)	[65010]
	22(4,18) - 23(3,21)					(0,0,0)	72693.63	(0.20)	[65010]
	8(0, 8) - 7(1, 7)					(0,0,0)	110583.17	(0.20)	[65010]
	6(1, 6) - 5(1, 5)					(0,0,0)	129969.59	(0.20)	[65010]
	6(0, 6) - 5(0, 5)					(0,0,0)	133543.69	(0.20)	[65010]
	6(2, 5) - 5(2, 4)					(0,0,0)	134028.58	(0.20)	[65010]
	6(5, 2) - 5(5, 1)					(0,0,0)	134147.45	(0.20)	[65010]
	6(4, 3) - 5(4, 2)					(0,0,0)	134158.45	(0.20)	[65010]
	6(3, 4) - 5(3, 3)					(0,0,0)	134185.96	(0.20)	[65010]
	6(3, 3) - 5(3, 2)					(0,0,0)	134192.16	(0.20)	[65010]
	6(2, 4) - 5(2, 3)					(0,0,0)	134582.32	(0.20)	[65010]
	9(0, 9) - 8(1, 8)					(0,0,0)	136693.56	(0.20)	[65010]
	6(1, 5) - 5(1, 4)					(0,0,0)	137972.83	(0.20)	[65010]
	7(1, 7) - 6(1, 6)					(0,0,0)	151568.60	(0.20)	[65010]
	7(0, 7) - 6(0, 6)					(0,0,0)	155556.86	(0.20)	[65010]
	7(2, 6) - 6(2, 5)					(0,0,0)	156319.48	(0.20)	[65010]
	7(5, 3) - 6(5, 2)					(0,0,0)	156507.98	(0.20)	[65010]
	7(4, 4) - 6(4, 3)					(0,0,0)	156526.85	(0.20)	[65010]
	7(3, 5) - 6(3, 4)					(0,0,0)	156570.47	(0.20)	[65010]
	7(2, 5) - 6(2, 4)					(0,0,0)	157201.94	(0.20)	[65010]
	7(1, 6) - 6(1, 5)					(0,0,0)	160896.53	(0.20)	[65010]
	8(1, 8) - 7(1, 7)					(0,0,0)	173140.14	(0.20)	[65010]
	8(0, 8) - 7(0, 7)					(0,0,0)	177463.08	(0.20)	[65010]
	8(2, 7) - 7(2, 6)					(0,0,0)	178588.40	(0.20)	[65010]
	8(7, 2) - 7(7, 1)					(0,0,0)	178853.65	(0.20)	[65010]
	8(6, 3) - 7(6, 2)					(0,0,0)	178858.28	(0.20)	[65010]
	8(5, 4) - 7(5, 3)					(0,0,0)	178871.46	(0.20)	[65010]

TABLE 30.2. The microwave spectrum of FNO—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{19}F^{14}N^{16}O$	8(3, 6) - 7(3, 5)					(0,0,0)	178960.88	(0.20)	[65010]
	8(3, 5) - 7(3, 4)					(0,0,0)	178990.69	(0.20)	[65010]
	8(2, 6) - 7(2, 5)					(0,0,0)	179904.25	(0.20)	[65010]
	8(1, 7) - 7(1, 6)					(0,0,0)	183785.06	(0.20)	[65010]
	11(0,11) - 10(1,10)					(0,0,0)	189179.10	(0.20)	[65010]
	9(1, 9) - 8(1, 8)					(0,0,0)	194681.56	(0.20)	[65010]
	9(2, 8) - 8(2, 7)					(0,0,0)	200832.97	(0.20)	[65010]
	9(7, 3) - 8(7, 2)					(0,0,0)	201207.38	(0.20)	[65010]
	9(6, 4) - 8(6, 3)					(0,0,0)	201215.62	(0.20)	[65010]
	9(5, 5) - 8(5, 4)					(0,0,0)	201234.71	(0.20)	[65010]
	9(4, 6) - 8(4, 5)					(0,0,0)	201278.06	(0.20)	[65010]
	9(3, 7) - 8(3, 6)					(0,0,0)	201360.00	(0.20)	[65010]
	9(3, 6) - 8(3, 5)					(0,0,0)	201414.28	(0.20)	[65010]
	9(2, 7) - 8(2, 6)					(0,0,0)	202696.92	(0.20)	[65010]
	9(1, 8) - 8(1, 7)					(0,0,0)	206632.35	(0.20)	[65010]
	10(1,10) - 9(1, 9)					(0,0,0)	216190.60	(0.20)	[65010]
	10(0,10) - 9(0, 9)					(0,0,0)	220912.37	(0.20)	[65010]
	10(2, 9) - 9(2, 8)					(0,0,0)	223049.95	(0.20)	[65010]
	10(8, 3) - 9(8, 2)					(0,0,0)	223554.74	(0.20)	[65010]
	10(7, 4) - 9(7, 3)					(0,0,0)	223559.69	(0.20)	[65010]
	10(6, 5) - 9(6, 4)					(0,0,0)	223572.63	(0.20)	[65010]
	10(5, 6) - 9(5, 5)					(0,0,0)	223600.65	(0.20)	[65010]
	10(4, 7) - 9(4, 6)					(0,0,0)	223660.71	(0.20)	[65010]
	10(4, 6) - 9(4, 5)					(0,0,0)	223661.70	(0.20)	[65010]
	10(3, 8) - 9(3, 7)					(0,0,0)	223765.54	(0.20)	[65010]
	10(3, 7) - 9(3, 6)					(0,0,0)	223858.44	(0.20)	[65010]
	10(2, 8) - 9(2, 7)					(0,0,0)	225582.27	(0.20)	[65010]
$^{19}F^{15}N^{16}O$	18(3,15) - 18(3,16)					(0,0,0)	7593.49	(0.10)	[69026]
	3(1, 2) - 3(1, 3)					(0,0,0)	8324.45	(0.10)	[69026]
	5(1, 4) - 5(1, 5)					(0,0,0)	20804.51	(0.10)	[69026]
	1(0, 1) - 0(0, 0)					(0,0,0)	22262.96	(0.10)	[69026]
	6(1, 5) - 6(1, 6)					(0,0,0)	29116.59	(0.10)	[69026]
	5(0, 5) - 4(1, 4)					(0,0,0)	37962.10	(0.10)	[69026]
$^{19}F^{14}N^{18}O$	19(3,16) - 19(3,17)					(0,0,0)	7081.50	(0.10)	[69026]
	3(1, 2) - 3(1, 3)					(0,0,0)	7448.85	(0.10)	[69026]
	20(3,17) - 20(3,18)					(0,0,0)	9478.50	(0.10)	[69026]
	11(2, 9) - 11(2,10)					(0,0,0)	9791.53	(0.10)	[69026]
	13(2,11) - 13(2,12)					(0,0,0)	18268.05	(0.10)	[69026]
	5(1, 4) - 5(1, 5)					(0,0,0)	18619.10	(0.10)	[69026]
	1(0, 1) - 0(0, 0)					(0,0,0)	21265.91	(0.10)	[69026]
	14(2,12) - 14(2,13)					(0,0,0)	23992.10	(0.10)	[69026]
	6(1, 5) - 6(1, 6)					(0,0,0)	26060.63	(0.10)	[69026]
	11(1,10) - 10(2, 9)					(0,0,0)	27159.68	(0.10)	[69026]
	8(2, 7) - 9(1, 8)					(0,0,0)	27529.31	(0.10)	[69026]
	5(0, 5) - 4(1, 4)					(0,0,0)	30042.33	(0.10)	[69026]
	15(2,13) - 15(2,14)					(0,0,0)	30823.74	(0.10)	[69026]
	7(1, 6) - 7(1, 7)					(0,0,0)	34733.60	(0.10)	[69026]

Table 31. Rotational and centrifugal distortion constants for NSF.

Watson's Determinable Parameters	$^{14}N^{32}S^{19}F$ Value[a] (MHz) [72031]	$^{14}N^{34}S^{19}F$ Value (MHz) [67013]
A"	49 719.6068(172)	48 298.98
B"	8 712.25890(316)	8 701.26
C"	7 392.99808(269)	7 352.78
τ_1	0.3771750(27383)	
τ_2	0.0254081(4089)	
τ_3[b]	1.276(9)	
τ_{aaaa}	-8.896917(3700)	-8.46707
τ_{bbbb}	-0.05625526(15169)	-0.05713
τ_{cccc}	-0.0194343(1098)	
H_J	$0.4061(2701)\times10^{-7}$	
H_{JK}	$0.3390(3104)\times10^{-6}$	
H_{KJ}	$-0.30861(3795)\times10^{-4}$	
H_K	$0.42285(4015)\times10^{-3}$	
h_J[c]	$0.9933(3768)\times10^{-8}$	
h_{JK}	$0.1770(986)\times10^{-5}$	
h_K	$-0.1116(2976)\times10^{-4}$	
Std. dev.	0.047	
No. lines fit	76	
Derived Parameters (assuming planarity conditions)		
A'	49 719.592(17)	
B'	8 712.324(3)	
C'	7 393.137(3)	
τ'_{bbcc}	-0.03043(13)	
τ'_{ccaa}	0.1303(7)	
τ'_{aabb}	0.2773(19)	
$\tau_{aabb}(1)$	0.4572(11)	0.42993
$\tau_{aabb}(2)$	0.4469(10)	
$\tau_{aabb}(3)$	0.4469(10)	
$\tau_{abab}(1)$	-0.08996(40)	-0.08346
$\tau_{abab}(2)$	-0.08100(53)	
$\tau_{abab}(3)$	-0.07967(56)	
$\Delta\tau$	-0.335(9)	

[a] The uncertainties quoted are one standard deviation as estimated by the least squares fit. The number of significant figures quoted are necessary to reproduce the calculated transition frequencies within their standard deviations.

[b] Strictly speaking, τ_3 is not a determinable parameter, but is calculated from τ_1, τ_2, τ_{aaaa} and τ_{bbbb} using the planarity conditions.

[c] Watson uses $2h_J$ for this parameter.

Table 31.1. Hyperfine constants and electric dipole moment of $^{14}N^{32}S^{19}F$.

Parameter	Value	Reference
χ_{aa} (^{14}N) (MHz)	-1.720(41)	this work
χ_{bb} (^{14}N) (MHz)	-3.990(36)	this work
χ_{cc} (^{14}N) (MHz)	5.710(46)	this work
μ_a (D)	0.242(12)	[67013]
μ_b (D)	1.886(11)	[67013]

TABLE 31.2. The microwave spectrum of NSF

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{14}N^{32}S^{19}F$	33(6,27) - 32(7,26)					(0,0,0)	8092.73	(0.10)	[67013]
	10(2, 8) - 11(1,11)		9		10	(0,0,0)	8220.82	(0.20)	[63006]
	10(2, 8) - 11(1,11)		11		12	(0,0,0)	8221.14	(0.20)	[63006]
	10(2, 8) - 11(1,11)		10		11	(0,0,0)	8224.42	(0.20)	[63006]
	26(6,21) - 27(5,22)					(0,0,0)	8265.34	(0.10)	[67013]
	3(0, 3) - 2(1, 2)		2		1	(0,0,0)	8471.52	(0.20)	[63006]
	3(0, 3) - 2(1, 2)		4		3	(0,0,0)	8472.23	(0.20)	[63006]
	3(0, 3) - 2(1, 2)		3		2	(0,0,0)	8473.42	(0.20)	[63006]
	1(1, 1) - 2(0, 2)		1		1	(0,0,0)	8824.46	(0.20)	[63006]
	1(1, 1) - 2(0, 2)		1		2	(0,0,0)	8825.31	(0.20)	[63006]
	1(1, 1) - 2(0, 2)		2		3	(0,0,0)	8825.96	(0.20)	[63006]
	1(1, 1) - 2(0, 2)		2		2	(0,0,0)	8826.50	(0.20)	[63006]
	1(1, 1) - 2(0, 2)		0		1	(0,0,0)	8827.46	(0.20)	[63006]
	13(2,11) - 14(1,14)		12		13	(0,0,0)	9366.14	(0.20)	[63006]
	13(2,11) - 14(1,14)		14		15	(0,0,0)	9366.39	(0.20)	[63006]
	13(2,11) - 14(1,14)		13		14	(0,0,0)	9370.22	(0.20)	[63006]
	31(7,25) - 32(6,26)					(0,0,0)	10061.91	(0.10)	[67013]
	28(5,23) - 27(6,22)					(0,0,0)	10460.47	(0.10)	[67013]
	12(3, 9) - 13(2,12)		13		14	(0,0,0)	10906.67	(0.20)	[63006]
	12(3, 9) - 13(2,12)		11		12	(0,0,0)	10906.67	(0.20)	[63006]
	12(3, 9) - 13(2,12)		12		13	(0,0,0)	10907.57	(0.20)	[63006]
	36(8,29) - 37(7,30)					(0,0,0)	11245.53	(0.10)	[67013]
	15(2,14) - 14(3,11)		15		14	(0,0,0)	11267.12	(0.20)	[63006]
	15(2,14) - 14(3,11)		14		13	(0,0,0)	11268.22	(0.20)	[63006]
	15(2,14) - 14(3,11)		16		15	(0,0,0)	11268.22	(0.20)	[63006]
	31(7,24) - 32(6,27)					(0,0,0)	11637.07	(0.10)	[67013]
	9(2, 7) - 10(1,10)		8		9	(0,0,0)	11888.95	(0.20)	[63006]
	9(2, 7) - 10(1,10)		10		11	(0,0,0)	11889.28	(0.20)	[63006]
	36(8,28) - 37(7,31)					(0,0,0)	11890.79	(0.10)	[67013]
	9(2, 7) - 10(1,10)		9		10	(0,0,0)	11892.31	(0.20)	[63006]
	26(6,20) - 27(5,23)					(0,0,0)	11953.85	(0.10)	[67013]
	19(3,17) - 18(4,14)		19		18	(0,0,0)	12810.00	(0.10)	[67013]
	19(3,17) - 18(4,14)		18		17	(0,0,0)	12810.00	(0.10)	[67013]
	19(3,17) - 18(4,14)		20		19	(0,0,0)	12810.00	(0.10)	[67013]
	21(5,16) - 22(4,19)					(0,0,0)	13404.79	(0.10)	[67013]
	37(3,35) - 36(4,32)					(0,0,0)	13644.47	(0.10)	[67013]
	14(2,12) - 15(1,15)		15		16	(0,0,0)	13904.62	(0.20)	[67013]
	23(4,19) - 22(5,18)					(0,0,0)	14464.73	(0.10)	[67013]
	5(2, 4) - 6(1, 5)		5		6	(0,0,0)	14896.43	(0.20)	[63006]
	5(2, 4) - 6(1, 5)		6		7	(0,0,0)	14897.89	(0.20)	[63006]
	5(2, 4) - 6(1, 5)		4		5	(0,0,0)	14897.89	(0.20)	[63006]
	10(3, 8) - 11(2, 9)		10		11	(0,0,0)	16079.34	(0.20)	[63006]
	10(3, 8) - 11(2, 9)		11		12	(0,0,0)	16080.37	(0.20)	[63006]
	1(0, 1) - 0(0, 0)		2		1	(0,0,0)	16105.50	(0.20)	[63006]
	25(2,24) - 24(3,21)					(0,0,0)	16312.53	(0.10)	[67013]

TABLE 31.2. The microwave spectrum of NSF—Continued

Isotopic species	$J'(K'_-,K'_+)$ – $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{14}N^{32}S^{19}F$	16(4,12) – 17(3,15)		15		16	(0,0,0)	16909.88	(0.10)	[67013]
	16(4,12) – 17(3,15)		16		17	(0,0,0)	16909.88	(0.10)	[67013]
	16(4,12) – 17(3,15)		17		18	(0,0,0)	16909.88	(0.10)	[67013]
	8(2, 6) – 9(1, 9)		9		10	(0,0,0)	17424.86	(0.20)	[63006]
	8(2, 6) – 9(1, 9)		7		8	(0,0,0)	17424.86	(0.20)	[63006]
	8(2, 6) – 9(1, 9)		8		9	(0,0,0)	17427.95	(0.20)	[63006]
	24(4,21) – 23(5,18)					(0,0,0)	19436.66	(0.10)	[67013]
	16(2,15) – 15(3,12)		16		15	(0,0,0)	20421.55	(0.20)	[63006]
	16(2,15) – 15(3,12)		17		16	(0,0,0)	20422.82	(0.20)	[63006]
	16(2,15) – 15(3,12)		15		14	(0,0,0)	20422.82	(0.20)	[63006]
	15(2,13) – 16(1,16)		16		17	(0,0,0)	20473.40	(0.20)	[63006]
	15(2,13) – 16(1,16)		14		15	(0,0,0)	20473.40	(0.20)	[63006]
	15(2,13) – 16(1,16)		15		16	(0,0,0)	20477.47	(0.20)	[63006]
	15(4,12) – 16(3,13)		15		16	(0,0,0)	20649.27	(0.20)	[63006]
	15(4,12) – 16(3,13)		16		17	(0,0,0)	20649.84	(0.20)	[63006]
	15(4,12) – 16(3,13)		14		15	(0,0,0)	20649.84	(0.20)	[63006]
	18(3,15) – 17(4,14)		18		17	(0,0,0)	20661.14	(0.20)	[63006]
	18(3,15) – 17(4,14)		19		18	(0,0,0)	20661.37	(0.20)	[63006]
	18(3,15) – 17(4,14)		17		16	(0,0,0)	20661.37	(0.20)	[63006]
	29(5,25) – 28(6,22)					(0,0,0)	22452.46	(0.10)	[67013]
	27(3,24) – 28(2,27)					(0,0,0)	22805.78	(0.10)	[67013]
	39(7,33) – 38(8,30)					(0,0,0)	23309.40	(0.10)	[67013]
	34(6,29) – 33(7,26)					(0,0,0)	23410.52	(0.10)	[67013]
	11(3, 8) – 12(2,11)					(0,0,0)	23555.89	(0.10)	[67013]
	20(5,16) – 21(4,17)					(0,0,0)	24315.90	(0.10)	[67013]
	39(7,32) – 38(8,31)					(0,0,0)	24610.57	(0.10)	[67013]
	7(2, 5) – 8(1, 8)		8		9	(0,0,0)	24678.78	(0.20)	[63006]
	7(2, 5) – 8(1, 8)		6		7	(0,0,0)	24678.78	(0.20)	[63006]
	7(2, 5) – 8(1, 8)		7		8	(0,0,0)	24681.70	(0.20)	[63006]
	24(2,23) – 23(3,20)					(0,0,0)	25404.05	(0.10)	[67013]
	38(4,34) – 39(3,37)					(0,0,0)	25947.61	(0.10)	[67013]
	4(0, 4) – 3(1, 3)		5		4	(0,0,0)	26261.53	(0.20)	[63006]
	4(0, 4) – 3(1, 3)		4		3	(0,0,0)	26262.69	(0.20)	[63006]
	8(1, 7) – 7(2, 6)		9		8	(0,0,0)	26437.85	(0.20)	[63006]
	8(1, 7) – 7(2, 6)		7		6	(0,0,0)	26437.85	(0.20)	[63006]
	8(1, 7) – 7(2, 6)		8		7	(0,0,0)	26439.41	(0.20)	[63006]
	34(6,28) – 33(7,27)					(0,0,0)	26550.93	(0.10)	[67013]
	25(6,20) – 26(5,21)					(0,0,0)	26579.12	(0.10)	[67013]
	20(3,18) – 19(4,15)					(0,0,0)	26764.20	(0.10)	[67013]
	13(2,11) – 12(3,10)					(0,0,0)	27102.47	(0.10)	[67013]
	30(7,24) – 31(6,25)					(0,0,0)	27957.29	(0.10)	[67013]
	17(2,16) – 16(3,13)		17		16	(0,0,0)	28029.27	(0.20)	[63006]
	17(2,16) – 16(3,13)		18		17	(0,0,0)	28030.78	(0.20)	[63006]
	17(2,16) – 16(3,13)		16		15	(0,0,0)	28030.78	(0.20)	[63006]
	35(8,28) – 36(7,29)					(0,0,0)	28899.70	(0.10)	[67013]
	16(2,14) – 17(1,17)		15		16	(0,0,0)	29003.06	(0.20)	[63006]
	16(2,14) – 17(1,17)		17		18	(0,0,0)	29003.32	(0.20)	[63006]
	16(2,14) – 17(1,17)		16		17	(0,0,0)	29007.37	(0.20)	[63006]
	30(7,23) – 31(6,26)					(0,0,0)	29051.23	(0.10)	[67013]
	25(6,19) – 26(5,22)					(0,0,0)	29154.09	(0.10)	[67013]
	35(8,27) – 36(7,30)					(0,0,0)	29346.37	(0.10)	[67013]
	30(5,26) – 29(6,23)					(0,0,0)	29581.33	(0.10)	[67013]
	29(5,24) – 28(6,23)					(0,0,0)	29676.26	(0.10)	[67013]
	20(5,15) – 21(4,18)					(0,0,0)	30057.24	(0.10)	[67013]
	2(1, 2) – 1(1, 1)		2		1	(0,0,0)	30891.49	(0.20)	[63006]
	2(1, 2) – 1(1, 1)		1		0	(0,0,0)	30891.49	(0.20)	[63006]
	2(1, 2) – 1(1, 1)		3		2	(0,0,0)	30892.13	(0.20)	[63006]
	36(3,34) – 35(4,31)					(0,0,0)	31091.45	(0.10)	[67013]
	2(0, 2) – 1(0, 1)		3		2	(0,0,0)	32179.27	(0.20)	[63006]
	2(0, 2) – 1(0, 1)		2		1	(0,0,0)	32179.27	(0.20)	[63006]
	23(2,22) – 22(3,19)					(0,0,0)	32339.22	(0.10)	[67013]
	15(4,11) – 16(3,14)		16		17	(0,0,0)	32425.85	(0.20)	[63006]
	15(4,11) – 16(3,14)		15		16	(0,0,0)	32425.85	(0.20)	[63006]
	15(4,11) – 16(3,14)		14		15	(0,0,0)	32425.85	(0.20)	[63006]
	6(2, 4) – 7(1, 7)		7		8	(0,0,0)	33478.91	(0.20)	[63006]
	6(2, 4) – 7(1, 7)		5		6	(0,0,0)	33478.56	(0.20)	[63006]

TABLE 31.2. The microwave spectrum of NSF—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{14}N^{32}S^{19}F$	6(2, 4) - 7(1, 7)		6		7	(0,0,0)	33481.42	(0.20)	[63006]
	2(1, 1) - 1(1, 0)		3		2	(0,0,0)	33530.31	(0.20)	[63006]
	18(2,17) - 17(3,14)		18		17	(0,0,0)	33901.19	(0.20)	[63006]
	18(2,17) - 17(3,14)		19		18	(0,0,0)	33902.92	(0.20)	[63006]
	18(2,17) - 17(3,14)		17		16	(0,0,0)	33902.92	(0.20)	[63006]
	4(2, 3) - 5(1, 4)		4		5	(0,0,0)	34757.01	(0.20)	[63006]
	4(2, 3) - 5(1, 4)		5		6	(0,0,0)	34758.35	(0.20)	[63006]
	4(2, 3) - 5(1, 4)		3		4	(0,0,0)	34758.61	(0.20)	[63006]
	24(4,20) - 23(5,19)					(0,0,0)	34948.10	(0.10)	[67013]
	25(4,22) - 24(5,19)					(0,0,0)	35473.92	(0.10)	[67013]
	9(3, 7) - 10(2, 8)		10		11	(0,0,0)	36366.81	(0.20)	[63006]
	9(3, 7) - 10(2, 8)		8		9	(0,0,0)	36366.81	(0.20)	[63006]
	10(3, 7) - 11(2,10)		11		12	(0,0,0)	37020.30	(0.20)	[63006]
	10(3, 7) - 11(2,10)		10		11	(0,0,0)	37020.30	(0.20)	[63006]
	10(3, 7) - 11(2,10)		9		10	(0,0,0)	37020.30	(0.20)	[63006]
	22(2,21) - 21(3,18)					(0,0,0)	37055.44	(0.10)	[67013]
	19(2,18) - 18(3,15)					(0,0,0)	37866.22	(0.10)	[67013]
	28(3,25) - 29(2,28)					(0,0,0)	39307.27	(0.10)	[67013]
	17(2,15) - 18(1,18)					(0,0,0)	39394.95	(0.10)	[67013]
	21(2,20) - 20(3,17)					(0,0,0)	39528.46	(0.10)	[67013]
	20(2,19) - 19(3,16)					(0,0,0)	39777.45	(0.10)	[67013]
	21(3,19) - 20(4,16)					(0,0,0)	39919.73	(0.10)	[67013]
	1(1, 0) - 1(0, 1)		0		1	(0,0,0)	42322.34	(0.20)	[63006]
	1(1, 0) - 1(0, 1)		2		2	(0,0,0)	42324.46	(0.20)	[63006]
	1(1, 0) - 1(0, 1)		2		1	(0,0,0)	42324.94	(0.20)	[63006]
	1(1, 0) - 1(0, 1)		1		0	(0,0,0)	42325.38	(0.20)	[63006]
	1(1, 0) - 1(0, 1)		1		2	(0,0,0)	42326.11	(0.20)	[63006]
	1(1, 0) - 1(0, 1)		1		1	(0,0,0)	42326.63	(0.20)	[63006]
	3(2, 2) - 4(1, 3)		4		5	(0,0,0)	54038.	(2.0)	[63006]
	3(2, 2) - 4(1, 3)		2		3	(0,0,0)	54038.	(2.0)	[63006]
	2(1, 2) - 1(0, 1)		2		2	(0,0,0)	71895.62	(0.20)	[63006]
	2(1, 2) - 1(0, 1)		2		1	(0,0,0)	71896.10	(0.20)	[63006]
	2(1, 2) - 1(0, 1)		3		2	(0,0,0)	71897.53	(0.20)	[63006]
	2(1, 2) - 1(0, 1)		1		0	(0,0,0)	71897.53	(0.20)	[63006]
	2(1, 2) - 1(0, 1)		1		1	(0,0,0)	71898.93	(0.20)	[63006]
	2(2, 1) - 3(1, 2)		3		4	(0,0,0)	72713.61	(0.20)	[63006]
	2(2, 1) - 3(1, 2)		2		3	(0,0,0)	72713.61	(0.20)	[63006]
	2(2, 1) - 3(1, 2)		1		2	(0,0,0)	72713.61	(0.20)	[63006]
$^{14}N^{34}S^{19}F$	7(1, 6) - 6(2, 5)		6		5	(0,0,0)	9687.58	(0.20)	[63006]
	7(1, 6) - 6(2, 5)		8		7	(0,0,0)	9687.58	(0.20)	[63006]
	7(1, 6) - 6(2, 5)		7		6	(0,0,0)	9689.05	(0.20)	[63006]
	3(0, 3) - 2(1, 2)		2		1	(0,0,0)	9743.35	(0.20)	[63006]
	3(0, 3) - 2(1, 2)		4		3	(0,0,0)	9744.08	(0.20)	[63006]
	3(0, 3) - 2(1, 2)		3		2	(0,0,0)	9745.12	(0.20)	[63006]
	5(2, 4) - 6(1, 5)		5		6	(0,0,0)	10747.13	(0.20)	[63006]
	5(2, 4) - 6(1, 5)		4		5	(0,0,0)	10748.64	(0.20)	[63006]
	5(2, 4) - 6(1, 5)		6		7	(0,0,0)	10748.64	(0.20)	[63006]
	8(2, 6) - 9(1, 9)		9		10	(0,0,0)	14947.94	(0.20)	[63006]
	8(2, 6) - 9(1, 9)		11		12	(0,0,0)	14947.94	(0.20)	[63006]
	8(2, 6) - 9(1, 9)		8		9	(0,0,0)	14951.28	(0.20)	[63006]
	7(2, 5) - 8(1, 8)		6		7	(0,0,0)	21805.07	(0.20)	[63006]
	7(2, 5) - 8(1, 8)		8		9	(0,0,0)	21805.46	(0.20)	[63006]
	7(2, 5) - 8(1, 8)		7		8	(0,0,0)	21808.20	(0.20)	[63006]
	9(3, 7) - 10(2, 8)		9		10	(0,0,0)	29140.12	(0.20)	[63006]
	9(3, 7) - 10(2, 8)		10		11	(0,0,0)	29141.04	(0.20)	[63006]
	9(3, 7) - 10(2, 8)		11		12	(0,0,0)	29141.04	(0.20)	[63006]
	6(2, 4) - 7(1, 7)		5		6	(0,0,0)	30282.65	(0.20)	[63006]
	6(2, 4) - 7(1, 7)		7		8	(0,0,0)	30283.01	(0.20)	[63006]
	6(2, 4) - 7(1, 7)		6		7	(0,0,0)	30285.51	(0.20)	[63006]
	4(2, 3) - 5(1, 4)		4		5	(0,0,0)	30627.67	(0.20)	[63006]
	4(2, 3) - 5(1, 4)		3		4	(0,0,0)	30629.01	(0.20)	[63006]
	4(2, 3) - 5(1, 4)		5		6	(0,0,0)	30629.01	(0.20)	[63006]
	8(1, 7) - 7(2, 6)		9		8	(0,0,0)	30638.50	(0.20)	[63006]
	8(1, 7) - 7(2, 6)		7		6	(0,0,0)	30638.50	(0.20)	[63006]
	8(1, 7) - 7(2, 6)		8		7	(0,0,0)	30640.01	(0.20)	[63006]
	10(3, 7) - 11(2,10)		11		12	(0,0,0)	31117.39	(0.20)	[63006]

TABLE 31.2. The microwave spectrum of NSF—Continued

Isotopic species	$J'(K'_-,K'_+)$ – $J''(K''_-,K''_+)$	F'	F_1'	F''	F_1''	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{14}N^{34}S^{19}F$	10(3, 7) – 11(2,10)		9		10	(0,0,0)	31117.39	(0.20)	[63006]
	10(3, 7) – 11(2,10)		10		11	(0,0,0)	31118.05	(0.20)	[63006]
	1(1, 0) – 1(0, 1)		1		0	(0,0,0)	40944.07	(0.20)	[63006]
	1(1, 0) – 1(0, 1)		2		1	(0,0,0)	40944.07	(0.20)	[63006]
	1(1, 0) – 1(0, 1)		1		2	(0,0,0)	40945.44	(0.20)	[63006]
	1(1, 0) – 1(0, 1)		1		1	(0,0,0)	40945.44	(0.20)	[63006]

Table 32. Rotational constants for GeF_2.

Isotopic Species	Vib. State v_1 v_2 v_3	A (MHz)	B (MHz)	C (MHz)	Reference
$^{76}Ge^{19}F_2$	0 0 0	15 243.86	7 848.91	5 166.48	[71004]
$^{74}Ge^{19}F_2$	0 0 0	15 381.29	7 848.95	5 182.30	[72032]
	1 0 0	15 371.27	7 808.14	5 169.82	[72032]
	0 1 0	15 571.60	7 834.47	5 166.78	[72032]
	0 2 0	15 767.28	7 819.57	5 151.27	[72032]
	0 0 1	15 300.31	7 831.90	5 159.72	[72032]
$^{73}Ge^{19}F_2$	0 0 0	15 452.75	...	5 190.30	[72032]
$^{72}Ge^{19}F_2$	0 0 0	15 526.34	7 848.84	5 198.66	[72032]
	1 0 0	15 516.77	7 807.63	5 186.26	[72032]
	0 1 0	15 718.64	7 834.31	5 183.04	[72032]
	0 2 0	15 916.46	7 819.69	5 167.47	[72032]
	0 0 1	15 443.53	7 831.55	5 175.60	[72032]
$^{70}Ge^{19}F_2$	0 0 0	15 679.82	7 848.82	5 215.79	[72032]
	1 0 0	15 670.71	7 807.33	5 203.64	[72032]
	0 1 0	15 873.96	7 834.28	5 200.02	[72032]
	0 2 0	16 074.23	7 819.92	5 184.47	[72032]
	0 0 1	15 595.12	7 831.42	5 192.16	[72032]

Electric dipole moment: μ_b = 2.61(2) D [71004]

Hyperfine constants for $^{73}Ge^{19}F_2$: $\chi_{aa}(^{73}Ge)$ = 17.2(10) MHz [72032]
$\chi_{bb}(^{73}Ge)$ = 121.7(10) MHz [72032]
$\chi_{cc}(^{73}Ge)$ = -138.9(10) MHz [72032]

Table 32.1. Rotational and centrifugal distortion constants for GeF_2.

Watson's Determinable Parameters	$^{74}Ge^{19}F_2$ Value[a] (MHz)	$^{72}Ge^{19}F_2$ Value[a] (MHz)	$^{70}Ge^{19}F_2$ Value[a] (MHz)
A''	15 381.247(44)	15 526.470(45)	15 679.895(54)
B''	7 848.8993(197)	7 848.8891(205)	7 848.8346(258)
C''	5 182.1477(156)	5 198.5465(184)	5 215.6731(196)
τ_1	0.1156(49)	0.08543(638)	0.08433(578)
τ_2	0.01706(115)	0.01034(191)	0.008345(1316)
τ_3[b]	-0.25(2)	-0.11(1)	-0.15(2)
τ_{aaaa}	-0.45135(499)	-0.49498(522)	-0.50121(601)
τ_{bbbb}	-0.072301(994)	-0.079803(891)	-0.077517(1275)
τ_{cccc}	-0.003941(682)	-0.009497(699)	-0.006282(893)
Std. dev.	0.205	0.179	0.263
No. lines fit	42	37	40
Derived Parameters (assuming planarity conditions)			
A'	15 381.239(44)	15 526.462(44)	15 679.885(54)
B'	7 848.906(19)	7 848.895(20)	7 848.836(26)
C'	5 182.206(14)	5 198.592(18)	5 215.724(19)
τ'_{bbcc}	-0.01469(51)	-0.0176(11)	-0.01973(59)
τ'_{ccaa}	0.01340(95)	0.0126(41)	0.0025(14)
τ'_{aabb}	0.1169(37)	0.0904(30)	0.1016(48)
$\tau_{aabb}(1)$	0.1485(12)	0.1556(83)	0.1317(30)
$\tau_{aabb}(2)$	0.1582(43)	0.1242(64)	0.1540(58)
$\tau_{aabb}(3)$	0.1582(43)	0.1242(64)	0.1540(58)
$\tau_{abab}(1)$	-0.0158(18)	-0.0326(44)	-0.0151(32)
$\tau_{abab}(2)$	-0.0233(17)	-0.0082(67)	-0.0324(29)
$\tau_{abab}(3)$	-0.0255(27)	-0.0011(99)	-0.0374(46)
$\Delta\tau$	$0.97(43)\times10^{-3}$	$-0.31(14)\times10^{-2}$	$0.22(7)\times10^{-2}$

[a] The uncertainties quoted are one standard deviation as estimated by the least squares fit. The number of significant figures quoted are necessary to reproduce the calculated transition frequencies within their standard deviations.

[b] Strictly speaking, τ_3 is not a determinable parameter, but is calculated from τ_1, τ_2, τ_{aaaa} and τ_{bbbb} using the planarity conditions.

TABLE 32.2. The microwave spectrum of GeF_2

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{76}Ge^{19}F_2$	1(1, 0) - 1(0, 1)	(0,0,0)	10077.37	(0.30)	[71004]
	1(1, 0) - 1(0, 1)	(0,1,0)	10281.16	(0.30)	[71004]
	2(1, 1) - 2(0, 2)	(0,0,0)	13366.80	(0.30)	[71004]
	2(0, 2) - 1(1, 1)	(0,0,0)	18028.64	(0.30)	[71004]
	3(1, 2) - 3(0, 3)	(0,0,0)	19205.50	(0.30)	[71004]
	3(1, 2) - 3(0, 3)	(0,1,0)	19367.74	(0.30)	[71004]
	3(1, 2) - 3(0, 3)	(0,2,0)	19534.99	(0.30)	[71004]
	1(1, 0) - 0(0, 0)	(0,0,0)	20410.33	(0.30)	[71004]
	1(1, 1) - 0(0, 0)	(0,1,0)	20582.90	(0.30)	[71004]
	3(2, 1) - 3(1, 2)	(0,0,0)	21449.95	(0.30)	[71004]
	3(2, 1) - 3(1, 2)	(0,1,0)	21991.62	(0.30)	[71004]
	4(2, 2) - 4(1, 3)	(0,1,0)	22356.42	(0.30)	[71004]
	2(2, 0) - 2(1, 1)	(0,0,0)	22790.72	(0.30)	[71004]
	5(2, 3) - 5(1, 4)	(0,0,0)	25074.28	(0.30)	[71004]
	5(2, 3) - 5(1, 4)	(0,1,0)	25390.50	(0.30)	[71004]
	5(2, 3) - 5(1, 4)	(0,2,0)	25715.30	(0.30)	[71004]
	2(2, 1) - 2(1, 2)	(0,0,0)	30230.40	(0.30)	[71004]
	2(1, 2) - 1(0, 1)	(0,0,0)	30743.00	(0.30)	[71004]
	2(2, 1) - 2(1, 2)	(0,1,0)	30840.81	(0.30)	[71004]
	2(1, 2) - 1(0, 1)	(0,1,0)	30880.36	(0.30)	[71004]
$^{74}Ge^{19}F_2$	1(1, 0) - 1(0, 1)	(0,0,1)	10140.43	(0.30)	[71004]
	1(1, 0) - 1(0, 1)	(0,0,0)	10199.19	(0.30)	[71004]
	1(1, 0) - 1(0, 1)	(0,1,0)	10405.05	(0.30)	[71004]
	1(1, 0) - 1(0, 1)	(0,2,0)	10616.18	(0.30)	[71004]
	2(1, 1) - 2(0, 2)	(0,0,1)	13410.75	(0.30)	[71004]
	2(1, 1) - 2(0, 2)	(0,0,0)	13457.51	(0.30)	[71004]
	2(1, 1) - 2(0, 2)	(0,1,0)	13651.77	(0.30)	[71004]
	7(4, 4) - 6(5, 1)	(0,0,0)	15620.90	(0.30)	[72032]
	11(3, 8) - 12(2,11)	(0,0,0)	15995.00	(0.30)	[72032]
	11(7, 5) - 10(8, 2)	(0,0,0)	17111.65	(0.30)	[72032]
	11(7, 4) - 10(8, 3)	(0,0,0)	17140.76	(0.30)	[72032]
	5(2, 4) - 4(3, 1)	(0,0,0)	17172.17	(0.30)	[72032]
	2(0, 2) - 1(1, 1)	(0,0,0)	17398.08	(0.30)	[71004]
	2(0, 2) - 1(1, 1)	(0,0,1)	17915.83	(0.30)	[71004]
	6(3, 4) - 5(4, 1)	(0,0,0)	18359.88	(0.30)	[72032]
	15(4,11) - 16(3,14)	(0,0,0)	19012.04	(0.30)	[72032]
	3(1, 2) - 3(0, 3)	(1,0,0)	19115.86	(0.30)	[71004]
	3(1, 2) - 3(0, 3)	(0,0,0)	19233.41	(0.30)	[71004]
	3(1, 2) - 3(0, 3)	(0,1,0)	19399.12	(0.30)	[71004]
	3(1, 2) - 3(0, 3)	(0,2,0)	19569.12	(0.30)	[71004]
	3(1, 2) - 2(2, 1)	(0,0,0)	20076.06	(0.30)	[72032]
	1(1, 1) - 0(0, 0)	(0,0,1)	20459.82	(0.30)	[71004]
	1(1, 1) - 0(0, 0)	(1,0,0)	20541.12	(0.30)	[71004]
	1(1, 1) - 0(0, 0)	(0,0,0)	20563.31	(0.30)	[71004]
	1(1, 1) - 0(0, 0)	(0,1,0)	20738.56	(0.30)	[71004]
	1(1, 1) - 0(0, 0)	(0,2,0)	20918.92	(0.30)	[71004]
	10(6, 5) - 9(7, 2)	(0,0,0)	21595.49	(0.30)	[72032]
	10(6, 4) - 9(7, 3)	(0,0,0)	21770.69	(0.30)	[72032]
	3(2, 1) - 3(1, 2)	(0,0,0)	21806.35	(0.30)	[71004]
	3(2, 1) - 3(1, 2)	(1,0,0)	21871.45	(0.30)	[71004]
	4(2, 2) - 4(1, 3)	(0,0,1)	22046.46	(0.30)	[71004]
	4(2, 2) - 4(1, 3)	(0,0,0)	22177.27	(0.30)	[72032]
	3(2, 1) - 3(1, 2)	(0,1,0)	22356.40	(0.30)	[71004]
	4(2, 2) - 4(1, 3)	(0,1,0)	22633.52	(0.30)	[71004]
	14(9, 6) - 13(10, 3)	(0,0,0)	22688.83	(0.30)	[72032]
	14(9, 5) - 13(10, 4)	(0,0,0)	22691.61	(0.30)	[72032]
	3(2, 1) - 3(1, 2)	(0,2,0)	22923.43	(0.30)	[71004]
	2(2, 0) - 2(1, 1)	(0,0,1)	23002.20	(0.30)	[71004]
	2(2, 0) - 2(1, 1)	(0,1,0)	23789.57	(0.30)	[71004]
	6(3, 3) - 5(4, 2)	(0,0,0)	24253.44	(0.30)	[72032]
	6(2, 5) - 5(3, 2)	(0,0,0)	24729.89	(0.30)	[72032]
	5(2, 3) - 5(1, 4)	(1,0,0)	25110.73	(0.30)	[71004]
	5(2, 3) - 5(1, 4)	(0,0,0)	25204.68	(0.30)	[71004]
	5(2, 3) - 5(1, 4)	(0,1,0)	25534.30	(0.30)	[71004]
	5(2, 3) - 5(1, 4)	(0,2,0)	25876.68	(0.30)	[71004]

TABLE 32.2. The microwave spectrum of GeF_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ – $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{74}Ge^{19}F_2$	9(5, 5) – 8(6, 2)	(0,0,0)	25993.38	(0.30)	[72032]
	9(5, 4) – 8(6, 3)	(0,0,0)	26929.51	(0.30)	[72032]
	13(8, 6) – 12(9, 3)	(0,0,0)	27154.76	(0.30)	[72032]
	13(8, 5) – 12(9, 4)	(0,0,0)	27171.78	(0.30)	[72032]
	4(1, 3) – 4(0, 4)	(0,0,0)	27820.51	(0.30)	[71004]
	13(3,11) – 12(4, 8)	(0,0,0)	28146.55	(0.30)	[72032]
	7(2, 6) – 6(3, 3)	(0,0,0)	28387.08	(0.30)	[72032]
	8(4, 5) – 7(5, 2)	(0,0,0)	29604.43	(0.30)	[72032]
	2(2, 1) – 2(1, 2)	(0,0,1)	30418.75	(0.30)	[71004]
	7(3, 5) – 6(4, 2)	(0,0,0)	30435.06	(0.30)	[72032]
	2(2, 1) – 2(1, 2)	(0,0,0)	30595.77	(0.30)	[71004]
	2(1, 2) – 1(0, 1)	(1,0,0)	30880.36	(0.30)	[71004]
	2(1, 2) – 1(0, 1)	(0,0,0)	30927.65	(0.30)	[72032]
	2(1, 2) – 1(0, 1)	(0,1,0)	31073.14	(0.30)	[71004]
	3(0, 3) – 2(1, 2)	(0,1,0)	31197.22	(0.30)	[71004]
	2(2, 1) – 2(1, 2)	(0,1,0)	31213.31	(0.30)	[71004]
	2(1, 2) – 1(0, 1)	(0,2,0)	31221.09	(0.30)	[71004]
	3(0, 3) – 2(1, 2)	(0,0,0)	31437.91	(0.30)	[72032]
	6(2, 4) – 6(1, 5)	(0,0,0)	31441.26	(0.30)	[72032]
	12(7, 6) – 11(8, 3)	(0,0,0)	31728.44	(0.30)	[72032]
	12(7, 5) – 11(8, 4)	(0,0,0)	31832.86	(0.30)	[72032]
	16(10, 7) – 15(11, 4)	(0,0,0)	32753.57	(0.30)	[72032]
	16(10, 6) – 15(11, 5)	(0,0,0)	32755.07	(0.30)	[72032]
	5(2, 3) – 4(3, 2)	(0,0,0)	32778.92	(0.30)	[72032]
	6(3, 3) – 6(2, 4)	(0,0,0)	33357.80	(0.30)	[72032]
	6(3, 3) – 6(2, 4)	(1,0,0)	33496.92	(0.30)	[71004]
	8(4, 4) – 7(5, 3)	(0,0,0)	33674.03	(0.30)	[72032]

Isotopic species	$J'(K'_-,K'_+)$ – $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{73}Ge^{19}F_2$	1(1, 0) – 1(0, 1)		9/2		11/2	(0,0,0)	10245.08	(0.30)	[72032]
	1(1, 0) – 1(0, 1)		9/2		7/2	(0,0,0)	10245.08	(0.30)	[72032]
	1(1, 0) – 1(0, 1)		11/2		9/2	(0,0,0)	10267.09	(0.30)	[72032]
	1(1, 0) – 1(0, 1)		11/2		11/2	(0,0,0)	10270.45	(0.30)	[72032]
	1(1, 0) – 1(0, 1)		7/2		9/2	(0,0,0)	10272.94	(0.30)	[72032]
	1(1, 1) – 0(0, 0)		7/2		9/2	(0,0,0)	20631.96	(0.30)	[72032]
	1(1, 1) – 0(0, 0)		11/2		9/2	(0,0,0)	20637.01	(0.30)	[72032]
	1(1, 1) – 0(0, 0)		9/2		9/2	(0,0,0)	20659.55	(0.30)	[72032]
	2(1, 2) – 1(0, 1)		5/2		7/2	(0,0,0)	31007.25	(0.30)	[72032]
	2(1, 2) – 1(0, 1)		13/2		11/2	(0,0,0)	31014.38	(0.30)	[72032]
	2(1, 2) – 1(0, 1)		7/2		7/2	(0,0,0)	31023.90	(0.30)	[72032]
	2(1, 2) – 1(0, 1)		11/2		9/2	(0,0,0)	31032.86	(0.30)	[72032]
	2(1, 2) – 1(0, 1)		11/2		11/2	(0,0,0)	31036.36	(0.30)	[72032]

Isotopic species	$J'(K'_-,K'_+)$ – $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{72}Ge^{19}F_2$	1(1, 0) – 1(0, 1)	(0,0,0)	10328.06	(0.30)	[71004]
	1(1, 0) – 1(0, 1)	(0,1,0)	10536.08	(0.30)	[71004]
	1(1, 0) – 1(0, 1)	(0,2,0)	10749.43	(0.30)	[71004]
	2(1, 1) – 2(0, 2)	(0,0,0)	13354.12	(0.30)	[71004]
	2(1, 1) – 2(0, 2)	(0,0,1)	13506.73	(0.30)	[71004]
	2(1, 1) – 2(0, 2)	(0,1,0)	13750.95	(0.30)	[71004]
	11(7, 4) – 10(8, 3)	(0,0,0)	15084.61	(0.30)	[72032]
	5(2, 4) – 4(3, 1)	(0,0,0)	16673.63	(0.30)	[72032]
	15(4,11) – 16(3,14)	(0,0,0)	17329.78	(0.30)	[72032]
	2(0, 2) – 1(1, 1)	(0,0,1)	17819.80	(0.30)	[71004]
	2(0, 2) – 1(1, 1)	(0,0,0)	17840.78	(0.30)	[71004]
	3(1, 2) – 3(0, 3)	(1,0,0)	19146.73	(0.30)	[71004]
	3(1, 2) – 3(0, 3)	(0,0,0)	19265.19	(0.30)	[71004]
	3(1, 2) – 3(0, 3)	(0,1,0)	19434.38	(0.30)	[71004]
	3(1, 2) – 3(0, 3)	(0,2,0)	19608.51	(0.30)	[71004]
	3(1, 2) – 2(2, 1)	(0,0,0)	19677.14	(0.30)	[72032]
	10(6, 5) – 9(7, 2)	(0,0,0)	19806.80	(0.30)	[72032]

TABLE 32.2. The microwave spectrum of GeF_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ – $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{72}Ge^{19}F_2$	10(6, 4) – 9(7, 3)	(0,0,0)	19963.60	(0.30)	[72032]
	14(9, 6) – 13(10, 3)	(0,0,0)	20092.06	(0.30)	[72032]
	14(9, 5) – 13(10, 4)	(0,0,0)	20094.22	(0.30)	[72032]
	1(1, 1) – 0(0, 0)	(0,0,1)	20619.00	(0.30)	[71004]
	1(1, 1) – 0(0, 0)	(1,0,0)	20703.34	(0.30)	[71004]
	1(1, 1) – 0(0, 0)	(0,0,0)	20724.78	(0.30)	[71004]
	1(1, 1) – 0(0, 0)	(0,1,0)	20901.53	(0.30)	[71004]
	1(1, 1) – 0(0, 0)	(0,2,0)	21083.94	(0.30)	[71004]
	3(2, 1) – 3(1, 2)	(0,0,0)	22185.68	(0.30)	[71004]
	4(2, 2) – 4(1, 3)	(0,0,1)	22332.97	(0.30)	[71004]
	4(2, 2) – 4(1, 3)	(0,0,0)	22465.39	(0.30)	[72032]
	3(2, 1) – 3(1, 2)	(0,1,0)	22743.20	(0.30)	[71004]
	4(2, 2) – 4(1, 3)	(0,1,0)	22931.50	(0.30)	[71004]
	6(3, 3) – 5(4, 2)	(0,0,0)	23142.92	(0.30)	[72032]
	2(2, 0) – 2(1, 1)	(0,0,0)	23607.19	(0.30)	[71004]
	6(2, 5) – 5(3, 2)	(0,0,0)	24404.45	(0.30)	[72032]
	9(5, 5) – 8(6, 2)	(0,0,0)	24484.50	(0.30)	[72032]
	13(8, 6) – 12(9, 3)	(0,0,0)	24815.79	(0.30)	[72032]
	13(8, 5) – 12(9, 4)	(0,0,0)	24830.56	(0.30)	[72032]
	9(5, 4) – 8(6, 3)	(0,0,0)	25342.73	(0.30)	[72032]
	5(2, 3) – 5(1, 4)	(0,0,0)	25351.13	(0.30)	[71004]
	5(2, 3) – 5(1, 4)	(0,1,0)	25690.61	(0.30)	[71004]
	5(2, 3) – 5(1, 4)	(0,2,0)	26047.24	(0.30)	[71004]
	4(1, 3) – 4(0, 4)	(0,0,0)	27772.26	(0.30)	[71004]
	7(2, 6) – 6(3, 3)	(0,0,0)	28327.92	(0.30)	[72032]
	8(4, 5) – 7(5, 2)	(0,0,0)	28422.30	(0.30)	[72032]
	12(7, 6) – 11(8, 3)	(0,0,0)	29648.12	(0.30)	[72032]
	7(3, 5) – 6(4, 2)	(0,0,0)	29657.06	(0.30)	[72032]
	12(7, 5) – 11(8, 4)	(0,0,0)	29739.52	(0.30)	[72032]
	16(10, 7) – 15(11, 4)	(0,0,0)	29871.79	(0.30)	[72032]
	16(10, 6) – 15(11, 5)	(0,0,0)	29873.30	(0.30)	[72032]
	2(2, 1) – 2(1, 2)	(0,0,0)	30982.09	(0.30)	[71004]
	2(1, 2) – 1(0, 1)	(0,0,0)	31122.08	(0.30)	[72032]
	2(1, 2) – 1(0, 1)	(0,1,0)	31267.90	(0.30)	[71004]
	3(0, 3) – 2(1, 2)	(0,0,0)	31393.09	(0.30)	[71004]
	6(2, 4) – 6(1, 5)	(0,0,0)	31405.02	(0.30)	[72032]
	2(1, 2) – 1(0, 1)	(0,2,0)	31418.51	(0.30)	[71004]
	2(2, 1) – 2(1, 2)	(0,1,0)	31605.59	(0.30)	[71004]
	8(4, 4) – 7(5, 3)	(0,0,0)	32248.42	(0.30)	[72032]
	7(3, 4) – 7(2, 5)	(0,0,0)	33593.92	(0.30)	[72032]
	6(3, 3) – 6(2, 4)	(0,0,0)	34009.08	(0.30)	[72032]
$^{70}Ge^{19}F_2$	1(1, 0) – 1(0, 1)	(0,0,0)	10464.40	(0.30)	[72032]
	1(1, 0) – 1(0, 1)	(0,1,0)	10673.14	(0.30)	[71004]
	1(1, 0) – 1(0, 1)	(0,2,0)	10889.95	(0.30)	[71004]
	11(7, 4) – 10(8, 3)	(0,0,0)	12915.75	(0.30)	[72032]
	2(1, 1) – 2(0, 2)	(0,0,1)	13609.15	(0.30)	[71004]
	2(1, 1) – 2(0, 2)	(0,0,0)	13657.38	(0.30)	[71004]
	2(1, 1) – 2(0, 2)	(0,1,0)	13856.96	(0.30)	[71004]
	7(4, 3) – 6(5, 2)	(0,0,0)	14426.04	(0.30)	[72032]
	15(4,11) – 16(3,14)	(0,0,0)	15506.28	(0.30)	[72032]
	5(2, 4) – 4(3, 1)	(0,0,0)	16140.36	(0.30)	[72032]
	6(3, 4) – 5(4, 1)	(0,0,0)	16558.96	(0.30)	[72032]
	14(9, 6) – 13(10, 3)	(0,0,0)	17352.83	(0.30)	[72032]
	14(9, 5) – 13(10, 4)	(0,0,0)	17354.84	(0.30)	[72032]
	2(0, 2) – 1(1, 1)	(0,0,1)	17716.80	(0.30)	[71004]
	2(0, 2) – 1(1, 1)	(0,0,0)	17738.11	(0.30)	[71004]
	10(6, 5) – 9(7, 2)	(0,0,0)	17920.20	(0.30)	[72032]
	10(6, 4) – 9(7, 3)	(0,0,0)	18059.99	(0.30)	[72032]
	3(1, 2) – 3(0, 3)	(1,0,0)	19181.57	(0.30)	[71004]
	3(1, 2) – 2(2, 1)	(0,0,0)	19254.66	(0.30)	[72032]
	3(1, 2) – 3(0, 3)	(0,0,0)	19301.10	(0.30)	[71004]
	3(1, 2) – 3(0, 3)	(0,1,0)	19473.95	(0.30)	[71004]
	3(1, 2) – 3(0, 3)	(0,2,0)	19652.10	(0.30)	[71004]
	1(1, 1) – 0(0, 0)	(0,0,1)	20787.23	(0.30)	[71004]
	1(1, 1) – 0(0, 0)	(0,0,0)	20895.36	(0.30)	[71004]

TABLE 32.2. The microwave spectrum of GeF_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{70}Ge^{19}F_2$	1(1, 1) - 0(0, 0)	(0,1,0)	21073.75	(0.30)	[71004]
	1(1, 1) - 0(0, 0)	(0,2,0)	21258.94	(0.30)	[71004]
	6(3, 3) - 5(4, 2)	(0,0,0)	21977.56	(0.30)	[72032]
	13(8, 6) - 12(9, 3)	(0,0,0)	22349.51	(0.30)	[72032]
	13(8, 5) - 12(9, 4)	(0,0,0)	22361.90	(0.30)	[72032]
	3(2, 1) - 3(1, 2)	(0,0,0)	22588.90	(0.30)	[71004]
	3(2, 1) - 3(1, 2)	(1,0,0)	22660.74	(0.30)	[71004]
	4(2, 2) - 4(1, 3)	(0,0,0)	22775.76	(0.30)	[72032]
	9(5, 5) - 8(6, 2)	(0,0,0)	22891.93	(0.30)	[72032]
	9(5, 4) - 8(6, 3)	(0,0,0)	23675.33	(0.30)	[72032]
	6(2, 6) - 5(3, 2)	(0,0,0)	24048.24	(0.30)	[72032]
	2(2, 0) - 2(1, 1)	(0,0,0)	24051.60	(0.30)	[71004]
	5(2, 3) - 5(1, 4)	(1,0,0)	25428.35	(0.30)	[71004]
	5(2, 3) - 5(1, 4)	(0,0,0)	25515.23	(0.30)	[71004]
	5(2, 3) - 5(1, 4)	(0,1,0)	25867.25	(0.30)	[71004]
	5(2, 3) - 5(1, 4)	(0,2,0)	26237.14	(0.30)	[71004]
	16(10, 7) - 15(11, 4)	(0,0,0)	26833.77	(0.30)	[72032]
	16(10, 6) - 15(11, 5)	(0,0,0)	26834.80	(0.30)	[72032]
	8(4, 5) - 7(5, 2)	(0,0,0)	27170.40	(0.30)	[72032]
	12(7, 6) - 11(8, 3)	(0,0,0)	27455.40	(0.30)	[72032]
	12(7, 5) - 11(8, 4)	(0,0,0)	27535.40	(0.30)	[72032]
	4(1, 3) - 4(0, 4)	(0,0,0)	27724.27	(0.30)	[71004]
	7(2, 6) - 6(3, 3)	(0,0,0)	28244.44	(0.30)	[72032]
	7(3, 5) - 6(4, 2)	(0,0,0)	28825.95	(0.30)	[72032]
	8(4, 4) - 7(5, 3)	(0,0,0)	30755.93	(0.30)	[72032]
	13(3,11) - 12(4, 8)	(0,0,0)	31311.35	(0.30)	[72032]
	2(1, 2) - 1(0, 1)	(0,0,0)	31326.88	(0.30)	[71004]
	3(0, 3) - 2(1, 2)	(0,0,0)	31343.98	(0.30)	[71004]
	6(2, 4) - 6(1, 5)	(0,0,0)	31379.89	(0.30)	[72032]
	2(2, 1) - 2(1, 2)	(0,0,0)	31390.86	(0.30)	[71004]
	2(1, 2) - 1(0, 1)	(0,1,0)	31474.05	(0.30)	[71004]
	2(1, 2) - 1(0, 1)	(0,2,0)	31627.16	(0.30)	[71004]
	7(3, 4) - 7(2, 5)	(0,0,0)	34087.70	(0.30)	[72032]

Table 33. Rotational and centrifugal distortion constants for $^{14}N^{19}F_2$.

Watson's Determinable Parameters	Present Value[a] (MHz)	Brown et al. [74003] (MHz)
A''	70 496.191(916)	
B''	11 872.057(191)	
C''	10 136.23(17)	
τ_1	0. 24259(22158)	
τ_2	0.00265(3299)	
τ_3[b]	2.2(7)	
τ_{aaaa}	-7.7880(3163)	-7.75(20)
τ_{bbbb}	-0.069050(12726)	-0.081(20)
τ_{cccc}	-0.02859(1016)	
Std. dev.	1.465	
No. lines fit	20	10
Derived Parameters (assuming planarity conditions)		
A'	70 496.17(92)	70 496(2)
B'	11 872.14(17)	11 872.24(20)
C'	10 136.29(16)	10 136.46(20)
τ'_{bbcc}	-0.041(11)	
τ'_{ccaa}	0.160(67)	
τ'_{aabb}	0.12(14)	
$\tau_{aabb}(1)$	0.44(10)	
$\tau_{aabb}(2)$	0.39(12)	0.297(30)
$\tau_{aabb}(3)$	0.39(12)	
$\tau_{abab}(1)$	-0.159(23)	
$\tau_{abab}(2)$	-0.111(56)	-0.126(60)
$\tau_{abab}(3)$	-0.104(64)	
$\Delta\tau$	$-0.17(21)\times10^{-2}$	

[a] The uncertainties quoted are one standard deviation as estimated by the least squares fit. The number of significant figures quoted are necessary to reproduce the calculated transition frequencies within their standard deviations.

[b] Strictly speaking, τ_3 is not a determinable parameter, but is calculated from τ_1, τ_2, τ_{aaaa} and τ_{bbbb} using the planarity conditions.

Table 33.1. Spin-rotation and spin-spin interaction constants and electric dipole moment of $^{14}N^{19}F_2$ [74003].

Parameter	Value (MHz)	Parameter	Value (MHz)
A_s	-951.79(10)	χ_{aa}	5.59(10)
B_s	-92.86(10)	χ_{bb}	-0.73(10)
C_s	4.49(10)	χ_{cc}	-4.86(10)
A_F	164.39(40)	A_N	46.57(10)
T_{aa} (F)	-241.75(40)	T_{aa} (N)	-47.72(10)
T_{bb} (F)	-226.48(40)	T_{bb} (N)	-50.47(10)
T_{cc} (F)	468.22(40)	T_{cc} (N)	98.19(10)

Electric dipole moment: μ_b = 0.136(10) D

TABLE 33.2. The microwave spectrum of NF_2

Isotopic species	$N'(K'_-,K'_+)$ – $N''(K''_-,K''_+)$	F'	ϵ'	F''	ϵ''	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{14}N^{19}F_2$	10(2, 8) - 11(1,11)	25/2	1	27/2	1	(0,0,0)	13845.52	(0.05)	[74003]
	10(2, 8) - 11(1,11)	23/2	1	25/2	1	(0,0,0)	13978.85	(0.05)	[74003]
	10(2, 8) - 11(1,11)	21/2	2	23/2	2	(0,0,0)	14010.95	(0.05)	[74003]
	10(2, 8) - 11(1,11)	19/2	2	21/2	2	(0,0,0)	14043.65	(0.05)	[74003]
	10(2, 8) - 11(1,11)	21/2	1	23/2	1	(0,0,0)	14122.11	(0.05)	[74003]
	10(2, 8) - 11(1,11)	19/2	1	21/2	1	(0,0,0)	14153.25	(0.05)	[74003]
	10(2, 8) - 11(1,11)	17/2	1	19/2	1	(0,0,0)	14185.87	(0.05)	[74003]
	1(1, 1) - 2(0, 2)	5/2	2	7/2	3	(0,0,0)	14425.6	(0.2)	[74003]
	1(1, 1) - 2(0, 2)	3/2	3	5/2	4	(0,0,0)	14428.75	(0.05)	[74003]
	1(1, 1) - 2(0, 2)	7/2	1	9/2	1	(0,0,0)	14431.	(1.0)	[74003]
	1(1, 1) - 2(0, 2)	3/2	1	5/2	1	(0,0,0)	14438.6	(0.2)	[74003]
	1(1, 1) - 2(0, 2)	1/2	2	3/2	2	(0,0,0)	14455.6	(0.2)	[74003]
	1(1, 1) - 2(0, 2)	3/2	2	5/2	2	(0,0,0)	14469.08	(0.05)	[74003]
	10(2, 8) - 11(1,11)	15/2	1	17/2	1	(0,0,0)	14469.08	(0.05)	[74003]
	10(2, 8) - 11(1,11)	17/2	3	19/2	3	(0,0,0)	14514.75	(0.05)	[74003]
	10(2, 8) - 11(1,11)	19/2	5	21/2	5	(0,0,0)	14553.2	(0.2)	[74003]
	10(2, 8) - 11(1,11)	17/2	2	19/2	2	(0,0,0)	14654.83	(0.05)	[74003]
	10(2, 8) - 11(1,11)	19/2	4	21/2	4	(0,0,0)	14690.61	(0.05)	[74003]
	10(2, 8) - 11(1,11)	21/2	5	23/2	5	(0,0,0)	14732.73	(0.05)	[74003]
	10(2, 8) - 11(1,11)	19/2	3	21/2	3	(0,0,0)	14840.03	(0.05)	[74003]
	10(2, 8) - 11(1,11)	21/2	4	23/2	4	(0,0,0)	14877.1	(0.2)	[74003]
	10(2, 8) - 11(1,11)	23/2	3	25/2	3	(0,0,0)	14915.13	(0.05)	[74003]
	12(3, 9) - 13(2,12)	29/2	1	31/2	1	(0,0,0)	25495.3	(0.2)	[74003]
	12(3, 9) - 13(2,12)	27/2	2	29/2	2	(0,0,0)	25503.4	(0.2)	[74003]
	25(4,22) - 24(5,19)	53/2	3	51/2	3	(0,0,0)	25506.6	(0.2)	[74003]
	25(4,22) - 24(5,19)	51/2	4	49/2	4	(0,0,0)	25507.2	(0.2)	[74003]
	25(4,22) - 24(5,19)	49/2	3	47/2	3	(0,0,0)	25507.5	(0.2)	[74003]
	25(4,22) - 24(5,19)	51/2	5	49/2	5	(0,0,0)	25509.2	(0.2)	[74003]
	25(4,22) - 24(5,19)	49/2	4	47/2	4	(0,0,0)	25509.8	(0.2)	[74003]
	25(4,22) - 24(5,19)	47/2	2	45/2	2	(0,0,0)	25510.2	(0.2)	[74003]
	25(4,22) - 24(5,19)	49/2	5	47/2	5	(0,0,0)	25511.8	(0.2)	[74003]
	12(3, 9) - 13(2,12)	25/2	3	27/2	3	(0,0,0)	25511.8	(0.2)	[74003]
	25(4,22) - 24(5,19)	47/2	3	45/2	3	(0,0,0)	25512.6	(0.2)	[74003]
	25(4,22) - 24(5,19)	45/2	1	43/2	1	(0,0,0)	25513.0	(0.2)	[74003]
	12(3, 9) - 13(2,12)	27/2	1	29/2	1	(0,0,0)	25534.5	(0.2)	[74003]
	12(3, 9) - 13(2,12)	25/2	2	27/2	2	(0,0,0)	25542.3	(0.2)	[74003]
	12(3, 9) - 13(2,12)	23/2	2	25/2	2	(0,0,0)	25550.9	(0.2)	[74003]
	12(3, 9) - 13(2,12)	25/2	1	27/2	1	(0,0,0)	25572.7	(0.2)	[74003]

TABLE 33.2. The microwave spectrum of NF_2—Continued

Isotopic species	$N'(K'_-,K'_+)$ – $N''(K''_-,K''_+)$	F'	ϵ'	F''	ϵ''	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{14}N^{19}F_2$	12(3, 9) – 13(2,12)	23/2	1	25/2	1	(0,0,0)	25580.9	(0.2)	[74003]
	12(3, 9) – 13(2,12)	21/2	1	23/2	1	(0,0,0)	25589.9	(0.2)	[74003]
	32(7,26) – 33(6,27)	63/2	1	65/2	1	(0,0,0)	25604.6	(0.2)	[74003]
	32(7,26) – 33(6,27)	65/2	1	67/2	1	(0,0,0)	25606.0	(0.2)	[74003]
	32(7,26) – 33(6,27)	67/2	1	69/2	1	(0,0,0)	25607.1	(0.2)	[74003]
	25(4,22) – 24(5,19)	47/2	1	45/2	1	(0,0,0)	25809.8	(0.2)	[74003]
	25(4,22) – 24(5,19)	49/2	1	47/2	1	(0,0,0)	25810.6	(0.2)	[74003]
	25(4,22) – 24(5,19)	51/2	1	49/2	1	(0,0,0)	25811.2	(0.2)	[74003]
	25(4,22) – 24(5,19)	49/2	2	47/2	2	(0,0,0)	25813.4	(0.2)	[74003]
	25(4,22) – 24(5,19)	51/2	2	49/2	2	(0,0,0)	25814.2	(0.2)	[74003]
	25(4,22) – 24(5,19)	53/2	1	51/2	1	(0,0,0)	25814.8	(0.2)	[74003]
	25(4,22) – 24(5,19)	51/2	3	49/2	3	(0,0,0)	25817.4	(0.2)	[74003]
	25(4,22) – 24(5,19)	53/2	2	51/2	2	(0,0,0)	25818.2	(0.2)	[74003]
	25(4,22) – 24(5,19)	55/2	1	53/2	1	(0,0,0)	25818.8	(0.2)	[74003]
	32(7,26) – 33(6,27)	65/2	2	67/2	2	(0,0,0)	25893.6	(0.2)	[74003]
	32(7,26) – 33(6,27)	63/2	2	65/2	2	(0,0,0)	25894.8	(0.2)	[74003]
	32(7,26) – 33(6,27)	61/2	1	63/2	1	(0,0,0)	25896.0	(0.2)	[74003]
	12(3, 9) – 13(2,12)	19/2	1	21/2	1	(0,0,0)	25942.4	(0.2)	[74003]
	12(3, 9) – 13(2,12)	21/2	3	23/2	3	(0,0,0)	25951.4	(0.2)	[74003]
	12(3, 9) – 13(2,12)	23/2	5	25/2	5	(0,0,0)	25961.9	(0.2)	[74003]
	12(3, 9) – 13(2,12)	21/2	2	23/2	2	(0,0,0)	25988.9	(0.2)	[74003]
	12(3, 9) – 13(2,12)	23/2	4	25/2	4	(0,0,0)	25997.8	(0.2)	[74003]
	12(3, 9) – 13(2,12)	25/2	5	27/2	5	(0,0,0)	26088.5	(0.2)	[74003]
	12(3, 9) – 13(2,12)	23/2	3	25/2	3	(0,0,0)	26036.5	(0.2)	[74003]
	12(3, 9) – 13(2,12)	25/2	4	27/2	4	(0,0,0)	26045.1	(0.2)	[74003]
	12(3, 9) – 13(2,12)	27/2	3	29/2	3	(0,0,0)	26054.2	(0.2)	[74003]
	8(1, 7) – 7(2, 6)	11/2	1	9/2	1	(0,0,0)	27263.08	(0.05)	[74003]
	8(1, 7) – 7(2, 6)	13/2	3	11/2	3	(0,0,0)	27280.23	(0.05)	[74003]
	8(1, 7) – 7(2, 6)	15/2	5	13/2	5	(0,0,0)	27300.56	(0.05)	[74003]
	8(1, 7) – 7(2, 6)	13/2	2	11/2	2	(0,0,0)	27347.12	(0.05)	[74003]
	8(1, 7) – 7(2, 6)	15/2	4	13/2	4	(0,0,0)	27363.57	(0.05)	[74003]
	8(1, 7) – 7(2, 6)	17/2	5	15/2	5	(0,0,0)	27386.84	(0.05)	[74003]
	8(1, 7) – 7(2, 6)	15/2	3	13/2	3	(0,0,0)	27435.45	(0.05)	[74003]
	8(1, 7) – 7(2, 6)	21/2	1	19/2	1	(0,0,0)	27447.04	(0.05)	[74003]
	8(1, 7) – 7(2, 6)	17/2	4	15/2	4	(0,0,0)	27452.51	(0.05)	[74003]
	8(1, 7) – 7(2, 6)	19/2	2	17/2	2	(0,0,0)	27460.41	(0.05)	[74003]
	8(1, 7) – 7(2, 6)	17/2	3	15/2	3	(0,0,0)	27473.08	(0.05)	[74003]
	8(1, 7) – 7(2, 6)	19/2	3	17/2	3	(0,0,0)	27473.90	(0.05)	[74003]
	8(1, 7) – 7(2, 6)	19/2	1	17/2	1	(0,0,0)	27493.13	(0.05)	[74003]
	8(1, 7) – 7(2, 6)	17/2	2	15/2	2	(0,0,0)	27508.60	(0.05)	[74003]
	8(1, 7) – 7(2, 6)	15/2	2	13/2	2	(0,0,0)	27522.77	(0.05)	[74003]
	8(1, 7) – 7(2, 6)	17/2	1	15/2	1	(0,0,0)	27552.69	(0.05)	[74003]
	8(1, 7) – 7(2, 6)	15/2	1	13/2	1	(0,0,0)	27567.27	(0.05)	[74003]
	8(1, 7) – 7(2, 6)	13/2	1	11/2	1	(0,0,0)	27581.79	(0.05)	[74003]
	32(7,25) – 33(6,28)	61/2	1	63/2	1	(0,0,0)	27600.49	(0.05)	[74003]
	32(7,25) – 33(6,28)	63/2	1	65/2	1	(0,0,0)	27601.12	(0.05)	[74003]
	32(7,25) – 33(6,28)	65/2	1	67/2	1	(0,0,0)	27601.88	(0.05)	[74003]
	32(7,25) – 33(6,28)	63/2	2	65/2	2	(0,0,0)	27603.56	(0.05)	[74003]
	32(7,25) – 33(6,28)	65/2	2	67/2	2	(0,0,0)	27604.25	(0.05)	[74003]
	32(7,25) – 33(6,28)	67/2	1	69/2	1	(0,0,0)	27604.98	(0.05)	[74003]
	32(7,25) – 33(6,28)	65/2	3	67/2	3	(0,0,0)	27606.27	(0.05)	[74003]
	32(7,25) – 33(6,28)	67/2	2	69/2	2	(0,0,0)	27606.95	(0.05)	[74003]
	32(7,25) – 33(6,28)	69/2	1	71/2	1	(0,0,0)	27607.68	(0.05)	[74003]
	32(7,25) – 33(6,28)	67/2	3	69/2	3	(0,0,0)	27903.13	(0.05)	[74003]
	32(7,25) – 33(6,28)	65/2	4	67/2	4	(0,0,0)	27903.90	(0.05)	[74003]
	32(7,25) – 33(6,28)	63/2	3	65/2	3	(0,0,0)	27904.67	(0.05)	[74003]
	32(7,25) – 33(6,28)	65/2	5	67/2	5	(0,0,0)	27906.50	(0.05)	[74003]
	32(7,25) – 33(6,28)	63/2	4	65/2	4	(0,0,0)	27907.27	(0.05)	[74003]
	32(7,25) – 33(6,28)	61/2	2	63/2	2	(0,0,0)	27908.08	(0.05)	[74003]
	32(7,25) – 33(6,28)	63/2	5	65/2	5	(0,0,0)	27910.10	(0.05)	[74003]
	32(7,25) – 33(6,28)	61/2	3	63/2	3	(0,0,0)	27910.76	(0.05)	[74003]
	32(7,25) – 33(6,28)	59/2	1	61/2	1	(0,0,0)	27911.55	(0.05)	[74003]
	8(2, 6) – 9(1, 9)	21/2	1	23/2	1	(0,0,0)	28404.8	(0.2)	[74003]
	8(2, 6) – 9(1, 9)	19/2	2	21/2	2	(0,0,0)	28430.1	(0.2)	[74003]
	8(2, 6) – 9(1, 9)	17/2	3	19/2	3	(0,0,0)	28457.3	(0.2)	[74003]
	5(2, 4) – 6(1, 5)	7/2	1	9/2	1	(0,0,0)	28461.8	(0.2)	[74003]

TABLE 33.2. The microwave spectrum of NF_2—Continued

Isotopic species	$N'(K'_-,K'_+)$ – $N''(K''_-,K''_+)$	F'	ϵ'	F''	ϵ''	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{14}N^{19}F_2$	5(2, 4) – 6(1, 5)	9/2	1	11/2	1	(0,0,0)	28475.2	(0.2)	[74003]
	5(2, 4) – 6(1, 5)	11/2	1	13/2	1	(0,0,0)	28489.7	(0.2)	[74003]
	5(2, 4) – 6(1, 5)	9/2	2	11/2	2	(0,0,0)	28513.8	(0.2)	[74003]
	8(2, 6) – 9(1, 9)	19/2	1	21/2	1	(0,0,0)	28520.7	(0.2)	[74003]
	5(2, 4) – 6(1, 5)	11/2	2	13/2	2	(0,0,0)	28526.6	(0.2)	[74003]
	5(2, 4) – 6(1, 5)	13/2	1	15/2	1	(0,0,0)	28542.6	(0.2)	[74003]
	8(2, 6) – 9(1, 9)	17/2	2	19/2	2	(0,0,0)	28550.6	(0.2)	[74003]
	5(2, 4) – 6(1, 5)	11/2	3	13/2	3	(0,0,0)	28552.9	(0.2)	[74003]
	5(2, 4) – 6(1, 5)	13/2	2	15/2	2	(0,0,0)	28563.6	(0.2)	[74003]
	5(2, 4) – 6(1, 5)	15/2	1	17/2	1	(0,0,0)	28575.6	(0.2)	[74003]
	8(2, 6) – 9(1, 9)	15/2	2	17/2	2	(0,0,0)	28579.2	(0.2)	[74003]
	8(2, 6) – 9(1, 9)	17/2	1	19/2	1	(0,0,0)	28647.8	(0.2)	[74003]
	8(2, 6) – 9(1, 9)	15/2	1	17/2	1	(0,0,0)	28675.5	(0.2)	[74003]
	8(2, 6) – 9(1, 9)	13/2	1	15/2	1	(0,0,0)	28704.2	(0.2)	[74003]
	5(2, 4) – 6(1, 5)	13/2	3	15/2	3	(0,0,0)	28749.2	(0.2)	[74003]
	5(2, 4) – 6(1, 5)	11/2	4	13/2	4	(0,0,0)	28772.1	(0.2)	[74003]
	5(2, 4) – 6(1, 5)	9/2	4	11/2	3	(0,0,0)	28788.7	(0.2)	[74003]
	5(2, 4) – 6(1, 5)	11/2	5	13/2	5	(0,0,0)	28836.	(1.0)	[74003]
	5(2, 4) – 6(1, 5)	9/2	4	11/2	5	(0,0,0)	28848.	(1.0)	[74003]
	5(2, 4) – 6(1, 5)	9/2	4	11/2	4	(0,0,0)	28864.6	(0.2)	[74003]
	5(2, 4) – 6(1, 5)	7/2	2	9/2	2	(0,0,0)	28876.5	(0.2)	[74003]
	37(8,30) – 38(7,31)	71/2	1	73/2	1	(0,0,0)	32946.6	(0.2)	[74003]
	37(8,30) – 38(7,31)	73/2	1	75/2	1	(0,0,0)	32947.5	(0.2)	[74003]
	37(8,30) – 38(7,31)	75/2	1	77/2	1	(0,0,0)	32948.3	(0.2)	[74003]
	37(8,30) – 38(7,31)	73/2	2	75/2	2	(0,0,0)	32950.2	(0.2)	[74003]
	37(8,30) – 38(7,31)	75/2	2	77/2	2	(0,0,0)	32951.1	(0.2)	[74003]
	37(8,30) – 38(7,31)	77/2	1	79/2	1	(0,0,0)	32951.9	(0.2)	[74003]
	37(8,30) – 38(7,31)	75/2	3	77/2	3	(0,0,0)	33953.7	(0.2)	[74003]
	37(8,30) – 38(7,31)	77/2	2	79/2	2	(0,0,0)	32954.5	(0.2)	[74003]
	37(8,30) – 38(7,31)	79/2	1	81/2	1	(0,0,0)	32955.3	(0.2)	[74003]
	4(0, 4) – 3(1, 3)	3/2	1	1/2	1	(0,0,0)	32978.86	(0.05)	[74003]
	4(0, 4) – 3(1, 3)	5/2	3	3/2	3	(0,0,0)	32988.15	(0.05)	[74003]
	4(0, 4) – 3(1, 3)	7/2	5	5/2	5	(0,0,0)	33011.36	(0.05)	[74003]
	4(0, 4) – 3(1, 3)	5/2	2	3/2	2	(0,0,0)	33057.56	(0.05)	[74003]
	4(0, 4) – 3(1, 3)	7/2	4	5/2	4	(0,0,0)	33072.19	(0.05)	[74003]
	4(0, 4) – 3(1, 3)	9/2	5	7/2	5	(0,0,0)	33094.08	(0.05)	[74003]
	4(0, 4) – 3(1, 3)	11/2	1	9/2	2	(0,0,0)	33110.15	(0.05)	[74003]
	4(0, 4) – 3(1, 3)	7/2	3	5/2	3	(0,0,0)	33180.95	(0.05)	[74003]
	4(0, 4) – 3(1, 3)	9/2	3	7/2	4	(0,0,0)	33192.3	(0.2)	[74003]
	4(0, 4) – 3(1, 3)	11/2	1	9/2	1	(0,0,0)	33214.1	(0.2)	[74003]
	4(0, 4) – 3(1, 3)	13/2	1	11/2	1	(0,0,0)	33221.92	(0.05)	[74003]
	4(0, 4) – 3(1, 3)	9/2	3	7/2	3	(0,0,0)	33223.9	(0.2)	[74003]
	4(0, 4) – 3(1, 3)	9/2	4	7/2	4	(0,0,0)	33224.9	(0.2)	[74003]
	4(0, 4) – 3(1, 3)	11/2	3	9/2	3	(0,0,0)	33235.07	(0.05)	[74003]
	37(8,30) – 38(7,31)	77/2	3	79/2	3	(0,0,0)	33241.0	(0.2)	[74003]
	37(8,30) – 38(7,31)	75/2	4	77/2	4	(0,0,0)	33241.9	(0.2)	[74003]
	37(8,30) – 38(7,31)	73/2	3	75/2	3	(0,0,0)	33242.8	(0.2)	[74003]
	37(8,30) – 38(7,31)	75/2	5	77/2	5	(0,0,0)	33245.0	(0.2)	[74003]
	37(8,30) – 38(7,31)	73/2	4	75/2	4	(0,0,0)	33245.9	(0.2)	[74003]
	37(8,30) – 38(7,31)	71/2	2	73/2	2	(0,0,0)	33246.7	(0.2)	[74003]
	37(8,30) – 38(7,31)	73/2	5	75/2	5	(0,0,0)	33249.0	(0.2)	[74003]
	37(8,30) – 38(7,31)	71/2	3	73/2	3	(0,0,0)	33249.9	(0.2)	[74003]
	37(8,30) – 38(7,31)	69/2	1	71/2	1	(0,0,0)	33250.8	(0.2)	[74003]
	4(0, 4) – 3(1, 3)	9/2	2	7/2	2	(0,0,0)	33252.50	(0.05)	[74003]
	4(0, 4) – 3(1, 3)	9/2	4	7/2	3	(0,0,0)	33255.45	(0.05)	[74003]
	4(0, 4) – 3(1, 3)	11/2	2	9/2	2	(0,0,0)	33256.25	(0.05)	[74003]
	21(5,17) – 22(4,18)	39/2	1	41/2	1	(0,0,0)	33266.4	(0.2)	[74003]
	21(5,17) – 22(4,18)	41/2	1	43/2	1	(0,0,0)	33269.0	(0.2)	[74003]
	21(5,17) – 22(4,18)	43/2	1	45/2	1	(0,0,0)	33271.7	(0.2)	[74003]
	4(0, 4) – 3(1, 3)	7/2	2	5/2	2	(0,0,0)	33272.50	(0.05)	[74003]
	21(5,17) – 22(4,18)	41/2	2	43/2	2	(0,0,0)	33277.9	(0.2)	[74003]
	21(5,17) – 22(4,18)	43/2	2	45/2	2	(0,0,0)	33280.5	(0.2)	[74003]
	21(5,17) – 22(4,18)	45/2	1	47/2	1	(0,0,0)	33283.2	(0.2)	[74003]
	21(5,17) – 22(4,18)	43/2	3	45/2	3	(0,0,0)	33288.4	(0.2)	[74003]
	21(5,17) – 22(4,18)	45/2	2	47/2	2	(0,0,0)	33290.9	(0.2)	[74003]
	21(5,17) – 22(4,18)	47/2	1	49/2	1	(0,0,0)	33293.4	(0.2)	[74003]

TABLE 33.2. The microwave spectrum of NF_2—Continued

Isotopic species	$N'(K'_-,K'_+) - N''(K''_-,K''_+)$	F'	ϵ'	F''	ϵ''	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{14}N^{19}F_2$	4(0, 4) - 3(1, 3)	9/2	1	7/2	1	(0,0,0)	33301.50	(0.05)	[74003]
	4(0, 4) - 3(1, 3)	7/2	1	5/2	1	(0,0,0)	33316.98	(0.05)	[74003]
	4(0, 4) - 3(1, 3)	5/2	1	3/2	1	(0,0,0)	33325.35	(0.05)	[74003]
	21(5,17) - 22(4,18)	45/2	3	47/2	3	(0,0,0)	33545.3	(0.2)	[74003]
	21(5,17) - 22(4,18)	43/2	4	45/2	4	(0,0,0)	33548.4	(0.2)	[74003]
	21(5,17) - 22(4,18)	41/2	3	43/2	3	(0,0,0)	33551.2	(0.2)	[74003]
	21(5,17) - 22(4,18)	43/2	5	45/2	5	(0,0,0)	33558.9	(0.2)	[74003]
	21(5,17) - 22(4,18)	41/2	4	43/2	4	(0,0,0)	33562.0	(0.2)	[74003]
	21(5,17) - 22(4,18)	39/2	2	41/2	2	(0,0,0)	33564.9	(0.2)	[74003]
	21(5,17) - 22(4,18)	41/2	5	43/2	5	(0,0,0)	33572.7	(0.2)	[74003]
	21(5,17) - 22(4,18)	39/2	3	41/2	3	(0,0,0)	33575.6	(0.2)	[74003]
	21(5,17) - 22(4,18)	37/2	1	39/2	1	(0,0,0)	33578.3	(0.2)	[74003]
	30(5,25) - 29(6,24)	55/2	1	53/2	1	(0,0,0)	34069.5	(0.2)	[74003]
	30(5,25) - 29(6,24)	57/2	3	55/2	3	(0,0,0)	34072.3	(0.2)	[74003]
	30(5,25) - 29(6,24)	59/2	5	57/2	5	(0,0,0)	34075.1	(0.2)	[74003]
	30(5,25) - 29(6,24)	57/2	2	55/2	2	(0,0,0)	34082.65	(0.05)	[74003]
	30(5,25) - 29(6,24)	59/2	4	57/2	4	(0,0,0)	34085.39	(0.05)	[74003]
	30(5,25) - 29(6,24)	61/2	5	59/2	5	(0,0,0)	34088.28	(0.05)	[74003]
	30(5,25) - 29(6,24)	59/2	3	57/2	3	(0,0,0)	34095.56	(0.05)	[74003]
	30(5,25) - 29(6,24)	61/2	4	59/2	4	(0,0,0)	34098.31	(0.05)	[74003]
	30(5,25) - 29(6,24)	63/2	3	61/2	3	(0,0,0)	34101.22	(0.05)	[74003]
	30(5,25) - 29(6,24)	65/2	1	63/2	1	(0,0,0)	34286.52	(0.05)	[74003]
	30(5,25) - 29(6,24)	63/2	2	61/2	2	(0,0,0)	34289.02	(0.05)	[74003]
	30(5,25) - 29(6,24)	61/2	3	59/2	3	(0,0,0)	34291.57	(0.05)	[74003]
	30(5,25) - 29(6,24)	63/2	1	61/2	1	(0,0,0)	34297.42	(0.05)	[74003]
	30(5,25) - 29(6,24)	61/2	2	59/2	2	(0,0,0)	34299.95	(0.05)	[74003]
	30(5,25) - 29(6,24)	59/2	2	57/2	2	(0,0,0)	34302.56	(0.05)	[74003]
	30(5,25) - 29(6,24)	61/2	1	59/2	1	(0,0,0)	34309.00	(0.05)	[74003]
	30(5,25) - 29(6,24)	59/2	1	57/2	1	(0,0,0)	34311.54	(0.05)	[74003]
	30(5,25) - 29(6,24)	57/2	1	55/2	1	(0,0,0)	34314.12	(0.05)	[74003]
	1(1, 0) - 1(0, 1)	3/2	1	5/2	1	(0,0,0)	60074.66	(0.05)	[74003]
	1(1, 0) - 1(0, 1)	5/2	1	3/2	2	(0,0,0)	60076.69	(0.05)	[74003]
	1(1, 0) - 1(0, 1)	5/2	1	5/2	1	(0,0,0)	60101.68	(0.05)	[74003]
	1(1, 0) - 1(0, 1)	1/2	1	3/2	1	(0,0,0)	60120.44	(0.05)	[74003]
	1(1, 0) - 1(0, 1)	3/2	1	3/2	1	(0,0,0)	60129.98	(0.05)	[74003]
	1(1, 0) - 1(0, 1)	1/2	1	1/2	1	(0,0,0)	60142.30	(0.05)	[74003]
	1(1, 0) - 1(0, 1)	3/2	1	1/2	1	(0,0,0)	60151.83	(0.05)	[74003]
	1(1, 0) - 1(0, 1)	1/2	2	3/2	2	(0,0,0)	60801.71	(0.05)	[74003]
	1(1, 0) - 1(0, 1)	3/2	2	1/2	2	(0,0,0)	60816.01	(0.05)	[74003]
	1(1, 0) - 1(0, 1)	3/2	2	3/2	2	(0,0,0)	60878.32	(0.05)	[74003]
	1(1, 0) - 1(0, 1)	3/2	2	5/2	2	(0,0,0)	60903.14	(0.05)	[74003]
	1(1, 0) - 1(0, 1)	3/2	2	3/2	1	(0,0,0)	60958.5	(0.2)	[74003]
	15(4,11) - 16(3,14)	33/2	1	35/2	1	(0,0,0)	61820.6	(0.2)	[74003]
	15(4,11) - 16(3,14)	31/2	1	33/2	1	(0,0,0)	61821.9	(0.2)	[74003]
	15(4,11) - 16(3,14)	29/2	1	31/2	1	(0,0,0)	61823.5	(0.2)	[74003]
	2(1, 1) - 2(0, 2)	7/2	1	7/2	2	(0,0,0)	61843.9	(0.2)	[74003]
	2(1, 1) - 2(0, 2)	9/2	1	9/2	1	(0,0,0)	61871.49	(0.05)	[74003]
	2(1, 1) - 2(0, 2)	7/2	2	7/2	3	(0,0,0)	61884.87	(0.05)	[74003]
	2(1, 1) - 2(0, 2)	5/2	3	5/2	4	(0,0,0)	61899.57	(0.05)	[74003]
	2(1, 1) - 2(0, 2)	9/2	1	7/2	3	(0,0,0)	61905.0	(0.2)	[74003]
	2(1, 1) - 2(0, 2)	7/2	2	5/2	4	(0,0,0)	61916.0	(0.2)	[74003]
	2(1, 1) - 2(0, 2)	5/2	3	3/2	3	(0,0,0)	61929.5	(0.2)	[74003]
	2(1, 1) - 2(0, 2)	5/2	3	5/2	3	(0,0,0)	61942.0	(0.2)	[74003]
	2(1, 1) - 2(0, 2)	7/2	2	7/2	2	(0,0,0)	61948.9	(0.2)	[74003]
	2(1, 1) - 2(0, 2)	3/2	1	5/2	2	(0,0,0)	61951.5	(0.2)	[74003]
	2(1, 1) - 2(0, 2)	7/2	2	5/2	3	(0,0,0)	61958.5	(0.2)	[74003]
	2(1, 1) - 2(0, 2)	9/2	1	7/2	2	(0,0,0)	61969.3	(0.2)	[74003]
	2(1, 1) - 2(0, 2)	5/2	1	7/2	1	(0,0,0)	61975.0	(0.2)	[74003]
	2(1, 1) - 2(0, 2)	3/2	2	3/2	2	(0,0,0)	61996.75	(0.05)	[74003]
	2(1, 1) - 2(0, 2)	5/2	2	5/2	2	(0,0,0)	61998.42	(0.05)	[74003]
	2(1, 1) - 2(0, 2)	7/2	1	5/2	2	(0,0,0)	62001.6	(0.2)	[74003]
	2(1, 1) - 2(0, 2)	3/2	1	5/2	1	(0,0,0)	62002.9	(0.2)	[74003]
	2(1, 1) - 2(0, 2)	5/2	1	5/2	1	(0,0,0)	62013.43	(0.05)	[74003]
	2(1, 1) - 2(0, 2)	7/2	1	7/2	1	(0,0,0)	62014.3	(0.2)	[74003]
	2(1, 1) - 2(0, 2)	1/2	1	3/2	1	(0,0,0)	62033.2	(0.2)	[74003]
	2(1, 1) - 2(0, 2)	3/2	1	3/2	1	(0,0,0)	62036.6	(0.2)	[74003]

TABLE 33.2. The microwave spectrum of NF_2—Continued

Isotopic species	$N'(K'_-,K'_+)$ - $N''(K''_-,K''_+)$	F'	ϵ'	F''	ϵ''	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{14}N^{19}F_2$	2(1, 1) - 2(0, 2)	5/2	1	3/2	1	(0,0,0)	62047.15	(0.05)	[74003]
	2(1, 1) - 2(0, 2)	5/2	2	5/2	1	(0,0,0)	62049.60	(0.05)	[74003]
	2(1, 1) - 2(0, 2)	7/2	1	5/2	1	(0,0,0)	62052.89	(0.05)	[74003]
	2(1, 1) - 2(0, 2)	1/2	1	1/2	1	(0,0,0)	62055.7	(0.2)	[74003]
	2(1, 1) - 2(0, 2)	3/2	1	1/2	1	(0,0,0)	62058.95	(0.05)	[74003]
	2(1, 1) - 2(0, 2)	3/2	3	1/2	3	(0,0,0)	62127.0	(0.2)	[74003]
	2(1, 1) - 2(0, 2)	1/2	2	3/2	5	(0,0,0)	62165.5	(0.2)	[74003]
	10(3, 7) - 11(2,10)	25/2	1	27/2	1	(0,0,0)	62182.0	(0.2)	[74003]
	10(3, 7) - 11(2,10)	23/2	2	25/2	2	(0,0,0)	62188.2	(0.2)	[74003]
	10(3, 7) - 11(2,10)	21/2	3	23/2	3	(0,0,0)	62194.2	(0.2)	[74003]
	10(3, 7) - 11(2,10)	23/2	1	25/2	1	(0,0,0)	62214.4	(0.2)	[74003]
	10(3, 7) - 11(2,10)	21/2	2	23/2	2	(0,0,0)	62219.1	(0.2)	[74003]
	2(1, 1) - 2(0, 2)	5/2	4	3/2	5	(0,0,0)	62223.2	(0.2)	[74003]
	10(3, 7) - 11(2,10)	19/2	2	21/2	2	(0,0,0)	62229.7	(0.2)	[74003]
	15(4,11) - 16(3,14)	27/2	1	29/2	1	(0,0,0)	62230.5	(0.2)	[74003]
	15(4,11) - 16(3,14)	29/2	2	31/2	2	(0,0,0)	62232.0	(0.2)	[74003]
	15(4,11) - 16(3,14)	31/2	2	33/2	2	(0,0,0)	62234.0	(0.2)	[74003]
	2(1, 1) - 2(0, 2)	3/2	3	3/2	4	(0,0,0)	62268.76	(0.05)	[74003]
	2(1, 1) - 2(0, 2)	3/2	3	5/2	5	(0,0,0)	62287.7	(0.2)	[74003]
	2(1, 1) - 2(0, 2)	1/2	3	3/2	4	(0,0,0)	62303.4	(0.2)	[74003]
	2(1, 1) - 2(0, 2)	3/2	4	3/2	4	(0,0,0)	62311.48	(0.05)	[74003]
	2(1, 1) - 2(0, 2)	3/2	4	5/2	5	(0,0,0)	62330.5	(0.2)	[74003]
	2(1, 1) - 2(0, 2)	3/2	5	1/2	2	(0,0,0)	62331.5	(0.2)	[74003]
	2(1, 1) - 2(0, 2)	5/2	4	5/2	5	(0,0,0)	62341.82	(0.05)	[74003]
	2(1, 1) - 2(0, 2)	5/2	5	3/2	4	(0,0,0)	62363.90	(0.05)	[74003]
	2(1, 1) - 2(0, 2)	7/2	3	5/2	5	(0,0,0)	62394.2	(0.2)	[74003]
	2(1, 1) - 2(0, 2)	7/2	3	9/2	1	(0,0,0)	62437.2	(0.2)	[74003]
	2(1, 1) - 2(0, 2)	5/2	5	7/2	3	(0,0,0)	62459.3	(0.2)	[74003]
	2(1, 1) - 2(0, 2)	3/2	4	3/2	3	(0,0,0)	62468.32	(0.05)	[74003]
	2(1, 1) - 2(0, 2)	3/2	4	5/2	3	(0,0,0)	62480.53	(0.05)	[74003]
	2(1, 1) - 2(0, 2)	5/2	4	7/2	2	(0,0,0)	62482.4	(0.2)	[74003]
	2(1, 1) - 2(0, 2)	5/2	4	5/2	3	(0,0,0)	62492.02	(0.05)	[74003]
	2(1, 1) - 2(0, 2)	3/2	5	3/2	3	(0,0,0)	62509.59	(0.05)	[74003]
	2(1, 1) - 2(0, 2)	5/2	5	5/2	3	(0,0,0)	62532.95	(0.05)	[74003]
	2(1, 1) - 2(0, 2)	7/2	3	7/2	2	(0,0,0)	62534.71	(0.05)	[74003]
	10(3, 7) - 11(2,10)	15/2	1	17/2	1	(0,0,0)	62664.58	(0.05)	[74003]
	10(3, 7) - 11(2,10)	17/2	3	19/2	3	(0,0,0)	62671.52	(0.05)	[74003]
	10(3, 7) - 11(2,10)	19/2	5	21/2	5	(0,0,0)	62680.03	(0.05)	[74003]
	2(1, 1) - 2(0, 2)	5/2	5	5/2	2	(0,0,0)	62681.28	(0.05)	[74003]
	10(3, 7) - 11(2,10)	17/2	2	19/2	2	(0,0,0)	62699.65	(0.05)	[74003]
	2(1, 1) - 2(0, 2)	7/2	3	7/2	1	(0,0,0)	62705.29	(0.05)	[74003]
	10(3, 7) - 11(2,10)	19/2	4	21/2	4	(0,0,0)	62706.47	(0.05)	[74003]
	10(3, 7) - 11(2,10)	21/2	5	23/2	5	(0,0,0)	62714.79	(0.05)	[74003]
	10(3, 7) - 11(2,10)	19/2	3	21/2	3	(0,0,0)	62737.32	(0.05)	[74003]
	10(3, 7) - 11(2,10)	21/2	4	23/2	4	(0,0,0)	62743.73	(0.05)	[74003]
	10(3, 7) - 11(2,10)	23/2	3	25/2	3	(0,0,0)	62751.4	(0.2)	[74003]
	20(5,15) - 21(4,18)	45/2	1	47/2	1	(0,0,0)	64633.10	(0.05)	[74003]
	20(5,15) - 21(4,18)	43/2	1	45/2	1	(0,0,0)	64634.2	(0.2)	[74003]
	20(5,15) - 21(4,18)	41/2	1	43/2	1	(0,0,0)	64634.38	(0.05)	[74003]
	3(1, 2) - 3(0, 3)	9/2	1	9/2	1	(0,0,0)	64695.19	(0.05)	[74003]
	3(1, 2) - 3(0, 3)	7/2	1	7/2	1	(0,0,0)	64714.84	(0.05)	[74003]
	3(1, 2) - 3(0, 3)	5/2	1	5/2	1	(0,0,0)	64729.65	(0.05)	[74003]
	20(5,15) - 21(4,18)	43/2	3	45/2	3	(0,0,0)	65002.02	(0.05)	[74003]
	3(1, 2) - 3(0, 3)	3/2	1	3/2	1	(0,0,0)	65033.38	(0.05)	[74003]
	3(1, 2) - 3(0, 3)	5/2	2	5/2	2	(0,0,0)	65058.46	(0.05)	[74003]
	3(1, 2) - 3(0, 3)	7/2	2	7/2	2	(0,0,0)	65094.62	(0.05)	[74003]

Table 34. Rotational and centrifugal distortion constants for $^{19}F_2{}^{16}O$.[a]

Watson's Determinable Parameters	Present Analysis[b] (MHz)	Derived Parameters (assuming planarity conditions)	
A"	58 782.6832(151)	A'	58 782.655(15)
B"	10 896.3521(30)	B'	10 896.418(3)
C"	9 167.37374(255)	C'	9 167.422(3)
τ_1	0.174809(1681)	τ'_{bbcc}	-0.05568(9)
τ_2	-0.0117994(2618)	τ'_{ccaa}	0.1329(5)
τ_3[c]	2.590(5)	τ'_{aabb}	0.0976(12)
τ_{aaaa}	-6.651478(1426)	$\tau_{aabb}(1)$	0.4165(7)
τ_{bbbb}	-0.09278132(10292)	$\tau_{aabb}(2)$	0.4044(6)
τ_{cccc}	-0.0367054(701)	$\tau_{aabb}(3)$	0.4044(6)
H_J	$(0.59137\pm0.22)\times10^{-7}$	$\tau_{abab}(1)$	-0.15895(27)
H_{JK}	$(0.4706\pm0.38)\times10^{-6}$	$\tau_{abab}(2)$	-0.14845(41)
H_{KJ}	$-0.22290(836)\times10^{-4}$	$\tau_{abab}(3)$	-0.14683(44)
H_K	$0.17668(978)\times10^{-3}$	$\Delta\tau$	$-0.355(11)\times10^{-3}$
h_J[d]	$0.2282(461)\times10^{-7}$		
h_{JK}	$0.1664(665)\times10^{-5}$		
h_K	$(0.565\pm17.2)\times10^{-6}$		
Std. dev.	0.066		
No. lines fit	108		

[a] Reanalysis was carried out with new unpublished millimeter measurements by F.J. Lovas and R.D. Suenram. The analysis is discussed in Appendix 2 and the new measurements are listed in Table A.2.1.

[b] The uncertainties quoted are one standard deviation as estimated by the least-squares fit. The number of significant figures quoted are necessary to reproduce the calculated transition frequencies within their standard deviation.

[c] Strictly speaking, τ_3 is not a determinable parameter, but is calculated from τ_1, τ_2, τ_{aaaa} and τ_{bbbb} using the planarity conditions.

[d] Watson uses $2h_J$ for this parameter.

Table 34.1. Rotational constants for the excited vibrational states of F_2O [66019].

Vib. State v_1 v_2 v_3	A (MHz)	B (MHz)	C (MHz)
1 0 0	59 213.58(100)	10 824.35(50)	9 128.09(50)
1 0 0[a]	58 744.08(100)	10 830.66(50)	9 160.23(50)
0 1 0	59 481.65(100)	10 854.07(50)	9 114.13(50)
0 2 0	59 711.17(100)	10 818.01(50)	9 092.99(50)
0 0 1	58 197.62(100)	10 826.87(50)	9 052.16(50)

[a] Corrected for the effect of ν_1-$2\nu_2$ Fermi resonance.

Table 34.2. Zeeman constants, spin-rotation constants and electric dipole moment of F_2O.

Parameter	Value	Reference
Zeeman constants:		
g_{aa} (μ_N)	-0.213(5)	[69027]
g_{bb} (μ_N)	-0.058(2)	[69027]
g_{cc} (μ_N)	-0.068(2)	[69027]
$2\chi_{aa}-\chi_{bb}-\chi_{cc}$ [a]	-8.8(14)	[69027]
$2\chi_{bb}-\chi_{aa}-\chi_{cc}$ [a]	-4.4(7)	[69027]
Spin-rotation constants:		
M_{aa} (kHz)	-42(1)	[65011]
M_{bb} (kHz)	-22(1)	[65011]
M_{cc} (kHz)	-49(1)	[65011]
Electric dipole moment		
μ_b (D)	0.297(5)	[61008]

TABLE 34.3. The microwave spectrum of F_2O

Isotopic species	$J'(K'_-,K'_+)$ – $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{19}F_2{}^{16}O$	5(2, 4) – 6(1, 5)					(0,0,0)	8299.51	(0.10)	[63007]
	12(2,10) – 13(1,13)					(0,0,0)	8610.91	(0.10)	[63007]
	34(8,27) – 35(7,28)					(0,0,0)	8769.86	(0.10)	[63007]
	31(6,25) – 30(7,24)					(0,0,0)	8779.55	(0.10)	[63007]
	20(5,15) – 21(4,18)					(0,0,0)	8782.91	(0.10)	[63007]
	34(8,26) – 35(7,29)					(0,0,0)	9533.43	(0.10)	[63007]
	9(2, 7) – 10(1,10)	10		11		(0,0,0)	10057.571	(0.01)	[65011]
	9(2, 7) – 10(1,10)	9		10		(0,0,0)	10057.730	(0.01)	[65011]
	9(2, 7) – 10(1,10)	8		9		(0,0,0)	10057.877	(0.01)	[65011]
	22(4,19) – 21(5,16)					(0,0,0)	11778.86	(0.10)	[63007]
	3(0, 3) – 2(1, 2)					(0,2,0)	12340.23	(0.10)	[66019]
	36(7,30) – 35(8,27)					(0,0,0)	12387.79	(0.10)	[63007]
	9(2, 7) – 10(1,10)					(0,0,1)	12679.59	(0.10)	[66019]
	14(2,13) – 13(3,10)	13		12		(0,0,0)	12782.514	(0.01)	[65011]
	14(2,13) – 13(3,10)	14		13		(0,0,0)	12782.600	(0.01)	[65011]
	14(2,13) – 13(3,10)	15		14		(0,0,0)	12782.690	(0.01)	[65011]
	3(0, 3) – 2(1, 2)					(0,1,0)	12787.24	(0.10)	[66019]
	3(0, 3) – 2(1, 2)					(1,0,0)	12944.84	(0.10)	[66019]
	7(1, 6) – 6(2, 6)					(0,2,0)	13230.72	(0.10)	[66019]
	36(7,29) – 35(8,28)					(0,0,0)	13500.68	(0.10)	[63007]
	9(2, 7) – 10(1,10)					(0,1,0)	13514.77	(0.10)	[66019]
	13(2,11) – 14(1,14)	14		15		(0,0,0)	13575.01	(0.01)	[63008]
	13(2,11) – 14(1,14)	13		14		(0,0,0)	13575.28	(0.01)	[63008]
	13(2,11) – 14(1,14)	12		13		(0,0,0)	13575.51	(0.01)	[63008]
	3(0, 3) – 2(1, 2)					(0,0,1)	13796.2	(0.50)	[66019]
	29(7,23) – 30(6,24)					(0,0,0)	13797.53	(0.10)	[63007]
	3(0, 3) – 2(1, 2)					(0,0,0)	13804.03	(0.10)	[63007]
	12(2,10) – 13(1,13)					(0,0,1)	13967.86	(0.10)	[66019]
	7(1, 6) – 6(2, 5)					(0,1,0)	14600.04	(0.10)	[66019]
	7(1, 6) – 6(2, 5)					(1,0,0)	14714.27	(0.10)	[66019]
	25(3,22) – 26(2,25)	26		27		(0,0,0)	14720.26	(0.01)	[63008]
	25(3,22) – 26(2,25)	25		26		(0,0,0)	14720.63	(0.01)	[63008]
	25(3,22) – 26(2,25)	24		25		(0,0,0)	14720.93	(0.01)	[63008]
	29(7,22) – 30(6,25)					(0,0,0)	15480.54	(0.10)	[63007]
	11(3, 8) – 12(2,11)	12		13		(0,0,0)	15624.761	(0.01)	[65011]
	11(3, 8) – 12(2,11)	11		12		(0,0,0)	15624.830	(0.01)	[65011]
	11(3, 8) – 12(2,11)	10		11		(0,0,0)	15624.896	(0.01)	[65011]
	8(2, 6) – 9(1, 9)					(0,0,0)	15771.44	(0.10)	[61008]
	8(2, 6) – 9(1, 9)					(1,0,0)	17022.18	(0.10)	[66019]
	24(2,23) – 23(3,20)	23		22		(0,0,0)	17257.70	(0.01)	[63008]
	24(2,23) – 23(3,20)	24		23		(0,0,0)	17257.96	(0.01)	[63008]
	24(2,23) – 23(3,20)	25		24		(0,0,0)	17258.26	(0.01)	[63008]
	7(1, 6) – 6(2, 5)					(0,0,0)	17354.71	(0.10)	[63007]
	8(2, 6) – 9(1, 9)					(0,0,1)	17661.49	(0.10)	[66019]
	18(3,16) – 17(4,13)					(0,0,0)	18095.67	(0.10)	[63007]
	7(1, 6) – 6(2, 5)					(0,0,1)	18108.02	(0.10)	[66019]
	24(6,19) – 25(5,20)					(0,0,0)	18474.80	(0.10)	[63007]
	11(3, 8) – 12(2,11)					(1,0,0)	18798.62	(0.10)	[66019]
	15(4,11) – 16(3,14)					(0,0,0)	19009.18	(0.10)	[63007]
	8(2, 6) – 9(1, 9)					(0,1,0)	19085.94	(0.10)	[66019]
	8(2, 6) – 9(1, 9)					(0,2,0)	19774.59	(0.10)	[66019]
	11(3, 8) – 12(2,11)					(0,1,0)	20450.52	(0.10)	[66019]
	12(2,10) – 11(3, 9)					(0,1,0)	20653.94	(0.10)	[66019]
	27(5,23) – 26(6,20)					(0,0,0)	20910.24	(0.10)	[63007]
	14(2,12) – 15(1,15)					(0,0,0)	21224.06	(0.10)	[63007]
	24(6,18) – 25(5,21)					(0,0,0)	22039.31	(0.10)	[63007]
	19(5,15) – 20(4,16)					(0,0,0)	22378.53	(0.10)	[63007]
	7(2, 5) – 8(1, 8)					(0,0,0)	23842.38	(0.10)	[61008]
	15(2,14) – 14(3,11)					(0,0,0)	24533.39	(0.10)	[63007]
	7(2, 5) – 8(1, 8)					(0,0,1)	25096.68	(0.10)	[66019]
	14(4,11) – 15(3,12)					(0,0,0)	25155.14	(0.10)	[63007]
	7(2, 5) – 8(1, 8)					(1,0,0)	25309.92	(0.10)	[66019]
	12(2,10) – 11(3, 9)					(0,0,0)	25527.21	(0.10)	[63007]
	38(9,30) – 39(8,31)					(0,0,0)	25569.29	(0.10)	[63007]
	38(9,29) – 39(8,32)					(0,0,0)	25796.85	(0.10)	[63007]

TABLE 34.3. The microwave spectrum of F_2O—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{19}F_2{}^{16}O$	9(3, 7) - 10(2, 8)					(0,0,1)	25998.68	(0.10)	[66019]
	17(3,14) - 16(4,13)					(0,0,0)	26192.22	(0.10)	[63007]
	22(4,18) - 21(5,17)					(0,0,0)	26359.08	(0.10)	[63007]
	7(2, 5) - 8(1, 8)					(0,1,0)	27020.76	(0.10)	[66019]
	12(2,10) - 11(3, 9)					(0,0,1)	27242.74	(0.10)	[66019]
	9(3, 7) - 10(2, 8)					(0,0,0)	27495.80	(0.10)	[63007]
	7(2, 5) - 8(1, 8)					(0,2,0)	27806.62	(0.10)	[66019]
	32(6,27) - 31(7,24)					(0,0,0)	28231.06	(0.10)	[63007]
	27(5,22) - 26(6,21)					(0,0,0)	28286.80	(0.10)	[63007]
	23(2,22) - 22(3,19)					(0,0,0)	29365.40	(0.10)	[63007]
	19(5,14) - 20(4,17)					(0,0,0)	29533.85	(0.10)	[63007]
	33(8,26) - 34(7,27)					(0,0,0)	30808.75	(0.10)	[63007]
	33(8,25) - 34(7,28)					(0,0,0)	31325.95	(0.10)	[63007]
	15(2,13) - 16(1,16)					(0,0,0)	31461.07	(0.10)	[63007]
	32(6,26) - 31(7,25)					(0,0,0)	31744.90	(0.10)	[63007]
	10(3, 7) - 11(2,10)					(0,0,0)	31774.50	(0.10)	[63007]
	10(3, 7) - 11(2,10)					(0,0,1)	31931.17	(0.10)	[66019]
	23(4,20) - 22(5,17)					(0,0,0)	32050.75	(0.10)	[63007]
	9(3, 7) - 10(3, 8)					(0,1,0)	32198.60	(0.10)	[66019]
	4(2, 3) - 5(1, 4)					(0,0,1)	32374.98	(0.10)	[66019]
	4(2, 3) - 5(1, 4)					(0,0,0)	33251.89	(0.05)	[69027]
	6(2, 4) - 7(1, 7)					(0,0,0)	34044.45	(0.10)	[63007]
	16(2,15) - 15(3,12)					(0,0,0)	34291.10	(0.10)	[63007]
	4(0, 4) - 3(1, 3)					(0,2,0)	34416.68	(0.10)	[66019]
	37(7,31) - 36(8,28)					(0,0,0)	34434.95	(0.10)	[63007]
	6(2, 4) - 7(1, 7)					(0,0,1)	34753.12	(0.10)	[66019]
	4(0, 4) - 3(1, 3)					(0,1,0)	34933.82	(0.10)	[66019]
	4(0, 4) - 3(1, 3)					(1,0,0)	35029.15	(0.10)	[66019]
	19(3,17) - 18(4,14)					(0,0,0)	35455.35	(0.10)	[63007]
	4(2, 3) - 5(1, 4)					(1,0,0)	35500.21	(0.10)	[66019]
	6(2, 4) - 7(1, 8)					(1,0,0)	35660.54	(0.10)	[66019]
	4(0, 4) - 3(1, 3)					(0,0,1)	35876.98	(0.10)	[66019]
	4(2, 3) - 5(1, 4)					(0,1,0)	35887.83	(0.10)	[66019]
	4(0, 4) - 3(1, 3)					(0,0,0)	36028.82	(0.05)	[69027]
	37(7,30) - 36(8,29)					(0,0,0)	36036.82	(0.10)	[63007]
	28(7,22) - 29(6,23)					(0,0,0)	36045.54	(0.10)	[63007]
	10(3, 7) - 11(2,10)					(0,1,0)	36520.35	(0.10)	[66019]
	4(2, 3) - 5(1, 4)					(0,2,0)	37053.30	(0.10)	[66019]
	6(2, 4) - 7(1, 7)					(0,1,0)	37091.44	(0.10)	[66019]
	28(7,21) - 29(6,24)					(0,0,0)	37184.65	(0.10)	[63007]
	14(4,10) - 15(3,13)					(0,0,0)	38408.88	(0.10)	[63007]
	23(6,18) - 24(5,19)					(0,0,0)	41064.05	(0.04)	[72031]
	34(3,32) - 33(4,29)	33		32		(0,0,0)	41297.60	(0.10)	[72031]
	34(3,32) - 33(4,29)	34		33		(0,0,0)	41298.01	(0.10)	[72031]
	34(3,32) - 33(4,29)	35		34		(0,0,0)	41298.33	(0.10)	[72031]
	21(2,20) - 20(3,17)					(0,0,0)	45089.32	(0.20)	[63007]
	18(2,17) - 17(3,14)					(0,0,0)	46795.92	(0.20)	[63007]
	9(3, 6) - 10(2, 9)					(0,0,0)	48919.17	(0.10)	[63007]
	13(4,10) - 14(3,11)					(0,0,0)	49186.21	(0.10)	[63007]
	1(1, 0) - 1(0, 1)					(0,0,0)	49613.55	(0.10)	[61008]
	33(6,28) - 32(7,25)					(0,0,0)	50198.50	(0.10)	[63007]
	18(5,13) - 19(4,16)					(0,0,0)	50393.23	(0.10)	[63007]
	2(1, 1) - 2(0, 2)					(0,0,0)	51388.95	(0.10)	[61008]
	20(3,18) - 19(4,15)					(0,0,0)	51747.90	(0.10)	[63007]
	24(4,21) - 23(5,18)					(0,0,0)	51911.88	(0.10)	[63007]
	23(4,19) - 22(5,18)					(0,0,0)	52223.40	(0.10)	[63007]
	8(3, 6) - 9(2, 7)					(0,0,0)	52302.40	(0.10)	[61008]
	32(8,25) - 33(7,26)					(0,0,0)	52643.25	(0.10)	[63007]
	28(5,23) - 27(6,22)					(0,0,0)	52676.00	(0.10)	[63007]
	32(8,24) - 33(7,27)					(0,0,0)	52988.75	(0.10)	[63007]
	13(2,11) - 12(3,10)					(0,0,0)	53708.85	(0.10)	[63007]
	18(3,15) - 17(4,14)					(0,0,0)	53739.10	(0.10)	[63007]
	3(1, 2) - 3(0, 3)					(0,0,0)	54137.05	(0.10)	[61008]
	33(6,27) - 32(7,26)					(0,0,0)	55170.63	(0.10)	[63007]
	38(7,32) - 37(8,29)					(0,0,0)	56600.15	(0.10)	[63007]

TABLE 34.3. The microwave spectrum of F_2O—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{19}F_2{}^{16}O$	3(2, 2) - 4(1, 3)					(0,0,0)	57457.10	(0.10)	[61008]
	4(1, 3) - 4(0, 4)					(0,0,0)	57958.30	(0.10)	[63007]
	27(7,21) - 28(6,22)					(0,0,0)	58013.45	(0.10)	[63007]
	13(4, 9) - 14(3,12)					(0,0,0)	58183.80	(0.10)	[63007]
	5(0, 5) - 4(1, 4)					(0,0,0)	58725.50	(0.10)	[61008]
	27(7,20) - 28(6,23)					(0,0,0)	58772.25	(0.10)	[63007]
	38(7,31) - 37(8,30)					(0,0,0)	58879.50	(0.10)	[63007]
	17(2,15) - 18(1,18)					(0,0,0)	59137.55	(0.10)	[63007]
	4(2, 2) - 5(1, 5)					(0,0,0)	59846.20	(0.10)	[61008]

Table 35. Rotational and centrifugal distortion constants for $^{32}S^{19}F_2$ [73035].

Watson's Determinable Parameters	Value[a] (MHz)	Derived Parameters (assuming planarity conditions)	Value (MHz)
A"	26 930.5017(45)	A'	26 930.486(4)
B"	9 212.04734(229)	B'	9 212.068(2)
C"	6 845.87452(120)	C'	6 845.934(1)
τ_1	0.128603(615)	τ'_{bbcc}	-0.03146(8)
τ_2	0.0080540(1504)	τ'_{ccaa}	0.04133(47)
τ_3[b]	0.3720(17)	τ'_{aabb}	0.11874(49)
τ_{aaaa}	-1.221848(481)	$\tau_{aabb}(1)$	0.2179(8)
τ_{bbbb}	-0.0823413(730)	$\tau_{aabb}(2)$	0.2117(10)
τ_{cccc}	-0.015201(78)	$\tau_{aabb}(3)$	
H_J	$(0.36044\pm0.14)\times10^{-6}$	$\tau_{abab}(1)$	-0.0495(6)
H_{JK}	$(0.6525\pm1.4)\times10^{-6}$	$\tau_{abab}(2)$	-0.0445(10)
H_{KJ}	$(0.1908\pm0.25)\times10^{-5}$	$\tau_{abab}(3)$	-0.0433(14)
H_K	$(0.15453\pm0.017)\times10^{-4}$		
h_J[c]	$-(0.3162\pm0.21)\times10^{-7}$	$\Delta\tau$	$-0.42(14)\times10^{-3}$
h_{JK}	$(0.53051\pm0.18)\times10^{-5}$		
h_K	$-(0.8503\pm0.74)\times10^{-5}$		
rms. dev.	0.078		
No. lines fit	75		

[a] The uncertainties quoted are one standard deviation as estimated by the least squares fit. The number of significant figures quoted are necessary to reproduce the calculated transition frequencies within their standard deviations.

[b] Strictly speaking τ_3 is not a determinable parameter, but is calculated from τ_1, τ_2, τ_{aaaa} and τ_{bbbb} using the planarity conditions.

[c] Watson uses $2h_J$ for this parameter.

Table 35.1. Rotational constants and electric dipole moment for SF_2.

Parameter	$(0,0,0)^a$	$^{32}S^{19}F_2$ $(1,0,0)^b$	$(0,1,0)^b$	$(0,0,1)^b$	$^{34}S^{19}F_2$ $(0,0,0)^c$
A (MHz)		26 967.13(25)	27 264.59(43)	26 780.09(43)	26 071.56(61)
B (MHz)		9 167.06(6)	9 188.94(13)	9 157.35(8)	9 211.42(53)
C (MHz)		6 830.64(6)	6 819.06(11)	6 801.95(8)	6 789.00(49)
τ_{aaaa}		-1.68(17)	-0.945(68)	-1.26(27)	
τ_{bbbb}		-0.0850^d	-0.064(7)	-0.0850^d	
τ_{aabb}		0.2055^d	0.229(31)	0.2055^d	
τ_{abab}		-0.0498^d	-0.062(16)	-0.0498^d	
μ_b (D)	1.05^c				

a See Table 35 for the ground state values.

b Reference [74010].

c Reference [69028].

d Fixed at the value determined for the ground state.

TABLE 35.2. The microwave spectrum of SF_2

Isotopic species	$J'(K'_-,K'_+)$ – $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{32}S^{19}F_2$	16(6,11) – 15(7, 8)	(0,0,0)	20591.22	(0.15)	[73035]
	16(6,10) – 15(7, 9)	(0,0,0)	21258.97	(0.15)	[73035]
	24(12,13) – 25(11,14)	(0,0,0)	21522.68	(0.15)	[73035]
	24(12,12) – 25(11,15)	(0,0,0)	21522.98	(0.15)	[73035]
	8(2, 7) – 7(3, 4)	(0,0,0)	22211.41	(0.05)	[73035]
	8(5, 3) – 9(4, 6)	(0,0,0)	22273.96	(0.10)	[73035]
	2(1, 1) – 2(0, 2)	(0,0,1)	22553.2	(0.50)	[74010]
	2(1, 1) – 2(0, 2)	(0,0,0)	22672.14	(0.04)	[73035]
	2(1, 1) – 2(0, 2)	(1,0,0)	22688.5	(0.50)	[74010]
	2(1, 1) – 2(0, 2)	(0,1,0)	23033.0	(0.50)	[74010]
	33(16,17) – 34(15,20)	(0,0,0)	23068.04	(0.10)	[73035]
	23(9,15) – 22(10,12)	(0,0,0)	23289.53	(0.10)	[73035]
	23(9,14) – 22(10,13)	(0,0,0)	23316.19	(0.10)	[73035]
	39(16,23) – 38(17,22)	(0,0,0)	23993.48	(0.15)	[73035]
	9(3, 6) – 8(4, 5)	(0,0,0)	24228.48	(0.10)	[73035]
	17(9, 9) – 18(8,10)	(0,0,0)	24336.89	(0.15)	[73035]
	17(9, 8) – 18(8,11)	(0,0,0)	24345.49	(0.15)	[73035]
	14(5,10) – 13(6, 7)	(0,0,0)	25190.53	(0.15)	[73035]
	13(2,12) – 12(3, 9)	(0,0,0)	25287.22	(0.50)	[73035]
	30(12,19) – 29(13,16)	(0,0,0)	25939.68	(0.15)	[73035]
	30(12,18) – 29(13,17)	(0,0,0)	25940.55	(0.15)	[73035]
	35(17,18) – 36(16,21)	(0,0,0)	27633.05	(0.15)	[73035]
	37(15,22) – 36(16,21)	(0,0,0)	28784.50	(0.15)	[73035]
	19(10,10) – 20(9,11)	(0,0,0)	29183.02	(0.16)	[73035]
	19(10, 9) – 20(9,12)	(0,0,0)	29185.13	(0.16)	[73035]
	9(2, 8) – 8(3, 5)	(0,0,0)	30324.25	(0.20)	[73035]
	3(3, 0) – 4(2, 3)	(0,0,0)	30574.90	(0.10)	[73035]
	28(11,18) – 27(12,15)	(0,0,0)	30934.31	(0.15)	[73035]
	28(11,17) – 27(12,16)	(0,0,0)	30937.96	(0.15)	[73035]
	3(0, 3) – 2(1, 2)	(0,1,0)	31236.6	(0.50)	[74010]
	3(0, 3) – 2(1, 2)	(0,0,0)	31725.57	(0.10)	[73035]
	12(7, 6) – 13(6, 7)	(0,0,0)	31774.72	(0.15)	[73035]
	12(7, 5) – 13(6, 8)	(0,0,0)	31830.16	(0.15)	[73035]
	37(18,19) – 38(17,22)	(0,0,0)	32131.31	(0.15)	[73035]
	4(1, 3) – 4(0, 4)	(0,1,0)	33646.5	(0.50)	[74010]
	1(1, 0) – 0(0, 0)	(1,0,0)	33797.5	(0.50)	[74010]

TABLE 35.2. The microwave spectrum of SF_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ – $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{32}S^{19}F_2$	1(1, 0) – 0(0, 0)	(0,1,0)	34086.2	(0.50)	[74010]
	5(1, 4) – 4(2, 3)	(0,1,0)	38487.0	(0.50)	[74010]
	11(3, 9) – 10(4, 6)	(0,1,0)	39340.1	(0.50)	[74010]
	13(4,10) – 12(5, 7)	(0,1,0)	41105.3	(0.50)	[74010]
	5(1, 4) – 5(0, 5)	(0,0,1)	41845.7	(0.50)	[74010]
	5(1, 4) – 5(0, 5)	(0,1,0)	42372.7	(0.50)	[74010]
	27(5,22) – 28(4,25)	(0,0,0)	42519.45	(0.10)	[73035]
	7(5, 3) – 8(4, 4)	(0,1,0)	42546.9	(0.50)	[74010]
	10(3, 7) – 9(4, 6)	(0,1,0)	43339.0	(0.50)	[74010]
	30(5,26) – 29(6,23)	(0,0,0)	43967.09	(0.15)	[73035]
	11(2, 9) – 12(1,12)	(0,0,0)	44515.86	(0.20)	[73035]
	34(17,18) – 35(16,19)	(0,0,0)	44673.70	(0.20)	[73035]
	13(4,10) – 12(5, 7)	(0,0,0)	44925.53	(0.20)	[73035]
	22(8,14) – 21(9,13)	(0,0,0)	46628.74	(0.10)	[73035]
	10(3, 7) – 9(4, 6)	(0,0,0)	46681.81	(0.15)	[73035]
	5(2, 3) – 5(1, 4)	(0,0,1)	46920.5	(0.50)	[74010]
	15(5,10) – 14(6, 9)	(0,0,0)	47150.74	(0.20)	[73035]
	5(2, 3) – 5(1, 4)	(0,0,0)	47175.57	(0.01)	[69028]
	2(1, 2) – 1(0, 1)	(0,0,1)	47186.0	(0.50)	[74010]
	6(2, 4) – 6(1, 5)	(0,0,1)	47201.0	(0.50)	[74010]
	5(2, 3) – 5(1, 4)	(1,0,0)	47377.0	(0.50)	[74010]
	6(2, 4) – 6(1, 5)	(0,0,0)	47452.06	(0.01)	[69028]
	2(1, 2) – 1(0, 1)	(1,0,0)	47458.3	(0.50)	[74010]
	2(1, 2) – 1(0, 1)	(0,0,0)	47468.04	(0.01)	[69028]
	6(2, 4) – 6(1, 5)	(1,0,0)	47562.5	(0.50)	[74010]
	2(1, 2) – 1(0, 1)	(0,1,0)	47722.4	(0.50)	[74010]
	5(2, 3) – 5(1, 4)	(0,1,0)	48112.4	(0.50)	[74010]
	18(3,16) – 17(4,13)	(0,0,0)	48293.34	(0.20)	[73035]
	6(2, 4) – 6(1, 5)	(0,1,0)	48294.6	(0.50)	[74010]
	4(2, 2) – 4(1, 3)	(0,0,0)	48531.28	(0.02)	[73035]
	4(2, 2) – 4(1, 3)	(1,0,0)	48777.8	(0.50)	[74010]
	4(0, 4) – 3(1, 3)	(0,1,0)	48853.1	(0.50)	[74010]
	11(7, 5) – 12(6, 6)	(0,0,0)	48858.43	(0.35)	[73035]
	11(7, 4) – 12(6, 7)	(0,0,0)	48879.05	(0.25)	[73035]
	4(0, 4) – 3(1, 3)	(0,0,1)	49041.7	(0.50)	[74010]
	4(0, 4) – 3(1, 3)	(1,0,0)	49042.7	(0.50)	[74010]
	4(0, 4) – 3(1, 3)	(0,0,0)	49356.29	(0.01)	[69028]
	4(2, 2) – 4(1, 3)	(0,1,0)	49535.9	(0.50)	[74010]
	22(4,18) – 23(3,21)	(0,0,0)	49768.04	(0.15)	[73035]
	7(2, 5) – 7(1, 6)	(0,0,0)	49896.43	(0.01)	[69028]
	4(4, 1) – 5(3, 2)	(0,0,0)	50607.46	(0.35)	[73035]
	7(2, 5) – 7(1, 6)	(0,1,0)	50623.1	(0.50)	[74010]
	3(2, 1) – 3(1, 2)	(0,0,0)	50843.68	(0.02)	[69028]
	4(4, 0) – 5(3, 3)	(0,0,0)	50967.20	(0.20)	[73035]
	3(2, 1) – 3(1, 2)	(1,0,0)	51096.4	(0.50)	[74010]
	24(4,21) – 23(5,18)	(0,0,0)	51429.83	(0.15)	[73035]
	20(7,14) – 19(8,11)	(0,0,0)	51642.91	(0.10)	[73035]
	20(7,13) – 19(8,12)	(0,0,0)	52415.70	(0.20)	[73035]
	6(1, 5) – 6(0, 6)	(0,0,0)	53243.12	(0.10)	[73035]
	2(2, 0) – 2(1, 1)	(0,0,0)	53372.52	(0.03)	[69028]
	13(8, 6) – 14(7, 7)	(0,0,0)	53736.24	(0.20)	[73035]
	13(8, 5) – 14(7, 8)	(0,0,0)	53741.29	(0.20)	[73035]
	12(3,10) – 11(4, 7)	(0,0,0)	53754.47	(0.20)	[73035]
	43(17,26) – 42(18,25)	(0,0,0)	53973.05	(0.30)	[73035]
	8(2, 6) – 8(1, 7)	(0,0,0)	54911.76	(0.02)	[69028]
	6(5, 2) – 7(4, 3)	(0,0,0)	55779.28	(0.10)	[73035]
	22(12,11) – 23(11,12)	(0,0,0)	55809.15	(0.20)	[73035]
	6(5, 1) – 7(4, 4)	(0,0,0)	55882.37	(0.10)	[73035]
	13(4, 9) – 12(5, 8)	(0,0,0)	57394.37	(0.20)	[73035]
	8(2, 6) – 7(3, 5)	(0,0,0)	58024.02	(0.20)	[73035]
	2(2, 1) – 2(1, 2)	(0,0,1)	59931.0	(0.50)	[74010]
	2(2, 1) – 2(1, 2)	(1,0,0)	60402.8	(0.50)	[74010]
	14(4,11) – 13(5, 8)	(0,0,0)	60520.62	(0.20)	[73035]
	32(12,21) – 31(13,18)	(0,0,0)	61470.80	(0.10)	[73035]
	32(12,20) – 31(13,19)	(0,0,0)	61474.80	(0.10)	[73035]
	33(17,16) – 34(16,19)	(0,0,0)	61638.47	(0.10)	[73035]

TABLE 35.2. The microwave spectrum of SF_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{32}S^{19}F_2$	9(2, 7) - 9(1, 8)	(0,0,0)	62764.65	(0.10)	[73035]
	3(2, 2) - 3(1, 3)	(0,0,0)	63931.79	(0.20)	[73035]
	3(2, 2) - 3(1, 3)	(1,0,0)	64037.7	(0.50)	[74010]
	26(14,13) - 27(13,14)	(0,0,0)	65075.18	(0.10)	[73035]
	35(18,17) - 36(17,20)	(0,0,0)	66033.10	(0.20)	[73035]
	6(2, 5) - 6(1, 6)	(0,0,0)	82714.08	(0.20)	[73035]
$^{34}S^{19}F_2$	5(2, 3) - 5(1, 4)	(0,0,0)	44982.21	(0.05)	[69028]
	6(2, 4) - 6(1, 5)	(0,0,0)	45658.72	(0.05)	[69028]
	2(1, 2) - 1(0, 1)	(0,0,0)	46438.56	(0.05)	[69028]
	7(2, 5) - 7(1, 6)	(0,0,0)	48659.53	(0.05)	[69028]
	4(0, 4) - 3(1, 3)	(0,0,0)	49853.29	(0.05)	[69028]
	8(2, 6) - 8(1, 7)	(0,0,0)	54380.70	(0.05)	[69028]

Table 36. Rotational and centrifugal distortion constants for $^{28}Si^{19}F_2$ [72031].

Watson's Determinable Parameters	Value[a] (MHz)	Derived Parameters (assuming planarity conditions)	Value[a] (MHz)
A''	30 602.2556(507)	A'	30 602.241(51)
B''	8 823.4827(146)	B'	8 823.517(14)
C''	6 830.2589(158)	C'	6 830.356(17)
τ_1	0.234713(12794)	τ'_{bbcc}	-0.0285(10)
τ_2	0.023005(2522)	τ'_{ccaa}	0.0692(31)
τ_3[b]	0.383(39)	τ'_{aabb}	0.1940(94)
τ_{aaaa}	-1.99213(655)	$\tau_{aabb}(1)$	0.2813(47)
τ_{bbbb}	-0.0708473(13806)	$\tau_{aabb}(2)$	0.2612(67)
τ_{cccc}	-0.014864(732)	$\tau_{aabb}(3)$	0.2612(67)
H_J	$-0.352510\pm0.164\times10^{-5}$	$\tau_{abab}(1)$	-0.0436(36)
H_{JK}	$-0.598708\pm0.268\times10^{-4}$	$\tau_{abab}(2)$	-0.0269(66)
H_{KJ}	$-0.40691\pm0.162\times10^{-4}$	$\tau_{abab}(3)$	-0.0234(75)
H_K	$-0.3145\pm0.320\times10^{-4}$	$\Delta\tau$	$-0.119(37)\times10^{-2}$
h_J[c]	$-0.14707\pm0.057\times10^{-5}$		
h_{JK}	$-0.20654\pm0.116\times10^{-4}$		
h_K	$0.8732\pm0.392\times10^{-4}$		
Std. dev.	0.151		
No. lines fit	73		

[a] The uncertainties quoted are one standard deviation as estimated by the least squres fit. The number of significant figures quoted are necessary to reproduce the calculated transition frequencies within their standard deviations.

[b] Strictly speaking, τ_3 is not a determinable parameter, but is calculated from τ_1, τ_2, τ_{aaaa} and τ_{bbbb} using the planarity conditions.

[c] Watson uses $2h_J$ for this parameter.

Table 36.1. Rotational constants and electric dipole moment for SiF_2.

Isotopic Species	Vib. State v_1 v_2 v_3	A (MHz)	B (MHz)	C (MHz)	Reference
$^{28}Si^{19}F_2$	0 0 0	a	a	a	
	1 0 0[b]	30 651.64(17)	8 768.17(6)	6 797.70(90)	[73036]
	0 1 0	31 054.31(4)	8 807.71(3)	6 808.23(1)	[66021]
	0 0 1[b]	30 300.85(13)	8 809.96(5)	6 806.57(90)	[73036]
$^{29}Si^{19}F_2$	0 0 0	29 994.39(37)	8 823.77(5)	6 799.63(14)	[66021]
$^{30}Si^{19}F_2$	0 0 0	29 428.3	8 824.0	6 770.2	[66021]
Electric dipole moment of $^{28}SiF_2$: μ_b = 1.230(15) D					[65012]

[a] See Table 36 for the ground state constants.

[b] The intervibration-state transition, v_1=1, 8_{54} ← v_3=1, 8_{17}, has been measured at 54351.8(1) MHz [73036]. Due to format difficulties, this is not shown in Table 36.2.

Additional reference: [66020].

TABLE 36.2. The microwave spectrum of SiF_2

Isotopic species	$J'(K'_-,K'_+)$ – $J''(K''_-,K''_+)$	(v_1,v_2,v_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{28}Si^{19}F_2$	16(5,12) – 15(6, 9)	(0,0,0)	7712.90	(0.20)	[66021]
	13(4, 9) – 12(5, 8)	(0,0,0)	7793.01	(0.20)	[66021]
	31(12,20) – 32(11,21)	(0,0,0)	7953.49	(0.20)	[66021]
	31(12,19) – 32(11,22)	(0,0,0)	7955.29	(0.20)	[66021]
	6(3, 3) – 7(2, 6)	(0,0,0)	8015.17	(0.20)	[66021]
	14(6, 9) – 15(5,10)	(0,0,0)	8262.04	(0.20)	[66021]
	2(0, 2) – 1(1, 1)	(0,1,0)	8856.70	(0.20)	[66021]
	33(11,23) – 32(12,20)	(0,0,0)	9036.07	(0.20)	[66021]
	33(11,22) – 32(12,21)	(0,0,0)	9039.56	(0.20)	[66021]
	14(6, 8) – 15(5,11)	(0,0,0)	9225.15	(0.20)	[66021]
	2(0, 2) – 1(1, 1)	(0,0,0)	9398.62	(0.20)	[66021]
	16(5,11) – 15(6,10)	(0,0,0)	9509.97	(0.20)	[66021]
	11(5, 7) – 12(4, 8)	(0,0,0)	10521.31	(0.20)	[66021]
	28(11,18) – 29(10,19)	(0,0,0)	10968.48	(0.20)	[66021]
	28(11,17) – 29(10,20)	(0,0,0)	10973.32	(0.20)	[66021]
	19(6,14) – 18(7,11)	(0,0,0)	11118.30	(0.20)	[66021]
	5(3, 3) – 6(2, 4)	(0,0,1)	11648.4	(0.20)	[73036]
	19(6,13) – 18(7,12)	(0,0,0)	11874.20	(0.20)	[66021]
	36(12,25) – 35(13,22)	(0,0,0)	12019.71	(0.20)	[66021]
	8(4, 5) – 9(3, 6)	(0,0,0)	12141.80	(0.20)	[66021]
	11(5, 6) – 12(4, 9)	(0,0,0)	12722.13	(0.20)	[66021]
	25(10,16) – 26(9,17)	(0,0,0)	13971.60	(0.20)	[66021]
	25(10,15) – 26(9,18)	(0,0,0)	13984.09	(0.20)	[66021]
	22(7,16) – 21(8,13)	(0,0,0)	14258.92	(0.20)	[66021]
	22(7,15) – 21(8,14)	(0,0,0)	14565.60	(0.20)	[66021]
	2(2, 1) – 3(1, 2)	(0,0,0)	15463.3	(0.50)	[66021]
	9(2, 8) – 8(3, 5)	(0,0,0)	15748.19	(0.20)	[66021]
	16(2,15) – 15(3,12)	(0,0,0)	16325.00	(0.20)	[66021]
	3(2, 1) – 4(1, 4)	(0,0,0)	16646.10	(0.20)	[66021]
	8(4, 4) – 9(3, 7)	(0,0,0)	16796.65	(0.20)	[66021]
	22(9,14) – 23(8,15)	(0,0,0)	16954.90	(0.20)	[66021]
	22(9,13) – 23(8,16)	(0,0,0)	16987.43	(0.20)	[66021]
	25(8,17) – 24(9,16)	(0,0,0)	17404.69	(0.20)	[66021]
	3(2, 1) – 4(1, 4)	(0,1,0)	18229.44	(0.20)	[66021]
	36(14,23) – 37(13,24)	(0,0,0)	18715.86	(0.20)	[66021]
	36(14,22) – 37(13,25)	(0,0,0)	18715.86	(0.20)	[66021]
	19(8,12) – 20(7,13)	(0,0,0)	19903.46	(0.20)	[66021]
	19(8,11) – 20(7,14)	(0,0,0)	19985.78	(0.20)	[66021]

TABLE 36.2. The microwave spectrum of SiF_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{28}Si^{19}F_2$	14(4,11) - 13(5, 8)	(0,0,0)	20078.86	(0.20)	[66021]
	28(9,20) - 27(10,17)	(0,0,0)	20259.47	(0.20)	[66021]
	33(13,20) - 34(12,23)	(0,0,0)	21777.53	(0.20)	[66021]
	5(3, 2) - 6(2, 5)	(0,0,0)	21780.24	(0.20)	[66021]
	31(10,22) - 30(11,19)	(0,0,0)	23212.86	(0.20)	[66021]
	31(10,21) - 30(11,20)	(0,0,0)	23230.46	(0.20)	[66021]
	5(1, 4) - 4(2, 3)	(1,0,0)	23236.10	(0.20)	[73036]
	1(1, 0) - 1(0, 1)	(0,0,1)	23416.64	(0.20)	[73036]
	1(1, 0) - 1(0, 1)	(0,0,0)	23771.54	(0.20)	[66021]
	1(1, 0) - 1(0, 1)	(1,0,0)	23921.30	(0.20)	[73036]
	5(1, 4) - 4(2, 3)	(0,0,0)	23998.41	(0.20)	[66021]
	1(1, 0) - 1(0, 1)	(0,1,0)	24245.59	(0.20)	[66021]
	11(2, 9) - 12(1,12)	(0,0,0)	24664.24	(0.20)	[66021]
	17(5,13) - 16(6,10)	(0,0,0)	24720.93	(0.20)	[66021]
	5(1, 4) - 4(2, 3)	(0,0,1)	24763.48	(0.20)	[73036]
	30(12,19) - 31(11,20)	(0,0,0)	24827.58	(0.20)	[66021]
	10(2, 9) - 9(3, 6)	(0,0,0)	24874.15	(0.20)	[66021]
	2(1, 1) - 2(0, 2)	(0,0,1)	25480.58	(0.20)	[73036]
	13(6, 8) - 14(5, 9)	(0,0,0)	25550.75	(0.20)	[66021]
	2(1, 1) - 2(0, 2)	(0,0,0)	25895.54	(0.20)	[66021]
	3(0, 3) - 2(1, 2)	(0,1,0)	25959.07	(0.20)	[66021]
	3(0, 3) - 2(1, 2)	(1,0,0)	25989.48	(0.20)	[73036]
	13(6, 7) - 14(5,10)	(0,0,0)	26041.39	(0.20)	[66021]
	2(1, 1) - 2(0, 2)	(1,0,0)	26104.46	(0.20)	[73036]
	34(11,24) - 33(12,21)	(0,0,0)	26153.73	(0.20)	[66021]
	34(11,23) - 33(12,22)	(0,0,0)	26160.67	(0.20)	[66021]
	2(0, 2) - 3(1, 3)	(0,0,1)	26263.26	(0.20)	[73036]
	2(1, 1) - 2(0, 2)	(0,1,0)	26374.28	(0.20)	[66021]
	3(0, 3) - 2(1, 2)	(0,0,0)	26525.33	(0.20)	[66021]
	3(0, 3) - 2(1, 2)	(0,0,1)	26909.96	(0.20)	[73036]
	14(4,10) - 13(5, 9)	(0,0,0)	27109.43	(0.20)	[66021]
	27(11,17) - 28(10,18)	(0,0,0)	27862.08	(0.20)	[66021]
	27(11,16) - 28(10,19)	(0,0,0)	27864.33	(0.20)	[66021]
	12(3,10) - 11(4, 7)	(0,0,0)	27891.98	(0.20)	[66021]
	17(5,12) - 16(6,11)	(0,0,0)	27922.68	(0.20)	[66021]
	10(5, 6) - 11(4, 7)	(0,0,0)	28081.64	(0.20)	[66021]
	8(2, 6) - 7(3, 5)	(0,0,0)	28141.36	(0.20)	[66021]
	3(1, 2) - 3(0, 3)	(0,0,1)	28805.10	(0.20)	[73036]
	37(12,25) - 36(13,24)	(0,0,0)	29087.50	(0.20)	[66021]
	3(1, 2) - 3(0, 3)	(0,0,0)	29319.55	(0.20)	[66021]
	8(2, 6) - 7(3, 5)	(0,0,1)	29458.4	(0.20)	[73036]
	3(1, 2) - 3(0, 3)	(1,0,0)	29629.14	(0.20)	[73036]
	20(6,14) - 19(7,13)	(0,0,0)	29787.53	(0.20)	[66021]
	3(1, 2) - 3(0, 3)	(0,1,0)	29802.20	(0.20)	[66021]
	4(3, 2) - 5(2, 3)	(0,0,1)	30239.04	(0.20)	[73036]
	24(10,15) - 25(9,16)	(0,0,0)	30876.10	(0.20)	[66021]
	24(10,14) - 25(9,17)	(0,0,0)	30882.30	(0.20)	[66021]
	11(2,10) - 10(3, 7)	(0,0,0)	31515.19	(0.20)	[66021]
	23(7,17) - 22(8,14)	(0,0,0)	31656.39	(0.20)	[66021]
	4(3, 2) - 5(2, 3)	(0,0,0)	31918.22	(0.20)	[66021]
	23(7,16) - 22(8,15)	(0,0,0)	32217.43	(0.20)	[66021]
	14(2,13) - 13(3,10)	(0,0,0)	32582.35	(0.20)	[66021]
	7(4, 3) - 8(3, 6)	(0,0,0)	32604.3	(0.50)	[66021]
	4(3, 2) - 5(2, 3)	(1,0,0)	33126.55	(0.20)	[73036]
	4(3, 1) - 5(2, 4)	(0,0,1)	34470.92	(0.20)	[73036]
	4(1, 3) - 4(0, 4)	(1,0,0)	34763.85	(0.20)	[73036]
	4(1, 3) - 4(0, 4)	(0,1,0)	34784.40	(0.20)	[66021]
	12(2,11) - 11(3, 8)	(0,0,0)	35215.04	(0.20)	[66021]
	13(2,12) - 12(3, 9)	(0,0,0)	35628.88	(0.20)	[66021]
	1(1, 1) - 0(0, 0)	(0,0,1)	37174.45	(0.20)	[73036]
	1(1, 1) - 0(0, 0)	(1,0,0)	37371.70	(0.20)	[73036]
	1(1, 1) - 0(0, 0)	(0,0,0)	37432.24	(0.20)	[66021]
	4(3, 1) - 5(2, 4)	(1,0,0)	37750.95	(0.20)	[73036]
	1(1, 1) - 0(0, 0)	(0,1,0)	37862.21	(0.20)	[66021]
	5(1, 4) - 5(0, 5)	(0,0,1)	40235.53	(0.20)	[73036]
	5(1, 4) - 5(0, 5)	(1,0,0)	41788.12	(0.20)	[73036]

TABLE 36.2. The microwave spectrum of SiF_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{28}Si^{19}F_2$	4(0, 4) - 3(1, 3)	(1,0,0)	43308.63	(0.20)	[73036]
	6(1, 5) - 5(2, 4)	(1,0,0)	43924.56	(0.20)	[73036]
	4(0, 4) - 3(1, 3)	(0,0,1)	44357.24	(0.20)	[73036]
	6(1, 5) - 5(2, 4)	(0,0,1)	45370.18	(0.20)	[73036]
	3(3, 1) - 4(2, 3)	(0,0,1)	47739.57	(0.20)	[73036]
	2(1, 2) - 1(0, 1)	(1,0,0)	50820.60	(0.20)	[73036]
	2(1, 2) - 1(0, 1)	(0,0,1)	50934.66	(0.20)	[73036]
	7(2, 5) - 7(1, 6)	(0,0,1)	56260.8	(0.20)	[73036]
	6(2, 4) - 6(1, 5)	(0,0,1)	56327.4	(0.20)	[73036]
	5(2, 3) - 5(1, 4)	(0,0,1)	57643.0	(0.20)	[73036]
	8(2, 6) - 8(1, 7)	(0,0,1)	58094.7	(0.20)	[73036]
	4(2, 2) - 4(1, 3)	(0,0,1)	59782.6	(0.20)	[73036]
	2(2, 0) - 2(1, 1)	(0,0,1)	64559.91	(0.20)	[73036]
	7(1, 6) - 6(2, 5)	(1,0,0)	65041.43	(0.20)	[73036]
	2(2, 0) - 2(1, 1)	(1,0,0)	65750.01	(0.20)	[73036]
	9(2, 7) - 9(1, 8)	(0,0,1)	69654.0	(0.20)	[73036]
	2(2, 1) - 2(1, 2)	(0,0,1)	70243.31	(0.20)	[73036]
	2(2, 1) - 2(1, 2)	(1,0,0)	71756.34	(0.20)	[73036]
	3(2, 2) - 3(1, 3)	(0,0,1)	73236.60	(0.20)	[73036]
$^{29}Si^{19}F_2$	2(0, 2) - 1(1, 1)	(0,0,0)	9938.32	(0.20)	[66021]
	1(1, 0) - 1(0, 1)	(0,0,0)	23194.5	(0.50)	[66021]
	2(1, 1) - 2(0, 2)	(0,0,0)	25357.12	(0.20)	[66021]
	3(0, 3) - 2(1, 2)	(0,0,0)	27035.20	(0.20)	[66021]
	3(1, 2) - 3(0, 3)	(0,0,0)	28853.00	(0.20)	[66021]
$^{30}Si^{19}F_2$	1(1, 0) - 1(0, 1)	(0,0,0)	22651.50	(0.20)	[66021]
	2(1, 1) - 2(0, 2)	(0,0,0)	24858.30	(0.20)	[66021]
	3(1, 2) - 3(0, 3)	(0,0,0)	28423.20	(0.20)	[66021]

Table 37. Rotational constants for $^{39}K^{16}OH$ [76036].[a]

Vib. State v_1 v_2 v_3	B_v(MHz)	D_v(kHz)	$\gamma_{\ell\ell}$(MHz)	q_0(MHz)	q_1(Hz)	$\chi_{\ell\ell}$(cm^{-1})
0 0 0	8 208.679(10)[b]	12.19(6)[b]				
0 1 0	8 169.03(2)	12.456(18)	-2.95(2)	-16.042(20)	-56(73)	
0 2 0	8 135.190(28)	12.599(21)	-3.146(10)	-16.47(10)[c]	-50[b]	8.1(5)
0 3 0	8 108.038(21)	12.811(51)	-3.337(2)	-16.900(9)	-48(36)	8.0(15)
0 4 0	8 087.009(78)	12.964(10)	-3.457(2)[d]	-17.29(10)[c]		8.2(4)[e]
			-3.281(30)[e]			
0 5 0	8 072.041(91)	13.082(223)	-3.317(7)	-17.665(8)	-96(37)	8.5(5)
0 1 1	8 102.47(2)	12.483(27)	-3.00(2)[c]	-17.376(6)	-44(24)	
0 2 1	8 096.264(28)	12.666(51)	-3.088(10)	-17.58(10)[c]	-40[c]	8.0(6)
0 3 1	8 043.179(78)	12.788(200)	-3.172(6)	-17.793(34)	-49(140)	7.2(15)
0 4 1	8 023.111(21)	13.007(42)	-3.173(7)[e]	-18.0(1)[c]		7.6(5)[e]
0 1 2	8 036.10(2)	12.528(111)	-3.05(2)[c]	-18.778(25)		

[a] The constants were obtained from fitting the data of references [76036] and [75011].

[b] Reference [73037].

[c] Extrapolated value.

[d] From ℓ=0 and 4 difference.

[e] From ℓ=0 and 2 difference.

Table 37.1. Rotational constants for $^{41}K^{16}OH$ and $^{39}K^{16}OD$ [76036].

Vib. State v_1 v_2 v_3	B_v(MHz)	D_v(kHz)	$\gamma_{\ell\ell}$(MHz)	q_0(MHz)	q_1(Hz)	$x_{\ell\ell}$(cm^{-1})
$^{41}K^{16}OH$						
0 0 0	8 088.910(2)	11.852(57)				
$^{39}K^{16}OD$						
0 0 0	7 494.825(20)	9.455(57)				
0 1 0[b]	7 483.458(24)	9.652(36)	-1.74(2)[a]	-16.775(29)	-31(63)	
0 2 0	7 474.872(9)	9.822(21)	-1.770(2)	-17.0(2)[b]		4.25(25)
0 3 0	7 468.878(28)	9.910(33)	-1.793(3)	-17.251(8)	-80(20)	4.40(15)
0 4 0	7 464.889(20)	10.00(5)[a]	-1.771(75)[c]	-17.5(2)[a]		4.27(20)[c]
0 0 1	7 438.072(12)	9.510(28)				
0 1 1[b]	7 429.461(36)	9.788(40)	-1.90(2)[a]	-18.008(17)	-71(40)	
0 2 1	7 420.653(17)	9.959(16)	-1.921(6)	-18.0(2)[a]		3.73(20)

[a] Extrapolated value.

[b] The B_v value for the v_2=1 states were corrected for $\gamma_{\ell\ell}$. See [76036].

[c] Determined for the ℓ=2 state only.

Table 37.2. Rotation-vibration interaction constants for KOH [76036].

Parameter	$^{39}K^{16}OH$ (MHz)	$^{41}K^{16}OH$ (MHz)	$^{39}K^{16}OD$ (MHz)
α_1	65.68(90)	64.21(90)	57.19(100)
α_2	48.94(96)	48.39(96)	14.88(100)
α_3	19.7[a]	19.3[a]	24.4[a]
γ_{11}	0.040(30)	0.040[b]	0.216(100)
γ_{22}	3.119(63)	3.12[b]	1.239(141)
γ_{12}	-0.44(90)	-0.44[b]	0[c]

[a] Calculated value.

[b] Assumed value from ^{39}KOH.

[c] Not determinable.

TABLE 37.3. The microwave spectrum of KOH

Isotopic species	J' - J''	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{39}K^{16}OH$	6 - 5					$(0,0^0,4)$	95329.79	(0.10)	[75011]
	6 - 5					$(0,3^3,2)$	95412.32	(0.15)	[75011]
	6 - 5					$(0,1^{L1},3)$	95470.19	(0.10)	[75011]
	6 - 5					$(0,3^{L1},2)$	95474.58	(0.10)	[75011]
	6 - 5					$(0,1^{U1},3)$	95713.10	(0.15)	[75011]
	6 - 5					$(0,5^{L1},1)$	95725.06	(0.15)	[75011]
	6 - 5					$(0,5^3,1)$	95750.80	(0.20)	[75011]
	6 - 5					$(0,2^2,2)$	95889.18	(0.15)	[75011]
	6 - 5					$(0,3^{U1},2)$	95922.18	(0.20)	[75011]
	6 - 5					$(0,2^0,2)$	96034.50	(0.20)	[75011]
	6 - 5					$(0,6^4,0)$	96102.00	(1.00)	[75011]
	6 - 5					$(0,4^{L2},1)$	96115.00	(0.20)	[75011]
	6 - 5					$(0,4^{U2},1)$	96115.90	(0.20)	[75011]
	6 - 5					$(0,0^0,3)$	96119.20	(0.10)	[75011]
	6 - 5					$(0,3^3,1)$	96167.42	(0.20)	[75011]
	6 - 5					$(0,3^{L1},1)$	96255.75	(0.40)	[75011]
	6 - 5					$(0,4^0,1)$	96265.27	(0.30)	[75011]
	6 - 5					$(0,1^{L1},2)$	96273.16	(0.10)	[75011]
	6 - 5					$(0,7^3,0)$	96325.30	(0.30)	[75011]
	6 - 5					$(0,5^{U1},1)$	96373.50	(0.15)	[75011]
	6 - 5					$(0,4^4,0)$	96374.40	(0.15)	[75011]
	6 - 5					$(0,5^{L1},0)$	96495.60	(0.20)	[75011]
	6 - 5					$(0,5^3,0)$	96498.00	(0.50)	[75011]
	6 - 5					$(0,1^{U1},2)$	96498.50	(0.20)	[75011]
	6 - 5					$(0,6^{L2},0)$	96579.96	(0.10)	[75011]
	6 - 5					$(0,6^{U2},0)$	96581.62	(0.10)	[75011]
	6 - 5					$(0,2^2,1)$	96673.45	(0.10)	[75011]
	6 - 5					$(0,3^{U1},1)$	96682.70	(0.40)	[75011]
	6 - 5					$(0,6^0,0)$	96727.70	(0.20)	[75011]
	6 - 5					$(0,2^0,1)$	96819.92	(0.10)	[75011]
	6 - 5					$(0,4^{L2},0)$	96876.70	(0.20)	[75011]
	6 - 5					$(0,4^{U2},0)$	96877.30	(0.20)	[75011]
	6 - 5					$(0,0^0,2)$	96909.76	(0.50)	[75011]
	6 - 5					$(0,3^3,0)$	96928.20	(0.50)	[75011]
	6 - 5					$(0,4^0,0)$	97032.24	(0.20)	[75011]
	6 - 5					$(0,3^{L1},0)$	97042.70	(0.20)	[75011]
	6 - 5					$(0,1^{L1},1)$	97078.63	(0.10)	[75011]
	6 - 5					$(0,5^{U1},0)$	97131.28	(0.10)	[75011]
	6 - 5					$(0,1^{U1},1)$	97287.13	(0.10)	[75011]
	6 - 5					$(0,3^{U1},0)$	97448.29	(0.10)	[75011]
	6 - 5					$(0,2^2,0)$	97461.80	(0.10)	[75011]
	6 - 5					$(0,2^0,0)$	97610.98	(0.10)	[75011]
	6 - 5					$(0,0^0,1)$	97701.30	(0.05)	[75011]
	6 - 5					$(0,1^{L1},0)$	97886.05	(0.05)	[75011]
	6 - 5					$(0,1^{U1},0)$	98078.44	(0.05)	[75011]
	6 - 5					$(0,0^0,0)$	98493.78	(0.05)	[75011]
	9 - 8					$(0,4^4,0)$	144540.16	(0.10)	[76036]
	9 - 8					$(0,2^{+2},1)$	144989.75	(0.10)	[76036]
	9 - 8					$(0,2^{-2},1)$	144989.75	(0.10)	[76036]
	9 - 8					$(0,3^{-1},1)$	145003.16	(0.10)	[76036]
	9 - 8					$(0,2^0,1)$	145208.76	(0.10)	[76036]
	9 - 8					$(0,4^{-2},0)$	145293.75	(0.10)	[76036]
	9 - 8					$(0,4^{+2},0)$	145296.54	(0.10)	[76036]
	9 - 8					$(0,0^0,2)$	145344.52	(0.10)	[76036]
	9 - 8					$(0,3^3,0)$	145371.28	(0.10)	[76036]
	9 - 8					$(0,4^0,0)$	145525.98	(0.10)	[76036]
	9 - 8					$(0,3^{+1},0)$	145543.34	(0.10)	[76036]
	9 - 8					$(0,1^{+1},1)$	145597.73	(0.10)	[76036]
	9 - 8					$(0,1^{-1},1)$	145910.34	(0.10)	[76036]
	9 - 8					$(0,3^{-1},0)$	146151.36	(0.10)	[76036]
	9 - 8					$(0,2^{+2},0)$	146172.44	(0.10)	[76036]
	9 - 8					$(0,2^{-2},0)$	146172.44	(0.10)	[76036]
	9 - 8					$(0,2^0,0)$	146395.84	(0.10)	[76036]
	9 - 8					$(0,0^0,1)$	146532.02	(0.10)	[76036]
	9 - 8					$(0,1^{+1},0)$	146808.85	(0.10)	[76036]

TABLE 37.3. The microwave spectrum of KOH—Continued

Isotopic species	J′ - J″	F′	F_1'	F″	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{39}K^{16}OH$	9 - 8					$(0,1^{-1},0)$	147097.44	(0.10)	[76036]
	9 - 8					$(0,0^{0},0)$	147720.71	(0.10)	[76036]
	11 - 10					$(0,4^{-2},1)$	176162.02	(0.10)	[76036]
	11 - 10					$(0,4^{+2},1)$	176167.82	(0.10)	[76036]
	11 - 10					$(0,0^{0},3)$	176172.32	(0.10)	[76036]
	11 - 10					$(0,3^{3},1)$	176259.63	(0.10)	[76036]
	11 - 10					$(0,3^{+1},1)$	176420.72	(0.10)	[76036]
	11 - 10					$(0,4^{0},1)$	176433.87	(0.10)	[76036]
	11 - 10					$(0,1^{+1},2)$	176453.94	(0.10)	[76036]
	11 - 10					$(0,4^{4},0)$	176637.68	(0.10)	[76036]
	11 - 10					$(0,5^{+1},0)$	176859.08	(0.10)	[76036]
	11 - 10					$(0,5^{3},0)$	176865.20	(0.10)	[76036]
	11 - 10					$(0,1^{-1},2)$	176867.06	(0.10)	[76036]
	11 - 10					$(0,2^{+2},1)$	177188.76	(0.10)	[76036]
	11 - 10					$(0,2^{-2},1)$	177186.87	(0.10)	[76036]
	11 - 10					$(0,3^{-1},1)$	177203.08	(0.10)	[76036]
	11 - 10					$(0,2^{0},1)$	177454.55	(0.10)	[76036]
	11 - 10					$(0,4^{-2},0)$	177558.50	(0.10)	[76036]
	11 - 10					$(0,4^{+2},0)$	177563.50	(0.10)	[76036]
	11 - 10					$(0,0^{0},2)$	177621.82	(0.10)	[76036]
	11 - 10					$(0,3^{3},0)$	177653.72	(0.10)	[76036]
	11 - 10					$(0,4^{0},0)$	177840.51	(0.10)	[76036]
	11 - 10					$(0,3^{+1},0)$	177863.67	(0.10)	[76036]
	11 - 10					$(0,1^{+1},1)$	177930.84	(0.10)	[76036]
	11 - 10					$(0,5^{-1},0)$	178023.42	(0.10)	[76036]
	11 - 10					$(0,1^{-1},1)$	178312.86	(0.10)	[76036]
	11 - 10					$(0,3^{-1},0)$	178606.73	(0.10)	[76036]
	11 - 10					$(0,2^{-2},0)$	178632.47	(0.10)	[76036]
	11 - 10					$(0,2^{+2},0)$	178634.00	(0.10)	[76036]
	11 - 10					$(0,2^{0},0)$	178905.51	(0.10)	[76036]
	11 - 10					$(0,0^{0},1)$	179073.17	(0.10)	[76036]
	11 - 10					$(0,1^{+1},0)$	179411.12	(0.10)	[76036]
	11 - 10					$(0,1^{-1},0)$	179763.83	(0.10)	[76036]
	11 - 10					$(0,0^{0},0)$	180526.07	(0.10)	[76036]
	12 - 11					$(0,0^{0},0)$	196923.81	(0.60)	[73037]
	13 - 12					$(0,4^{4},0)$	208721.57	(0.10)	[76036]
	13 - 12					$(0,5^{+1},0)$	208982.27	(0.10)	[76036]
	13 - 12					$(0,5^{3},0)$	208990.71	(0.10)	[76036]
	13 - 12					$(0,1^{-1},2)$	208993.41	(0.10)	[76036]
	13 - 12					$(0,2^{-2},1)$	209371.08	(0.10)	[76036]
	13 - 12					$(0,2^{+2},1)$	209373.99	(0.10)	[76036]
	13 - 12					$(0,3^{-1},1)$	209389.54	(0.10)	[76036]
	13 - 12					$(0,2^{0},1)$	209686.60	(0.10)	[76036]
	13 - 12					$(0,0^{0},2)$	209885.84	(0.10)	[76036]
	13 - 12					$(0,3^{3},0)$	209922.69	(0.10)	[76036]
	13 - 12					$(0,3^{+1},0)$	210170.26	(0.10)	[76036]
	13 - 12					$(0,1^{+1},1)$	210250.83	(0.10)	[76036]
	13 - 12					$(0,1^{-1},1)$	210702.22	(0.10)	[76036]
	13 - 12					$(0,3^{-1},0)$	211048.21	(0.10)	[76036]
	13 - 12					$(0,2^{-2},0)$	211079.65	(0.10)	[76036]
	13 - 12					$(0,2^{+2},0)$	211082.19	(0.10)	[76036]
	13 - 12					$(0,2^{0},0)$	211401.73	(0.10)	[76036]
	13 - 12					$(0,0^{0},1)$	211601.37	(0.10)	[76036]
	13 - 12					$(0,1^{+1},0)$	212000.41	(0.10)	[76036]
	13 - 12					$(0,1^{-1},0)$	212416.95	(0.10)	[76036]
	13 - 12					$(0,0^{0},0)$	213318.61	(0.10)	[76036]
$^{39}K^{16}OD$	9 - 8					$(0,2^{-2},0)$	134393.06	(0.10)	[76036]
	9 - 8					$(0,2^{+2},0)$	134394.79	(0.10)	[76036]
	9 - 8					$(0,1^{+1},0)$	134491.78	(0.10)	[76036]
	9 - 8					$(0,2^{0},0)$	134517.31	(0.10)	[76036]
	9 - 8					$(0,3^{-1},0)$	134688.82	(0.10)	[76036]
	9 - 8					$(0,1^{-1},0)$	134793.55	(0.10)	[76036]
	9 - 8					$(0,0^{0},0)$	134879.23	(0.10)	[76036]
	12 - 11					$(0,0^{0},2)$	177095.95	(0.10)	[76036]
	12 - 11					$(0,2^{-2},1)$	177844.33	(0.10)	[76036]

TABLE 37.3. The microwave spectrum of KOH—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{39}K^{16}OD$	12 - 11					$(0,2^{+2},1)$	177849.52	(0.10)	[76036]
	12 - 11					$(0,1^{+1},1)$	177977.47	(0.10)	[76036]
	12 - 11					$(0,2^{0},1)$	178021.67	(0.10)	[76036]
	12 - 11					$(0,1^{-1},1)$	178410.16	(0.10)	[76036]
	12 - 11					$(0,0^{0},1)$	178448.00	(0.10)	[76036]
	12 - 11					$(0,3^{+1},0)$	178727.06	(0.10)	[76036]
	12 - 11					$(0,3^{3},0)$	178803.13	(0.10)	[76036]
	12 - 11					$(0,4^{-2},0)$	178920.08	(0.10)	[76036]
	12 - 11					$(0,4^{+2},0)$	178933.16	(0.10)	[76036]
	12 - 11					$(0,4^{0},0)$	179075.16	(0.10)	[76036]
	12 - 11					$(0,2^{-2},0)$	179160.94	(0.10)	[76036]
	12 - 11					$(0,2^{+2},0)$	179165.01	(0.10)	[76036]
	12 - 11					$(0,1^{+1},0)$	179293.25	(0.10)	[76036]
	12 - 11					$(0,2^{0},0)$	179324.95	(0.10)	[76036]
	12 - 11					$(0,3^{-1},0)$	179553.98	(0.10)	[76036]
	12 - 11					$(0,1^{-1},0)$	179695.72	(0.10)	[76036]
	12 - 11					$(0,0^{0},0)$	179810.53	(0.10)	[76036]
	16 - 15					$(0,2^{-2},1)$	237054.41	(0.10)	[76036]
	16 - 15					$(0,2^{+2},1)$	237067.19	(0.10)	[76036]
	16 - 15					$(0,1^{+1},1)$	237232.88	(0.10)	[76036]
	16 - 15					$(0,2^{0},1)$	237284.94	(0.10)	[76036]
	16 - 15					$(0,1^{-1},1)$	237810.31	(0.10)	[76036]
	16 - 15					$(0,0^{0},1)$	237862.50	(0.10)	[76036]
	16 - 15					$(0,3^{+1},0)$	238230.72	(0.10)	[76036]
	16 - 15					$(0,3^{3},0)$	238334.71	(0.10)	[76036]
	16 - 15					$(0,2^{-2},0)$	238810.86	(0.10)	[76036]
	16 - 15					$(0,2^{+2},0)$	238820.73	(0.10)	[76036]
	16 - 15					$(0,1^{+1},0)$	238988.58	(0.10)	[76036]
	16 - 15					$(0,2^{0},0)$	239025.23	(0.10)	[76036]
	16 - 15					$(0,3^{-1},0)$	239332.13	(0.10)	[76036]
	16 - 15					$(0,1^{-1},0)$	239524.83	(0.10)	[76036]
	16 - 15					$(0,0^{0},0)$	239679.43	(0.10)	[76036]
$^{41}K^{16}OH$	6 - 5					$(0,1^{L1},1)$	95668.66	(0.20)	[75011]
	6 - 5					$(0,1^{U1},1)$	95871.30	(0.40)	[75011]
	6 - 5					$(0,2^{2},0)$	96038.16	(0.10)	[75011]
	6 - 5					$(0,0^{0},1)$	96281.80	(0.20)	[75011]
	6 - 5					$(0,1^{L1},0)$	96458.20	(0.10)	[75011]
	6 - 5					$(0,1^{U1},0)$	96645.26	(0.20)	[75011]
	6 - 5					$(0,0^{0},0)$	97056.68	(0.10)	[75011]
	11 - 10					$(0,0^{0},0)$	177892.92	(0.10)	[76036]

Table 38. Rotational and hyperfine constants and electric dipole moments for $^7Li^{16}OH$ and $^7Li^{16}OD$. [76007]

Isotopic Species	Vib. State v_1 v_2^ℓ v_3	B_v (MHz)	eqQ (^{7}Li) (kHz)	c_{Li} (kHz)	μ (D)
$^7Li^{16}OH$	0 0^0 0	35 342.44(5)	295.8(15)	1.70(29)	4.755(2)
	1 0^0 0	35 240.8(5)			
	0 1^1 0	...			4.899(5)
	0 2^0 0	35 165.88(5)	346.9(21)	1.18(40)	5.031(2)
	0 3^1 0	...			5.133(5)
	0 0^0 1	34 887.76(5)	299.7(31)	1.17(58)	4.851(2)
	0 2^0 1	34 723.44(10)			
	1 0^0 1	34 836(1)			
$^7Li^{16}OD$	0 0^0 0	31 477.39(5)			4.711(1)
	0 1^1 0	...			4.815(5)
	0 2^0 0	...			4.89(1)
	0 3^1 0	...			5.002(5)
	0 0^0 1	...			4.80(1)

TABLE 38.1. The microwave spectrum of LiOH

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	(v_1,v_2^ℓ,v_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^7Li^{16}OH$	6 - 6					$(0,3^3,0)$	1.040	(5E-3)	[76007]
	2 - 2					$(0,2^2,0)$	2.555	(5E-3)	[76007]
	7 - 7					$(0,3^3,0)$	2.555	(5E-3)	[76007]
	8 - 8					$(0,3^3,0)$	5.635	(5E-3)	[76007]
	9 - 9					$(0,3^3,0)$	11.323	(5E-3)	[76007]
	3 - 3					$(0,2^2,0)$	12.690	(5E-3)	[76007]
	10 - 10					$(0,3^3,0)$	21.155	(5E-3)	[76007]
	11 - 11					$(0,3^3,0)$	37.260	(5E-3)	[76007]
	4 - 4					$(0,2^2,0)$	38.065	(5E-3)	[76007]
	12 - 12					$(0,3^3,0)$	62.555	(5E-3)	[76007]
	5 - 5					$(0,2^2,0)$	88.920	(5E-3)	[76007]
	6 - 6					$(0,2^2,0)$	178.082	(5E-3)	[76007]
	7 - 7					$(0,2^2,0)$	321.068	(5E-3)	[76007]
	8 - 8					$(0,2^2,0)$	536.060	(5E-3)	[76007]
	1 - 1					$(0,1^1,0)$	591.60	(0.02)	[76007]
	1 - 1					$(0,3^1,0)$	1221.06	(0.01)	[76007]
	2 - 2					$(0,1^1,0)$	1774.55	(0.01)	[76007]
	1 - 0					$(0,2^0,1)$	69446.88	(0.20)	[70056]
	1 - 0					$(1,0^0,1)$	69672.	(2.)	[70056]
	1 - 0					$(0,0^0,1)$	69775.52	(0.10)	[70056]
	1 - 0					$(0,2^0,0)$	70331.76	(0.10)	[70056]
	1 - 0					$(1,0^0,0)$	70481.6	(1.0)	[70056]
	1 - 0					$(0,0^0,0)$	70684.88	(0.10)	[70056]
$^7Li^{16}OD$	1 - 1					$(0,1^1,0)$	597.44	(0.02)	[76007]
	1 - 1					$(0,3^1,0)$	1260.47	(0.01)	[76007]
	2 - 2					$(0,1^1,0)$	1792.11	(0.01)	[76007]
	1 - 0					$(0,0^0,0)$	62954.78	(0.10)	[70056]

Table 39. Molecular parameters for $H^{14}N^{16}O$ and $D^{14}N^{16}O$.

Parameter	$H^{14}N^{16}O$ Value	$D^{14}N^{16}O$ Value	Reference
A (MHz)	553 903.0(27)	315 496.5(23)	[73038]
B (MHz)	42 308.52(10)	38 732.16(10)	[73038]
C (MHz)	39 169.46(10)	34 353.68(10)	[73038]
D_J (MHz)	0.1216(3)	0.094(9)	[73038][a]
D_{JK} (MHz)	2.94(6)	1.75(3)	[73038][a]
D_K (MHz)	134.5(6)	43.6(6)	[73038][a]
d_{EJ}	$1.170(4)\times10^{-5}$	$1.115(4)\times10^{-5}$	[73038]
χ_{aa} (^{14}N) (MHz)	0.36(56)	1.03(40)	[73038,72034]
χ_{bb} (^{14}N) (MHz)	-5.46(30)	-6.13(26)	[73038,72034]
χ_{cc} (^{14}N) (MHz)	5.10(26)[b]	5.10(26)	[73038,72034]
μ_a (D)	1.03(1)	1.18(4)	[73038,72034]
μ_b (D)	1.31(2)	1.22(4)	[73038,72034]

[a] Distortion constants taken from F. W. Dalby, Can. J. Phys. 36, 1336 (1958).

[b] Assumed.

TABLE 39.1. The microwave spectrum of HNO

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$H^{14}N^{16}O$	5(1, 4) - 5(1, 5)		4		4	(0,0,0)	47066.67	(0.10)	[72033]
	5(1, 4) - 5(1, 5)		6		6	(0,0,0)	47067.32	(0.10)	[72033]
	5(1, 4) - 5(1, 5)		5		5	(0,0,0)	47070.96	(0.10)	[72033]
	6(1, 5) - 6(1, 6)		5		5	(0,0,0)	65882.88	(0.10)	[72033]
	6(1, 5) - 6(1, 6)		7		7	(0,0,0)	65883.56	(0.10)	[72033]
	6(1, 5) - 6(1, 6)		6		6	(0,0,0)	65887.27	(0.10)	[72033]
	1(0, 1) - 0(0, 0)					(0,0,0)	81477.49	(0.10)	[72033]
	7(1, 6) - 7(1, 7)		8		8	(0,0,0)	87826.59	(0.10)	[72033]
	7(1, 6) - 7(1, 7)		7		7	(0,0,0)	87830.32	(0.10)	[72033]
	7(0, 7) - 6(1, 6)		8		7	(0,0,0)	88622.55	(0.10)	[72033]
	7(0, 7) - 6(1, 6)		7		6	(0,0,0)	88624.40	(0.10)	[72033]
	4(1, 4) - 5(0, 5)		4		5	(0,0,0)	90415.07	(0.10)	[72033]
	4(1, 4) - 5(0, 5)		5		6	(0,0,0)	90417.01	(0.10)	[72033]
$D^{14}N^{16}O$	4(0, 4) - 3(1, 3)		5		4	(0,0,0)	25823.36	(0.10)	[72034]
	4(0, 4) - 3(1, 3)		4		3	(0,0,0)	25825.23	(0.10)	[72034]
	4(1, 3) - 4(1, 4)		3		3	(0,0,0)	43770.30	(0.10)	[72034]
	4(1, 3) - 4(1, 4)		5		5	(0,0,0)	43771.28	(0.10)	[72034]
	4(1, 3) - 4(1, 4)		4		4	(0,0,0)	43775.11	(0.10)	[72034]
	2(1, 2) - 3(0, 3)		2		3	(0,0,0)	53341.02	(0.10)	[72034]
	2(1, 2) - 3(0, 3)		3		4	(0,0,0)	53342.95	(0.10)	[72034]
	2(1, 2) - 3(0, 3)		1		2	(0,0,0)	53343.91	(0.10)	[72034]
	5(1, 4) - 5(1, 5)		4		4	(0,0,0)	65642.64	(0.10)	[72034]
	5(1, 4) - 5(1, 5)		6		6	(0,0,0)	65643.48	(0.10)	[72034]
	5(1, 4) - 5(1, 5)		5		5	(0,0,0)	65647.25	(0.10)	[72034]
	1(0, 1) - 0(0, 0)					(0,0,0)	73085.46	(0.10)	[72034]

Table 40. Molecular constants for HN_2^+

Parameters	$H^{14}N^{14}N^+$ Value (MHz)	$H^{15}N^{15}N^+$ Value (MHz)
B_0-2D_0	46 586.696(16)	44 132.06(3)
eqQ (^{14}N inner)	-5.666(12)	
eqQ (^{14}N outer)	-1.426(21)	
c (^{14}N outer)	0.0147(23)	
Reference	[75017]	[76014]

TABLE 40.1. The microwave spectrum of HN_2^+

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	(v_1,v_2^{ℓ},v_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$H^{14}N^{14}N^+$	1 - 0		1		1	$(0,0^0,0)$	93171.88	(0.08)	[76005]
	1 - 0		2		1	$(0,0^0,0)$	93173.70	(0.08)	[76005]
	1 - 0		0		1	$(0,0^0,0)$	93176.13	(0.36)	[76005]
$H^{15}N^{15}N^+$	1 - 0					$(0,0^0,0)$	88264.11	(0.06)	[76014]

Table 41. Rotational constants of $^{23}Na^{16}OH$

Parameter	Value (MHz)	Reference
$B_{0,0,0}$	12 567.054(10)	[73039]
D_0	0.02872(5)	[73039]
$B_{0,0,1}-B_{0,0,0}$	116.3(15)	[76032]
α_2	97(20)	[76032]
γ_{22}	9(2)	[76032]
$\gamma_{\ell\ell}$	-10(2)	[76032]
$q_v(0,1^1,0)$	51.66(3)	[76032]

TABLE 41.1. The microwave spectrum of NaOH

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	(v_1,v_2^{ℓ},v_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{23}Na^{16}OH$	4 - 3					$(0,2^2,1)$	98490.75	(0.20)	[76032]
	4 - 3					$(0,1^{U1},1)$	99224.57	(0.15)	[76032]
	4 - 3					$(0,2^2,0)$	99255.04	(0.15)	[76032]
	4 - 3					$(0,3^{U1},0)$	99637.08	(0.08)	[76032]
	4 - 3					$(0,1^{L1},0)$	99665.56	(0.08)	[76032]
	4 - 3					$(0,1^{U1},0)$	100078.82	(0.15)	[76032]
	4 - 3					$(0,0^0,0)$	100529.11	(0.06)	[76032]
	7 - 6					$(0,0^0,0)$	175899.37	(0.55)	[73039]
	8 - 7					$(0,0^0,0)$	201014.01	(0.60)	[73039]
	9 - 8					$(0,0^0,0)$	226123.23	(0.70)	[73039]

Table 42. Rotational and hyperfine constants for ^{85}RbOH. [69029]

Vib. State $v_1\ v_2^{\ell}\ v_3$	B_v ($^{85}Rb^{16}OH$)[a] (MHz)	B_v ($^{85}RbOD$)[a] (MHz)	eqQ (^{85}Rb) (MHz)
0 0^0 0	6 290.15	5 720.77	-67.9
0 1^1 0	6 260.55	5 711.69	-67.6
0 2^0 0	6 238.37	5 707.08	-67.9[b]
0 2^2 0	6 230.13	5 702.57	-67.4
0 3^1 0	6 216.43	5 702.34	-67.6[b]
0 4^2 0	6 194.38	5 697.42	-67
0 0^0 1	6 246.45	5 682.50	-65.9
0 1^1 1	6 216.70	5 673.24	-67
0 2^0 1	6 194.03	5 668.37	-66[b]
0 2^2 1	6 187.95	5 663.75	-66.3
0 0^0 2	6 202.75	5 644.40	-64.2

[a] A value of D_0 = 0.0067 MHz was used in calculating the rotational constants. The uncertainty in the rotational constants is expected to be ∿0.10 MHz.

[b] Assumed value.

Table 42.1 Rotational and hyperfine constants for ^{87}RbOH. [69029]

Vib. State $v_1\ v_2^{\ell}\ v_3$	B_v ($^{87}Rb^{16}OH$)[a] (MHz)	B_v ($^{87}Rb^{16}OD$)[a] (MHz)	eqQ (^{87}Rb) (MHz)
0 0^0 0	6 266.35	5 698.13	-35
0 1^1 0	6 236.84	5 689.32	-33
0 2^0 0	6 214.63	5 684.53	-31
0 2^2 0	6 206.48	5 680.02	-32
0 0^0 1	6 222.90	5 660.18	-33[b]

[a] A value of D_0 = 0.0067 MHz was used in calculating the rotational constants. The uncertainty in the rotational constants is expected to be ∿0.10 MHz.

[b] Assumed value.

Table 42.2. The ℓ-doubling constants for RbOH [69029].

Vib. State $v_1\ v_2^{\ell}\ v_3$	q_v (^{85}RbOH) (MHz)	q_v (^{85}RbOD) (MHz)	q_v (^{87}RbOH) (MHz)	q_v (^{87}RbOD) (MHz)
0 1^1 0	9.87	9.82	9.85	9.70
0 3^1 0	10.33	10.51		
0 1^1 0	10.73	10.12		

TABLE 42.3. The microwave spectrum of RbOH

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{85}Rb^{16}OH$	3 – 2		9/2		7/2	$(0,2^2,1)$	37119.2	(0.2)	[69029]
	3 – 2		7/2		5/2	$(0,2^2,1)$	37122.3	(0.2)	[69029]
	3 – 2		11/2		9/2	$(0,2^2,1)$	37132.0	(0.2)	[69029]
	3 – 2		3/2		1/2	$(0,2^2,1)$	37140.7	(0.2)	[69029]
	3 – 2		9/2		7/2	$(0,4^2,0)$	37157.8	(0.2)	[69029]
	3 – 2		7/2		5/2	$(0,4^2,0)$	37160.9	(0.2)	[69029]
	3 – 2		11/2		9/2	$(0,2^0,1)$	37164.5	(0.2)	[69029]
	3 – 2		11/2		9/2	$(0,4^2,0)$	37170.7	(0.2)	[69029]
	3 – 2		3/2		1/2	$(0,4^2,0)$	37179.4	(0.2)	[69029]
	3 – 2		7/2		9/2	$(0,0^0,2)$	37204.8	(0.2)	[69029]
	3 – 2		5/2		3/2	$(0,0^0,2)$	37210.8	(0.2)	[69029]
	3 – 2		7/2		5/2	$(0,0^0,2)$	37213.9	(0.2)	[69029]
	3 – 2		11/2		9/2	$(0,0^0,2)$	37216.9	(0.2)	[69029]
	3 – 2		7/2		5/2	$(0,3^{L1},0)$	37233.0	(0.2)	[69029]
	3 – 2		9/2		7/2	$(0,3^{L1},0)$	37235.0	(0.2)	[69029]
	3 – 2		11/2		9/2	$(0,3^{L1},0)$	37238.1	(0.2)	[69029]
	3 – 2		7/2		9/2	$(0,1^{L1},1)$	37260.0	(0.2)	[69029]
	3 – 2		7/2		5/2	$(0,1^{L1},1)$	37264.9	(0.2)	[69029]
	3 – 2		9/2		7/2	$(0,1^{L1},1)$	37266.4	(0.2)	[69029]
	3 – 2		11/2		9/2	$(0,1^{L1},1)$	37269.2	(0.2)	[69029]
	3 – 2		7/2		9/2	$(0,1^{U1},1)$	37324.1	(0.2)	[69029]
	3 – 2		7/2		5/2	$(0,1^{U1},1)$	37329.0	(0.2)	[69029]
	3 – 2		9/2		7/2	$(0,1^{U1},1)$	37330.8	(0.2)	[69029]
	3 – 2		11/2		9/2	$(0,1^{U1},1)$	37333.6	(0.2)	[69029]
	3 – 2		7/2		9/2	$(0,3^{U1},0)$	37352.5	(0.2)	[69029]
	3 – 2		7/2		5/2	$(0,3^{U1},0)$	37357.2	(0.2)	[69029]
	3 – 2		9/2		7/2	$(0,3^{U1},0)$	37358.9	(0.2)	[69029]
	3 – 2		11/2		5/2	$(0,3^{U1},0)$	37362.2	(0.2)	[69029]
	3 – 2		9/2		7/2	$(0,2^2,0)$	37372.2	(0.2)	[69029]
	3 – 2		7/2		5/2	$(0,2^2,0)$	37375.6	(0.2)	[69029]
	3 – 2		11/2		9/2	$(0,2^2,0)$	37385.2	(0.2)	[69029]
	3 – 2		3/2		1/2	$(0,2^2,0)$	37394.0	(0.2)	[69029]
	3 – 2		7/2		5/2	$(0,2^0,0)$	37417.1	(0.2)	[69029]
	3 – 2		11/2		9/2	$(0,2^0,0)$	37430.5	(0.2)	[69029]
	3 – 2		7/2		9/2	$(0,0^0,1)$	37466.7	(0.2)	[69029]
	3 – 2		5/2		3/2	$(0,0^0,1)$	37472.7	(0.2)	[69029]
	3 – 2		11/2		9/2	$(0,0^0,1)$	37479.1	(0.2)	[69029]
	3 – 2		7/2		9/2	$(0,1^{L1},0)$	37525.5	(0.2)	[69029]
	3 – 2		7/2		5/2	$(0,1^{L1},0)$	37530.6	(0.2)	[69029]
	3 – 2		9/2		7/2	$(0,1^{L1},0)$	37532.0	(0.2)	[69029]
	3 – 2		11/2		9/2	$(0,1^{L1},0)$	37534.9	(0.2)	[69029]
	3 – 2		3/2		5/2	$(0,1^{L1},0)$	37541.0	(0.2)	[69029]
	3 – 2		7/2		9/2	$(0,1^{U1},0)$	37584.7	(0.2)	[69029]
	3 – 2		7/2		5/2	$(0,1^{U1},0)$	37589.4	(0.2)	[69029]
	3 – 2		9/2		7/2	$(0,1^{U1},0)$	37591.3	(0.2)	[69029]
	3 – 2		11/2		9/2	$(0,1^{U1},0)$	37594.3	(0.2)	[69029]
	3 – 2		3/2		5/2	$(0,1^{U1},0)$	37600.7	(0.2)	[69029]
	3 – 2		7/2		9/2	$(0,0^0,0)$	37728.6	(0.2)	[69029]
	3 – 2		5/2		3/2	$(0,0^0,0)$	37734.9	(0.2)	[69029]
	3 – 2		7/2		5/2	$(0,0^0,0)$	37738.3	(0.2)	[69029]
	3 – 2		11/2		9/2	$(0,0^0,0)$	37741.2	(0.2)	[69029]
	3 – 2		5/2		5/2	$(0,0^0,0)$	37744.8	(0.2)	[69029]
$^{87}Rb^{16}OH$	3 – 2		7/2		5/2	$(0,2^2,0)$	37232.8	(0.2)	[69029]
	3 – 2		5/2		3/2	$(0,2^2,0)$	37238.3	(0.2)	[69029]
	3 – 2		9/2		7/2	$(0,2^2,0)$	37241.1	(0.2)	[69029]
	3 – 2		3/2		1/2	$(0,2^2,0)$	37246.8	(0.2)	[69029]
	3 – 2		5/2		3/2	$(0,2^0,0)$	37285.6	(0.2)	[69029]
	3 – 2		9/2		7/2	$(0,2^0,0)$	37287.5	(0.2)	[69029]
	3 – 2		9/2		7/2	$(0,0^0,1)$	37337.1	(0.2)	[69029]
	3 – 2		7/2		5/2	$(0,1^{L1},0)$	37389.7	(0.2)	[69029]
	3 – 2		9/2		7/2	$(0,1^{L1},0)$	37391.7	(0.2)	[69029]
	3 – 2		7/2		7/2	$(0,1^{U1},0)$	37444.0	(0.2)	[69029]
	3 – 2		7/2		5/2	$(0,1^{U1},0)$	37448.7	(0.2)	[69029]
	3 – 2		9/2		7/2	$(0,1^{U1},0)$	37450.8	(0.2)	[69029]
	3 – 2		3/2		3/2	$(0,1^{U1},0)$	37455.1	(0.2)	[69029]

TABLE 42.3. The microwave spectrum of RbOH—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{87}Rb^{16}OH$	3 - 2		5/2		3/2	$(0,0^0,0)$	37595.6	(0.2)	[69029]
	3 - 2		9/2		7/2	$(0,0^0,0)$	37597.8	(0.2)	[69029]
$^{85}Rb^{16}OD$	3 - 2		5/2		3/2	$(0,2^2,2)$	33860.7	(0.2)	[69029]
	3 - 2		7/2		5/2	$(0,2^2,2)$	33863.9	(0.2)	[69029]
	3 - 2		11/2		9/2	$(0,2^2,2)$	33866.8	(0.2)	[69029]
	3 - 2		9/2		7/2	$(0,2^2,1)$	33974.1	(0.2)	[69029]
	3 - 2		7/2		5/2	$(0,2^2,1)$	33977.3	(0.2)	[69029]
	3 - 2		11/2		9/2	$(0,2^2,1)$	33986.8	(0.2)	[69029]
	3 - 2		3/2		1/2	$(0,2^2,1)$	33995.2	(0.2)	[69029]
	3 - 2		7/2		5/2	$(0,1^{L1},1)$	34006.1	(0.2)	[69029]
	3 - 2		9/2		7/2	$(0,1^{L1},1)$	34007.5	(0.2)	[69029]
	3 - 2		7/2		5/2	$(0,2^0,1)$	34007.6	(0.2)	[69029]
	3 - 2		11/2		9/2	$(0,1^{L1},1)$	34010.2	(0.2)	[69029]
	3 - 2		11/2		9/2	$(0,2^0,1)$	34010.5	(0.2)	[69029]
	3 - 2		7/2		5/2	$(0,1^{U1},1)$	34066.4	(0.2)	[69029]
	3 - 2		9/2		7/2	$(0,1^{U1},1)$	34068.2	(0.2)	[69029]
	3 - 2		11/2		9/2	$(0,1^{U1},1)$	34071.0	(0.2)	[69029]
	3 - 2		7/2		9/2	$(0,0^0,1)$	34082.9	(0.2)	[69029]
	3 - 2		5/2		3/2	$(0,0^0,1)$	34089.0	(0.2)	[69029]
	3 - 2		11/2		9/2	$(0,0^0,1)$	34095.4	(0.2)	[69029]
	3 - 2		7/2		5/2	$(0,3^{L1},0)$	34147.8	(0.2)	[69029]
	3 - 2		9/2		7/2	$(0,3^{L1},0)$	34149.3	(0.2)	[69029]
	3 - 2		11/2		9/2	$(0,3^{L1},0)$	34152.2	(0.2)	[69029]
	3 - 2		9/2		7/2	$(0,4^2,0)$	34174.8	(0.2)	[69029]
	3 - 2		7/2		5/2	$(0,4^2,0)$	34179.2	(0.2)	[69029]
	3 - 2		11/2		9/2	$(0,4^2,0)$	34189.2	(0.2)	[69029]
	3 - 2		9/2		7/2	$(0,2^2,0)$	34207.1	(0.2)	[69029]
	3 - 2		7/2		5/2	$(0,2^2,0)$	34210.4	(0.2)	[69029]
	3 - 2		11/2		9/2	$(0,2^2,0)$	34220.1	(0.2)	[69029]
	3 - 2		3/2		1/2	$(0,2^2,0)$	34228.8	(0.2)	[69029]
	3 - 2		7/2		9/2	$(0,1^{L1},0)$	34233.5	(0.2)	[69029]
	3 - 2		5/2		3/2	$(0,2^0,0)$	34236.0	(0.2)	[69029]
	3 - 2		7/2		5/2	$(0,1^{L1},0)$	34238.5	(0.2)	[69029]
	3 - 2		7/2		5/2	$(0,2^0,0)$	34240.0	(0.2)	[69029]
	3 - 2		9/2		7/2	$(0,1^{L1},0)$	34240.1	(0.2)	[69029]
	3 - 2		11/2		9/2	$(0,2^0,0)$	34242.8	(0.2)	[69029]
	3 - 2		11/2		9/2	$(0,1^{L1},0)$	34242.9	(0.2)	[69029]
	3 - 2		7/2		5/2	$(0,3^{U1},0)$	34273.5	(0.2)	[69029]
	3 - 2		9/2		7/2	$(0,3^{U1},0)$	34275.4	(0.2)	[69029]
	3 - 2		11/2		9/2	$(0,3^{U1},0)$	34278.3	(0.2)	[69029]
	3 - 2		7/2		9/2	$(0,1^{U1},0)$	34292.3	(0.2)	[69029]
	3 - 2		7/2		5/2	$(0,1^{U1},0)$	34297.3	(0.2)	[69029]
	3 - 2		9/2		7/2	$(0,1^{U1},0)$	34299.0	(0.2)	[69029]
	3 - 2		11/2		9/2	$(0,1^{U1},0)$	34301.9	(0.2)	[69029]
	3 - 2		7/2		9/2	$(0,0^0,0)$	34311.9	(0.2)	[69029]
	3 - 2		5/2		3/2	$(0,0^0,0)$	34317.9	(0.2)	[69029]
	3 - 2		7/2		5/2	$(0,0^0,0)$	34321.6	(0.2)	[69029]
	3 - 2		11/2		9/2	$(0,0^0,0)$	34324.6	(0.2)	[69029]
$^{87}Rb^{16}OD$	3 - 2		7/2		5/2	$(0,0^0,1)$	33959.0	(0.2)	[69029]
	3 - 2		9/2		7/2	$(0,0^0,1)$	33960.8	(0.2)	[69029]
	3 - 2		7/2		5/2	$(0,2^2,0)$	34074.2	(0.2)	[69029]
	3 - 2		9/2		7/2	$(0,2^2,0)$	34082.5	(0.2)	[69029]
	3 - 2		7/2		5/2	$(0,1^{L1},0)$	34105.1	(0.2)	[69029]
	3 - 2		5/2		3/2	$(0,2^0,0)$	34105.2	(0.2)	[69029]
	3 - 2		9/2		7/2	$(0,1^{L1},0)$	34106.9	(0.2)	[69029]
	3 - 2		9/2		7/2	$(0,2^0,0)$	34106.9	(0.2)	[69029]
	3 - 2		7/2		5/2	$(0,1^{U1},0)$	34163.4	(0.2)	[69029]
	3 - 2		9/2		7/2	$(0,1^{U1},0)$	34165.1	(0.2)	[69029]
	3 - 2		5/2		3/2	$(0,0^0,0)$	34186.6	(0.2)	[69029]
	3 - 2		9/2		7/2	$(0,0^0,0)$	34188.4	(0.2)	[69029]

Table 43. Molecular parameters for HO_2.

Parameter	$H^{16}O_2$ Value (MHz) [76031]	$D^{16}O_2$ Value (MHz) [76008]
A	610 257(35)	
B	33 511.95(60)	
C	31 673.46(60)	
B+C		60 467.7(30)
D_N	0.112(68)	
D_K	123(9)[a]	
D_{NK}	3.47(48)	
ε_{aa}	-49 546.1(58)	
ε_{bb}	-431.9(33)	
ε_{cc}	17.6(33)	
$\lvert\varepsilon_{ab}+\varepsilon_{ba}\rvert/2$	189(30)	
$\varepsilon_{bb}+\varepsilon_{cc}$		-382(6)
a_F	-27.6(14)	
T_{aa}	-8.1(11)	
T_{bb}	19.5(11)	
T_{cc}	-11.4(11)	

[a] From the laser magnetic resonance study by J.T. Hougen, H.E. Radford, K.M. Evenson and C.J. Howard, J. Mol. Spectrosc. 56, 210 (1975).

Additional references: [75019], [74004].

TABLE 43.1. The microwave spectrum of HO_2

Isotopic species	$N'(K'_-,K'_+)$ – $N''(K''_-,K''_+)$	J'	F'	J''	F''	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$H^{16}O^{16}O$	7(1, 7) – 8(0, 8)	15/2	8	17/2	9	(0,0,0)	27474.24	(0.06)	[76031]
	7(1, 7) – 8(0, 8)	15/2	7	17/2	8	(0,0,0)	27477.69	(0.04)	[76031]
	7(1, 7) – 8(0, 8)	13/2	6	15/2	7	(0,0,0)	35530.88	(0.03)	[76031]
	7(1, 7) – 8(0, 8)	13/2	7	15/2	8	(0,0,0)	35535.41	(0.04)	[76031]
	9(0, 9) – 8(1, 8)	17/2	9	15/2	8	(0,0,0)	37138.59	(0.07)	[76031]
	9(0, 9) – 8(1, 8)	17/2	8	15/2	7	(0,0,0)	37142.60	(0.06)	[76031]
	9(0, 9) – 8(1, 8)	19/2	9	17/2	8	(0,0,0)	44069.56	(0.04)	[76031]
	9(0, 9) – 8(1, 8)	19/2	10	17/2	9	(0,0,0)	44073.10	(0.10)	[76031]
	1(0, 1) – 0(0, 0)	3/2	1	1/2	0	(0,0,0)	65070.85	(0.08)	[76031]
	1(0, 1) – 0(0, 0)	3/2	2	1/2	1	(0,0,0)	65081.82	(0.04)	[76031]
	1(0, 1) – 0(0, 0)	3/2	1	1/2	1	(0,0,0)	65098.44	(0.09)	[76031]
	1(0, 1) – 0(0, 0)	1/2	1	1/2	0	(0,0,0)	65373.01	(0.10)	[76031]
	1(0, 1) – 0(0, 0)	1/2	0	1/2	1	(0,0,0)	65396.15	(0.10)	[76031]
	1(0, 1) – 0(0, 0)	1/2	1	1/2	1	(0,0,0)	65400.63	(0.10)	[76031]
	6(1, 6) – 7(0, 7)	13/2	7	15/2	8	(0,0,0)	98117.82	(0.05)	[76031]
	6(1, 6) – 7(0, 7)	13/2	6	15/2	7	(0,0,0)	98121.15	(0.05)	[76031]
	6(1, 6) – 7(0, 7)	11/2	5	13/2	6	(0,0,0)	107635.51	(0.10)	[76031]
	6(1, 6) – 7(0, 7)	11/2	6	13/2	7	(0,0,0)	107640.22	(0.10)	[76031]
	10(0,10) – 9(1, 9)	19/2	10	17/2	9	(0,0,0)	110472.20	(0.04)	[76031]
	10(0,10) – 9(1, 9)	19/2	9	17/2	8	(0,0,0)	110476.90	(0.07)	[76031]
	10(0,10) – 9(1, 9)	21/2	10	19/2	9	(0,0,0)	116448.40	(0.10)	[76031]
	10(0,10) – 9(1, 9)	21/2	11	19/2	10	(0,0,0)	116451.73	(0.10)	[76031]
	2(1, 2) – 1(1, 1)	3/2	1	1/2	1	(0,0,0)	119137.04	(0.07)	[76031]
	2(1, 2) – 1(1, 1)	3/2	2	1/2	1	(0,0,0)	119153.74	(0.04)	[76031]
	2(1, 2) – 1(1, 1)	3/2	1	1/2	0	(0,0,0)	119159.19	(0.11)	[76031]
	2(1, 1) – 1(1, 0)	3/2	1	1/2	1	(0,0,0)	122856.61	(0.09)	[76031]
	2(1, 1) – 1(1, 0)	3/2	1	1/2	0	(0,0,0)	122858.26	(0.07)	[76031]
	2(1, 1) – 1(1, 0)	3/2	2	1/2	1	(0,0,0)	122858.92	(0.05)	[76031]
	2(0, 2) – 1(0, 1)	5/2	2	3/2	1	(0,0,0)	130258.13	(0.20)	[76031]
	2(0, 2) – 1(0, 1)	5/2	3	3/2	2	(0,0,0)	130260.07	(0.20)	[76031]
	2(0, 2) – 1(0, 1)	3/2	1	1/2	0	(0,0,0)	130463.68	(0.20)	[76031]
	2(0, 2) – 1(0, 1)	3/2	2	1/2	1	(0,0,0)	130467.41	(0.20)	[76031]
	2(1, 2) – 1(1, 1)	5/2	2	3/2	1	(0,0,0)	132959.56	(0.08)	[76031]
	2(1, 2) – 1(1, 1)	5/2	3	3/2	2	(0,0,0)	132961.99	(0.08)	[76031]
	2(1, 1) – 1(1, 0)	5/2	2	3/2	1	(0,0,0)	136492.09	(0.12)	[76031]
	2(1, 1) – 1(1, 0)	5/2	3	3/2	2	(0,0,0)	136495.97	(0.09)	[76031]
$D^{16}O^{16}O$	1(0, 1) – 0(0, 0)	3/2	3/2	1/2	1/2	(0,0,0)	60368.17	(1.5)	[76008]
	1(0, 1) – 0(0, 0)	3/2	5/2	1/2	3/2	(0,0,0)	60371.75	(0.8)	[76008]
	1(0, 1) – 0(0, 0)	3/2	1/2	1/2	1/2	(0,0,0)	60371.75	(0.8)	[76008]
	1(0, 1) – 0(0, 0)	1/2	3/2	1/2	1/2	(0,0,0)	60655.4	(3.)	[76008]
	1(0, 1) – 0(0, 0)	1/2	1/2	1/2	3/2	(0,0,0)	60660.84	(0.6)	[76008]
	1(0, 1) – 0(0, 0)	1/2	3/2	1/2	3/2	(0,0,0)	60660.84	(0.6)	[76008]

Table 44. Molecular parameters for NH_2. [76022]

Parameter	NH_2 ground state Value (MHz)	NH_2 $\Pi(0,10,0)\tilde{A}\ ^2A_1$ Value (MHz)
Fermi contact		
$(0)_I$	39.6	162.5
Dipole-dipole		
$(aa)_I$	-31.1	-16.6
$(bb)_I$	-31.1	+33.2
$(cc)_I$	+62.2	-16.6
Spin-rotation[a]		
$(0)_S$	-3467.63	-10874.5
$(aa)_S$	-5286.4	-19857.1
$(cc)_S$	3437.63	6940.7

[a] The ground state spin-rotation constants are from G. Duxbury, J. Mol. Spectrosc. 25, 1 (1968) and the excited state values from K. Dressler and D.A. Ramsey, Phil. Trans. Roy. Soc. A251, 553 (1959).

TABLE 44.1. The microwave spectrum of NH_2

Isotopic species	$J'(K'_-,K'_+)$ – $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{14}NH_2$	1(1, 1) – 1(1, 1)	1/2		3/2		(0,0,0)	6933.25	(0.50)	[76024]
	1(1, 1) – 1(1, 1)	1/2		3/2		(0,0,0)	6961.59	(0.50)	[76024]
	1(1, 1) – 1(1, 1)	1/2		3/2		(0,0,0)	6974.08	(0.50)	[76024]
	1(1, 1) – 1(1, 1)	1/2		3/2		(0,0,0)	7012.66	(0.50)	[76024]
	1(1, 1) – 1(1, 1)	1/2		3/2		(0,0,0)	7029.51	(0.50)	[76024]
	1(1, 1) – 1(1, 1)	1/2		3/2		(0,0,0)	7035.24	(0.50)	[76024]
	1(1, 0) – 1(1, 0)	1/2	1/2	3/2	3/2	(0,0,0)	7910.53	(0.50)	[76024]
	1(1, 0) – 1(1, 0)	1/2	1/2	3/2	1/2	(0,0,0)	7916.63	(0.50)	[76024]
	1(1, 0) – 1(1, 0)	1/2	3/2	3/2	5/2	(0,0,0)	7975.56	(0.50)	[76024]
	1(1, 0) – 1(1, 0)	1/2	3/2	3/2	3/2	(0,0,0)	7983.72	(0.50)	[76024]
	5(2, 3) – 6(1, 6)	11/2	13/2	13/2	15/2	(0,0,0)	8749.68	(0.50)	[76023]
	5(2, 3) – 6(1, 6)	11/2	11/2	13/2	13/2	(0,0,0)	8790.30	(0.50)	[76023]
	5(2, 3) – 6(1, 6)	11/2	13/2	13/2	13/2	(0,0,0)	8797.71	(0.50)	[76023]
	5(2, 3) – 6(1, 6)	11/2	9/2	13/2	11/2	(0,0,0)	8819.81	(0.50)	[76023]
	5(2, 3) – 6(1, 6)	11/2	11/2	13/2	11/2	(0,0,0)	8828.89	(0.50)	[76023]
	5(2, 3) – 6(1, 6)	9/2	9/2	11/2	11/2	(0,0,0)	15991.22	(0.50)	[76024]
	5(2, 3) – 6(1, 6)	9/2	7/2	11/2	9/2	(0,0,0)	15942.63	(0.50)	[76024]
	5(2, 3) – 6(1, 6)	9/2	11/2	11/2	13/2	(0,0,0)	16043.84	(0.50)	[76024]

Table 45. Rotational and centrifugal distortion constants for $H_2{}^{16}O$, $H_2{}^{17}O$ and $H_2{}^{18}O$.

Parameter	$H_2{}^{16}O$ Value (MHz) [74005][a]	$H_2{}^{17}O$ Value (MHz) [75009]	$H_2{}^{18}O$ Value (MHz) [74005][b]
$\mathcal{A}$	835 840.288(1000)	830 282.838±8.7	825 366.08±8.7
$\mathcal{B}$	435 351.717(900)	435 341.662±8.0	435 331.59±8.0
$\mathcal{C}$	278 138.700(900)	277 510.396±8.0	276 950.46±8.0
Δ_J	37.59422±0.049	37.44401[c]	37.2938±0.30
Δ_{JK}	-172.9128±0.34	-171.5584	-170.204±1.3
Δ_K	973.29052±0.19	965.7665±2.3	959.6441±2.3
δ_J	15.21040±0.020	15.22675	15.2431±0.21
δ_K	41.0502±0.30	36.2566	31.463±1.2
H_J	$(1.56556\pm0.039)\times10^{-2}$	1.48878×10^{-2}	$(1.412\pm0.34)\times10^{-2}$
H_{JK}	$(-4.2081\pm1.1)\times10^{-2}$	-2.10405×10^{-2}	
H_{KJ}	$(-5.09508\pm0.21)\times10^{-1}$	-4.81054×10^{-1}	$(-4.5260\pm0.71)\times10^{-1}$
H_K	3.733028±0.015	4.409069	5.08511±0.24
h_J	$(7.79579\pm0.18)\times10^{-3}$	7.844745×10^{-3}	$(7.8937\pm1.1)\times10^{-3}$
h_{JK}	$(-2.5165\pm0.22)\times10^{-2}$	-2.11625×10^{-2}	$(-1.716\pm2.8)\times10^{-2}$
h_K	1.0971±0.052	5.4855×10^{-1}	
L_{JK}	$(-3.0647\pm0.93)\times10^{-3}$	1.53235×10^{-3}	
L_{KKJ}	$(1.02952\pm0.24)\times10^{-2}$	5.1476×10^{-3}	
L_K	$(-2.340138\pm0.15)\times10^{-2}$	-5.966754×10^{-2}	$(-9.59337\pm0.83)\times10^{-2}$
ℓ_K	$(-1.3546\pm0.20)\times10^{-2}$	4.982×10^{-3}	$(2.351\pm0.24)\times10^{-2}$
P_K	$(5.19841\pm0.15)\times10^{-5}$	7.50542×10^{-4}	$(1.449\pm0.13)\times10^{-3}$
p_K	$(3.7603\pm2.1)\times10^{-5}$	1.88015×10^{-5}	

[a] See reference [72049].

[b] See reference [72050].

[c] All distortion constants except Δ_K were calculated from $H_2{}^{16}O$ and $H_2{}^{18}O$ constants.

Table 45.1. Rotational and centrifugal distortion constants for HDO and HTO.

Parameter	HDO Value (MHz) [74005][a]	HTO Value (MHz) [74037]
$\mathcal{A}$	701 931.502±0.22	677 849.040±0.17
$\mathcal{B}$	272 912.599±0.11	198 197.489±0.128
$\mathcal{C}$	192 055.245±0.10	150 462.412±0.128
Δ_J	10.83749±0.0058	5.212023±0.003
Δ_{JK}	34.20729±0.037	48.52276±0.02
Δ_K	377.07828±0.026	271.27533±0.06
δ_J	3.647126±0.0014	1.414126±0.0005
δ_K	63.08750±0.035	51.32833±0.07
H_J	$(1.1275\pm0.099)\times10^{-3}$	$(5.19072\pm0.4)\times10^{-4}$
H_{JK}	$(7.3435\pm0.091)\times10^{-2}$	$(3.94327\pm0.06)\times10^{-2}$
H_{KJ}	$(-2.740667\pm0.022)\times10^{-1}$	$(-6.34743\pm0.18)\times10^{-2}$
H_K	1.465159±0.0027	0.8963777±0.011
h_J	$(6.5461\pm0.15)\times10^{-4}$	$(1.7818\pm0.08)\times10^{-4}$
h_{JK}	$(3.0963\pm0.037)\times10^{-2}$	$(1.7126\pm0.02)\times10^{-2}$
h_K	$(5.54951\pm0.055)\times10^{-1}$	$(5.38348\pm0.13)\times10^{-1}$
L_J	$(2.1939\pm0.40)\times10^{-6}$	
L_{JK}	$(-7.45685\pm0.45)\times10^{-4}$	$(-5.42921\pm0.3)\times10^{-4}$
L_{KKJ}	$(2.86575\pm0.091)\times10^{-3}$	$(1.98579\pm0.08)\times10^{-3}$
L_K	$(-7.557072\pm0.10)\times10^{-3}$	$(-8.34015\pm0.7)\times10^{-3}$
ℓ_{KJ}		$(-9.1126\pm2.0)\times10^{-5}$
ℓ_K	$(-5.69461\pm0.24)\times10^{-3}$	$(-8.1573\pm0.7)\times10^{-3}$
P_K	$(1.90459\pm0.10)\times10^{-5}$	$(1.10422\pm0.17)\times10^{-4}$
p_K	$(1.4074\pm0.39)\times10^{-5}$	$(5.95655\pm1.1)\times10^{-5}$

[a] See also reference [71037].

Table 45.2. Rotational and centrifugal distortion constants for DTO and T_2O.

Parameters	DTO Value (MHz) [74037]	T_2O Value (MHz) [73058]
$\mathcal{A}$	410 174.145±0.078	338 810.923±0.076
$\mathcal{B}$	172 101.952±0.045	145 665.417±0.044
$\mathcal{C}$	119 127.850±0.045	100 259.415±0.044
Δ_J	5.199034±0.003	4.145597±0.0014
Δ_{JK}	-15.50411±0.015	-22.03898±0.008
Δ_K	180.31052±0.010	144.13766±0.006
δ_J	1.941256±0.0010	1.609823±0.0008
δ_K	12.8893±0.012	5.44092±0.01
H_J	$(5.9488\pm0.7)\times10^{-4}$	$(5.5745\pm0.18)\times10^{-4}$
H_{JK}	$(4.1358\pm0.8)\times10^{-3}$	$(-2.4519\pm0.18)\times10^{-3}$
H_{KJ}	$(-6.44426\pm0.10)\times10^{-2}$	$(-2.73425\pm0.034)\times10^{-2}$
H_K	$(3.466981\pm0.009)\times10^{-1}$	$(2.036106\pm0.003)\times10^{-1}$
h_J	$(2.9687\pm0.16)\times10^{-4}$	$(2.6829\pm0.10)\times10^{-4}$
h_{JK}	$(2.962\pm0.42)\times10^{-3}$	$(2.774\pm2.4)\times10^{-4}$
h_K	$(8.08715\pm0.16)\times10^{-2}$	$(3.63685\pm0.04)\times10^{-2}$
L_{JJK}	$(1.3294\pm0.4)\times10^{-5}$	
L_{KKJ}	$(1.7846\pm0.2)\times10^{-4}$	
L_{JK}		$(1.9022\pm0.24)\times10^{-5}$
L_K	$(-8.21427\pm0.2)\times10^{-4}$	$(-3.77789\pm0.04)\times10^{-4}$
ℓ_J		$(7.001\pm5.0)\times10^{-8}$
ℓ_K	$(-6.7028\pm0.7)\times10^{-4}$	
ℓ_{JK}		$(-3.143\pm1.4)\times10^{-6}$
P_{JJK}	$(-6.0406\pm1.3)\times10^{-8}$	
P_{KJ}		$(1.6559\pm0.6)\times10^{-7}$
P_K		$(5.5117\pm0.32)\times10^{-7}$
p_K	$(6.1777\pm0.8)\times10^{-6}$	
p_{KKJ}		$(-3.4123\pm1.0)\times10^{-7}$

Table 45.3. Rotational and centrifugal distortion constants for $D_2{}^{16}O$ [73057].

Parameter	$D_2{}^{16}O$ (0,0,0) State (MHz)	$D_2{}^{16}O$ (0,1,0) State (MHz)
$\mathcal{A}$	462 278.854(52)	498 730(24)
$\mathcal{B}$	218 038.233(33)	220 039(14)
$\mathcal{C}$	145 258.022(21)	143 611(6)
τ'_{xxxx}	-66.654(11)	-74.1(7)
τ'_{yyyy}	-7.650(4)	-7.67(24)
τ'_{zzzz}	-963.936(68)	-1491.2(37)
τ'_1	71.429(76)	101.0(32)
τ'_2	-51.107(79)	-17.5(56)
H_J	$0.174(2)\times10^{-2}$	
H_{JK}	$-0.776(41)\times10^{-2}$	
H_{KJ}	$-7.862(57)\times10^{-2}$	
H_K	$55.527(42)\times10^{-2}$	1.05(3)
$2h_J$	$0.181(1)\times10^{-2}$	
h_{JK}	$-0.266(17)\times10^{-2}$	
h_K	$11.824(134)\times10^{-2}$	
G_{KJK}	$-0.154(16)\times10^{-3}$	
G_{KJ}	$0.612(42)\times10^{-3}$	
G_K	$-1.923(29)\times10^{-3}$	
g_K	$-0.660(42)\times10^{-3}$	
F_2	$-0.133(27)\times10^{-6}$	
F_3	$4.991(64)\times10^{-6}$	
F_5	$-0.098(2)\times10^{-7}$	
Kivelson-Wilson Rotational Constants:		
A	462 291.698	498 746
B	217 982.286	219 960
C	145 301.126	143 672

Table 45.4. Rotational and centrifugal distion constants for $D_2{}^{17}O$ and $D_2{}^{18}O$ [73056].

Parameter	$D_2{}^{17}O$ Value[a] (MHz)	$D_2{}^{18}O$ Value[a] (MHz)
G	456 766.850(250)	451 891.921(530)
B	218 041.011(160)	218 045.181(280)
C	144 701.487(58)	144 201.681(140)
τ'_{xxxx}	-66.219(44)	-66.653(83)
τ'_{yyyy}	-7.405(18)	-7.537(45)
τ'_{zzzz}	-938.124(240)	-920.459(50)
τ'_1	72.050(270)	67.238(550)
τ'_2	-47.660(280)	-49.030(570)
H_J	0.174×10^{-2}	0.174×10^{-2}
H_{JK}	-0.776×10^{-2}	-0.776×10^{-2}
H_{KJ}	$-7.723(46)\times10^{-2}$	$-7.049(120)\times10^{-2}$
H_K	0.53655(35)	0.51773(77)
$2h_J$	0.181×10^{-2}	$0.177(1)\times10^{-2}$
h_{JK}	-0.266×10^{-2}	-0.266×10^{-2}
h_K	0.11636(63)	0.10905(150)
G_{KJK}	-0.154×10^{-3}	-0.154×10^{-3}
G_{KJ}	0.612×10^{-3}	0.612×10^{-3}
G_K	$-1.862(4)\times10^{-3}$	$-1.834(1)\times10^{-3}$
g_K	-0.660×10^{-3}	-0.660×10^{-3}
F_2	-0.133×10^{-6}	-0.133×10^{-6}
F_3	$4.867(2)\times10^{-6}$	4.991×10^{-6}
F_5	-0.098×10^{-7}	-0.098×10^{-7}
Kivelson-Wilson Rotational Constants:		
A	456 779.808	451 905.017
B	217 985.875	217 990.613
C	144 743.666	144 243.154

[a] In cases where no uncertainties are indicated the values were fixed at those obtained for $D_2{}^{16}O$.

Table 45.5. Rotational and centrifugal distortion constants for $HD^{18}O$ and the (0,1,0) state of $HD^{16}O$.

Parameter	$HD^{18}O$ Value (MHz) [70059]	$HD^{16}O$ (0,1,0) State (MHz) [71035]
A	692 872.91(879)	764 781(48)
B	271 598.61(201)	276 856(16)
C	190 714.17(280)	189 567(14)
τ'_{xxxx}	-70.04(24)	-81.66(50)
τ'_{yyyy}	-13.043(220)	-12.85(40)
τ'_{zzzz}	-1599.58(275)	-2953.0(93)
τ'_1	-268.61(265)	-265.5(35)
τ'_2	-115.86(357)	-49.2(37)
H_J	0.00161(49)	
H_{JK}	0.0516(42)	
H_K	0.582(72)	3.22(11)
$2h_J$	0.00088(20)	
h_{JK}	0.0666(66)	
h_K	0.225(30)	
G_K	0.0103(13)	-0.0156(15)
Kivelson-Wilson Rotational Constants:		
A	692 883.9	764 798
B	271 530.5	276 745
C	190 771.3	189 662

Table 45.6. Hyperfine constants for various isotopic species of H_2O in in individual rotational states.

Isotopic Species	Rotational State	eqQ (D) (kHz)	c (D) (kHz)	c (H) (kHz)	Reference
$H_2{}^{16}O$	6_{16}			-32.70[a]	[67014]
	5_{23}			-31.75[a]	[67014]
$HD^{16}O$	2_{20}	80.10(3)	-2.07(1)	-42.38(2)	[67023]
	2_{21}	79.16(3)	-2.04(1)	-43.23(3)	[67023]
	7_{43}	-15.65(20)	-3.16(3)	-26.15(5)	[68014]
	7_{44}	-15.65(20)	-3.16(3)	-26.15(5)	[68014]
D_2O	3_{13}	-72.92(2)	-2.62(1)		[67023]
	2_{20}	49.57(2)	-2.80(1)		[67023]
	4_{41}	78.5(1)	-2.86(3)		[68014]
	5_{32}	8.3(1)	-2.60(2)		[68014]

[a] Kukolich [69033] obtained the following values c (6_{16}) = -32.78(30) kHz, c (5_{23}) = -31.84(30) kHz, D (6_{16}) = 14.63(30) kHz, and D (5_{23}) = 10.89(30) kHz, where D is the spin-spin interaction.

Table 45.7. Diagonal components of the hyperfine tensors for H_2O.

Isotopic Species	Atom	χ_{aa} (kHz)	χ_{bb} (kHz)	χ_{cc} (kHz)	M_{aa} (kHz)	M_{bb} (kHz)	M_{cc} (kHz)	Reference
$H_2{}^{16}O$	H				-35.14(15)	-30.68(30)	-32.68(16)	[67024]
$HD^{16}O$	H				-56.81(30)	-8.80(8)	-23.28(10)	[67024]
	D				-1.07(1)	-4.32(4)	-3.57(2)	[67024]
$D_2{}^{16}O$	D	307.91(14)	-133.13(14)	-174.78(20)	-2.99(1)	-2.36(2)	-2.64(1)	[67024,67023]
$H_2{}^{17}O$	^{17}O	-8899.	-1269.	10 169.				[75009]
$HD^{17}O$	^{17}O	-7877.8	-2229.	10 106.8				[73056,69031]
$D_2{}^{17}O$ [a]	^{17}O	-8896.4	-1210.4	10 106.8				[73056]

[a] Calculated from the $HD^{17}O$ values.

Table 45.8. Zeeman constants and electric dipole moment for H_2O.

Parameters	$H_2{}^{16}O$ Value	$HD^{16}O$ Value	$D_2{}^{16}O$ Value	Reference
μ_a (D)		0.6567(4)		[73059]
μ_b (D)	1.8546(4)	1.7318(9)	1.8545(4)	[73059,73060]
g_{aa} (μ_N)	0.6650(20)	0.623[a]	0.3233(10)	[69033]
g_{bb} (μ_N)	0.7145(20)	0.408[a]	0.3580(10)	[69033]
g_{cc} (μ_N)	0.6465(20)	0.438[a]	0.3226(10)	[69033]
$2\chi_{aa}-\chi_{bb}-\chi_{cc}$ [b]			$-2.3(10)\times10^{-6}$	[69033]
$2\chi_{bb}-\chi_{cc}-\chi_{aa}$ [b]			$-1.1(6)\times10^{-6}$	[69033]

[a] See reference [53015].

[b] Units are $erg/G^2\cdot mole$.

Table 45.9 Additional references for H_2O.

Microwave Spectrum	Microwave Spectrum	Stark Effect	Zeeman Effect	Hyperfine Structure	Pressure Broadening Line Width	Other
[46001]	[54006]	[48010]	[49011]	[59014]	[65022]	[54011]
[46002]	[54012]	[49012]	[51008]	[60006]	[69030]	[62003]
[46003]	[55011]	[72051]	[51009]	[64020]	[69032]	[67025]
[47006]	[66030]	[72052]	[63020]		[69034]	[69052]
[49010]	[66031]	[75008]	[65021]		[69051]	[69053]
[53013]	[70053]		[69035]		[71027]	[70054]
[53014]	[71005]					
[53016]	[74043]					
[53018]						

TABLE 45.10. The microwave spectrum of H_2O

Isotopic species	$J'(K'_-,K'_+)$ – $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$H_2{}^{16}O$	6(1, 6) – 5(2, 3)	7		6		(0,0,0)	22235.044	(1E–3)	[69033]
	6(1, 6) – 5(2, 3)	6		5		(0,0,0)	22235.077	(1E–3)	[69033]
	6(1, 6) – 5(2, 3)					(0,0,0)	22235.080	(*1E–4)	[69033]
	6(1, 6) – 5(2, 3)	5		4		(0,0,0)	22235.120	(1E–3)	[69033]
	6(1, 6) – 5(2, 3)	6		6		(0,0,0)	22235.253	(1E–3)	[69033]
	6(1, 6) – 5(2, 3)	5		5		(0,0,0)	22235.298	(1E–3)	[69033]
	3(2, 1) – 4(1, 4)					(0,1,0)	67803.62	(0.10)	[71036]
	3(1, 3) – 2(2, 0)					(0,0,0)	183310.091	(2E–3)	[71032]
	10(2, 9) – 9(3, 6)					(0,0,0)	321225.644	(0.24)	[72049]
	5(1, 5) – 4(2, 2)					(0,0,0)	325152.919	(0.03)	[72049]
	4(1, 4) – 3(2, 1)					(0,0,0)	380197.372	(0.03)	[72049]
	7(5, 3) – 6(6, 0)					(0,0,0)	437346.667	(0.20)	[72049]
	6(4, 3) – 5(5, 0)					(0,0,0)	439150.812	(0.05)	[72049]
	7(5, 2) – 6(6, 1)					(0,0,0)	443018.295	(0.21)	[72049]
	4(2, 3) – 3(3, 0)					(0,0,0)	448001.075	(0.02)	[72049]
	6(4, 2) – 5(5, 1)					(0,0,0)	470888.947	(0.19)	[72049]
	5(3, 3) – 4(4, 0)					(0,0,0)	474689.127	(0.07)	[72049]
	6(2, 4) – 7(1, 7)					(0,0,0)	488491.133	(0.38)	[72049]
	1(1, 0) – 1(0, 1)					(0,0,0)	556936.002	(0.09)	[72049]
	5(3, 2) – 4(4, 1)					(0,0,0)	620700.807	(0.39)	[72049]
	2(1, 1) – 2(0, 2)					(0,0,0)	752033.227	(0.49)	[72049]
$H_2{}^{17}O$	6(1, 6) – 5(2, 3)		13/2		11/2	(0,0,0)	13533.79	(0.10)	[71036]
	6(1, 6) – 5(2, 3)		15/2		13/2	(0,0,0)	13534.41	(0.10)	[71036]
	6(1, 6) – 5(2, 3)		11/2		9/2	(0,0,0)	13534.41	(0.10)	[71036]
	6(1, 6) – 5(2, 3)		9/2		7/2	(0,0,0)	13536.02	(0.10)	[71036]
	6(1, 6) – 5(2, 3)		17/2		15/2	(0,0,0)	13537.06	(0.10)	[71036]
	6(1, 6) – 5(2, 3)		7/2		5/2	(0,0,0)	13537.97	(0.10)	[71036]
	3(1, 3) – 2(2, 0)		9/2		7/2	(0,0,0)	193999.796	(0.01)	[75009]
	3(1, 3) – 2(2, 0)		7/2		7/2	(0,0,0)	193999.796	(0.01)	[75009]
	3(1, 3) – 2(2, 0)		7/2		5/2	(0,0,0)	194000.310	(0.01)	[75009]
	3(1, 3) – 2(2, 0)		5/2		5/2	(0,0,0)	194001.675	(0.01)	[75009]
	3(1, 3) – 2(2, 0)		9/2		9/2	(0,0,0)	194001.675	(0.01)	[75009]
	3(1, 3) – 2(2, 0)		5/2		3/2	(0,0,0)	194002.998	(0.01)	[75009]
	3(1, 3) – 2(2, 0)		11/2		9/2	(0,0,0)	194004.172	(0.01)	[75009]
	3(1, 3) – 2(2, 0)		3/2		3/2	(0,0,0)	194004.172	(0.01)	[75009]
	3(1, 3) – 2(2, 0)		3/2		1/2	(0,0,0)	194005.835	(0.01)	[75009]
	3(1, 3) – 2(2, 0)		1/2		1/2	(0,0,0)	194007.002	(0.01)	[75009]
	5(1, 5) – 4(2, 2)		13/2		11/2	(0,0,0)	323825.089	(0.01)	[75009]
	5(1, 5) – 4(2, 2)		15/2		13/2	(0,0,0)	323827.873	(0.01)	[75009]
	4(1, 4) – 3(2, 1)		11/2		9/2	(0,0,0)	385784.860	(0.01)	[75009]
	4(1, 4) – 3(2, 1)		13/2		11/2	(0,0,0)	385788.189	(0.01)	[75009]
	4(2, 3) – 3(3, 0)		11/2		9/2	(0,0,0)	469808.134	(0.01)	[75009]
	4(2, 3) – 3(3, 0)		13/2		11/2	(0,0,0)	469811.064	(0.01)	[75009]
	1(1, 0) – 1(0, 1)					(0,0,0)	552020.960	(0.01)	[75009]
	2(1, 1) – 2(0, 2)					(0,0,0)	748458.254	(0.01)	[75009]
$H_2{}^{18}O$	6(1, 6) – 5(2, 3)					(0,0,0)	5625.147	(0.02)	[70025]
	3(1, 3) – 2(2, 0)					(0,0,0)	203407.52	(0.02)	[72050]
	5(1, 5) – 4(2, 2)					(0,0,0)	322465.17	(0.05)	[72050]
	4(1, 4) – 3(2, 1)					(0,0,0)	390607.76	(0.04)	[72050]
	4(2, 3) – 3(3, 0)					(0,0,0)	489054.26	(0.08)	[72050]
	6(2, 4) – 7(1, 7)					(0,0,0)	517181.96	(0.21)	[72050]
	6(4, 3) – 5(5, 0)					(0,0,0)	520137.32	(0.47)	[72050]
	5(3, 3) – 4(4, 0)					(0,0,0)	537337.57	(0.47)	[72050]
	1(1, 0) – 1(0, 1)					(0,0,0)	547676.44	(0.06)	[72050]
	6(4, 2) – 5(5, 1)					(0,0,0)	554859.87	(0.49)	[72050]
	5(3, 2) – 4(4, 1)					(0,0,0)	692079.14	(0.60)	[72050]
	2(1, 1) – 2(0, 2)					(0,0,0)	745320.20	(0.48)	[72050]
$H^{16}OD$	7(6, 1) – 7(6, 2)					(0,0,0)	2.340	(*1E–3)	[74005]
	5(5, 0) – 5(5, 1)					(0,0,0)	3.259	(*1E–3)	[74005]
	6(5, 1) – 6(5, 2)					(0,0,0)	35.484	(*1E–3)	[74005]
	4(4, 0) – 4(4, 1)					(0,0,0)	54.618	(*1E–3)	[74005]
	7(5, 2) – 7(5, 3)					(0,0,0)	209.887	(*5E–3)	[74005]
	5(4, 1) – 5(4, 2)	9/2	5	11/2	5	(0,0,0)	486.266	(2E–3)	[62019]
	5(4, 1) – 5(4, 2)	9/2	4	11/2	5	(0,0,0)	486.450	(2E–3)	[62019]
	5(4, 1) – 5(4, 2)	13/2	6	11/2	5	(0,0,0)	486.487	(2E–3)	[62019]

TABLE 45.10. The microwave spectrum of H_2O—Continued

Isotopic species	$J'(K'_-,K'_+)$ – $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$H^{16}OD$	5(4, 1) – 5(4, 2)					(0,0,0)	486.528	(*2E–3)	[62019]
	5(4, 1) – 5(4, 2)	11/2	5	9/2	4	(0,0,0)	486.569	(2E–3)	[62019]
	5(4, 1) – 5(4, 2)	11/2	5	13/2	6	(0,0,0)	486.607	(2E–3)	[62019]
	3(3, 0) – 3(3, 1)	3/2	2	5/2	3	(0,0,0)	824.478	(2E–3)	[62019]
	3(3, 0) – 3(3, 1)	7/2	4	9/2	4	(0,0,0)	824.507	(2E–3)	[62019]
	3(3, 0) – 3(3, 1)	7/2	4	5/2	3	(0,0,0)	824.525	(2E–3)	[62019]
	3(3, 0) – 3(3, 1)	5/2	3	7/2	3	(0,0,0)	824.549	(2E–3)	[62019]
	3(3, 0) – 3(3, 1)	9/2	4	7/2	3	(0,0,0)	824.569	(2E–3)	[62019]
	3(3, 0) – 3(3, 1)	7/2	4	5/2	2	(0,0,0)	824.604	(2E–3)	[62019]
	3(3, 0) – 3(3, 1)	9/2	4	9/2	4	(0,0,0)	824.671	(2E–3)	[62019]
	3(3, 0) – 3(3, 1)	7/2	4	7/2	4	(0,0,0)	824.671	(2E–3)	[62019]
	3(3, 0) – 3(3, 1)	7/2	3	7/2	3	(0,0,0)	824.671	(2E–3)	[62019]
	3(3, 0) – 3(3, 1)	5/2	3	5/2	3	(0,0,0)	824.671	(2E–3)	[62019]
	3(3, 0) – 3(3, 1)	5/2	2	5/2	2	(0,0,0)	824.671	(2E–3)	[62019]
	3(3, 0) – 3(3, 1)	3/2	2	3/2	2	(0,0,0)	824.671	(2E–3)	[62019]
	3(3, 0) – 3(3, 1)	5/2	2	7/2	4	(0,0,0)	824.742	(2E–3)	[62019]
	3(3, 0) – 3(3, 1)	7/2	3	9/2	4	(0,0,0)	824.773	(2E–3)	[62019]
	3(3, 0) – 3(3, 1)	7/2	3	5/2	3	(0,0,0)	824.790	(2E–3)	[62019]
	3(3, 0) – 3(3, 1)	5/2	3	7/2	4	(0,0,0)	824.814	(2E–3)	[62019]
	3(3, 0) – 3(3, 1)	9/2	4	7/2	4	(0,0,0)	824.834	(2E–3)	[62019]
	3(3, 0) – 3(3, 1)	5/2	3	3/2	2	(0,0,0)	824.864	(2E–3)	[62019]
	8(5, 3) – 8(5, 4)					(0,0,0)	892.229	(*0.02)	[74005]
	6(4, 2) – 6(4, 3)					(0,0,0)	2394.56	(0.05)	[55010]
	9(5, 4) – 9(5, 5)					(0,0,0)	3044.71	(0.10)	[55010]
	5(0, 5) – 4(2, 2)					(0,0,0)	3296.488	(*0.24)	[74005]
	4(3, 1) – 4(3, 2)					(0,0,0)	5702.78	(0.06)	[53017]
	7(4, 3) – 7(4, 4)					(0,0,0)	8577.812	(0.04)	[68014]
	10(5, 5) – 10(5, 6)					(0,0,0)	8837.21	(0.10)	[71035]
	2(2, 0) – 2(2, 1)	5/2	2	3/2	1	(0,0,0)	10278.080	(1E–3)	[64020]
	2(2, 0) – 2(2, 1)	3/2	2	1/2	1	(0,0,0)	10278.080	(1E–3)	[64020]
	2(2, 0) – 2(2, 1)	7/2	3	5/2	3	(0,0,0)	10278.137	(1E–3)	[64020]
	2(2, 0) – 2(2, 1)	3/2	2	5/2	3	(0,0,0)	10278.137	(1E–3)	[64020]
	2(2, 0) – 2(2, 1)	3/2	1	1/2	1	(0,0,0)	10278.168	(1E–3)	[64020]
	2(2, 0) – 2(2, 1)	5/2	2	7/2	3	(0,0,0)	10278.168	(1E–3)	[64020]
	2(2, 0) – 2(2, 1)	3/2	1	5/2	3	(0,0,0)	10278.226	(1E–3)	[64020]
	2(2, 0) – 2(2, 1)	3/2	2	3/2	2	(0,0,0)	10278.246	(1E–3)	[64020]
	2(2, 0) – 2(2, 1)	5/2	2	5/2	2	(0,0,0)	10278.246	(1E–3)	[64020]
	2(2, 0) – 2(2, 1)	5/2	3	5/2	3	(0,0,0)	10278.246	(1E–3)	[64020]
	2(2, 0) – 2(2, 1)	7/2	3	7/2	3	(0,0,0)	10278.246	(1E–3)	[64020]
	2(2, 0) – 2(2, 1)	5/2	3	3/2	1	(0,0,0)	10278.264	(1E–3)	[64020]
	2(2, 0) – 2(2, 1)	1/2	1	3/2	1	(0,0,0)	10278.323	(1E–3)	[64020]
	2(2, 0) – 2(2, 1)	7/2	3	5/2	2	(0,0,0)	10278.323	(1E–3)	[64020]
	2(2, 0) – 2(2, 1)	5/2	3	7/2	3	(0,0,0)	10278.355	(1E–3)	[64020]
	2(2, 0) – 2(2, 1)	5/2	3	3/2	2	(0,0,0)	10278.355	(1E–3)	[64020]
	2(2, 0) – 2(2, 1)	3/2	1	5/2	2	(0,0,0)	10278.413	(1E–3)	[64020]
	2(2, 0) – 2(2, 1)	1/2	1	3/2	2	(0,0,0)	10278.413	(1E–3)	[64020]
	2(2, 0) – 2(2, 1)					(0,1,0)	10557.45	(0.05)	[71035]
	6(2, 4) – 7(0, 7)					(0,0,0)	11618.2	(0.1)	[73062]
	3(2, 1) – 4(1, 4)					(0,0,0)	20460.01	(0.05)	[70023]
	5(3, 2) – 5(3, 3)					(0,1,0)	21820.34	(0.10)	[71035]
	5(3, 2) – 5(3, 3)					(0,0,0)	22307.67	(0.05)	[48011]
	11(5, 6) – 11(5, 7)					(0,0,0)	22581.57	(0.10)	[71035]
	8(4, 4) – 8(4, 5)					(0,0,0)	24884.77	(0.05)	[53017]
	7(1, 7) – 6(2, 4)					(0,0,0)	26880.38	(0.05)	[53017]
	6(2, 5) – 5(3, 2)					(0,1,0)	27892.29	(0.10)	[71035]
	11(7, 5) – 12(6, 6)					(0,0,0)	28668.34	(0.10)	[71035]
	11(7, 4) – 12(6, 7)					(0,0,0)	31670.43	(0.10)	[71035]
	13(2,12) – 12(3, 9)					(0,0,0)	45902.54	(0.10)	[71035]
	3(2, 1) – 3(2, 2)					(0,0,0)	50236.30	(0.10)	[56016]
	3(2, 1) – 3(2, 2)					(0,1,0)	51675.47	(0.10)	[71035]
	12(5, 7) – 12(5, 8)					(0,0,0)	51917.87	(0.10)	[71035]
	4(3, 1) – 5(2, 4)					(0,0,0)	61185.95	(0.10)	[70028]
	9(4, 5) – 9(4, 6)					(0,0,0)	61704.59	(0.20)	[70028]
	6(3, 3) – 6(3, 4)					(0,1,0)	63155.55	(0.10)	[71035]
	6(3, 3) – 6(3, 4)					(0,0,0)	64427.34	(0.10)	[70028]

TABLE 45.10. The microwave spectrum of H_2O—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$H^{16}OD$	3(1, 2) - 2(2, 1)					(0,1,0)	67153.04	(0.10)	[71035]
	6(0, 6) - 5(2, 3)					(0,0,0)	69550.58	(0.10)	[70023]
	1(1, 0) - 1(1, 1)					(0,0,0)	80578.15	(0.15)	[56016]
	7(3, 5) - 6(4, 2)					(0,0,0)	87962.81	(0.02)	[71037]
	5(1, 5) - 4(2, 2)					(0,0,0)	120778.19	(0.01)	[71037]
	7(1, 6) - 6(3, 3)					(0,0,0)	127527.533	(*3.00)	[74005]
	10(4, 6) - 10(4, 7)					(0,0,0)	134770.22	(0.04)	[71037]
	6(1, 6) - 5(2, 3)					(0,0,0)	138530.57	(0.06)	[71037]
	4(2, 2) - 4(2, 3)					(0,0,0)	143727.21	(0.04)	[71037]
	7(3, 4) - 7(3, 5)					(0,0,0)	151616.19	(0.03)	[71037]
	9(6, 4) - 10(5, 5)					(0,0,0)	160329.47	(0.10)	[70023]
	9(6, 3) - 10(5, 6)					(0,0,0)	169246.05	(0.10)	[71037]
	3(2, 1) - 4(0, 4)					(0,0,0)	207110.65	(0.10)	[73061]
	7(2, 5) - 8(1, 8)					(0,0,0)	207345.71	(0.07)	[71037]
	9(4, 6) - 8(5, 3)					(0,0,0)	210310.65	(0.02)	[71037]
	3(1, 2) - 2(2, 1)					(0,0,0)	225896.72	(0.04)	[71037]
	7(2, 5) - 8(0, 8)					(0,0,0)	228072.253	(*0.51)	[74005]
	2(1, 1) - 2(1, 2)					(0,0,0)	241561.55	(0.04)	[71037]
	7(3, 4) - 6(4, 3)					(0,0,0)	241973.57	(0.04)	[71037]
	5(2, 3) - 4(3, 2)					(0,0,0)	255050.26	(0.06)	[71037]
	7(5, 3) - 8(4, 4)					(0,0,0)	258223.76	(0.10)	[71037]
	2(2, 0) - 3(1, 3)					(0,0,0)	266161.07	(0.03)	[71037]
	9(4, 5) - 8(5, 4)					(0,0,0)	272907.54	(0.03)	[71037]
	7(5, 2) - 8(4, 5)					(0,0,0)	283318.59	(0.02)	[71037]
	8(3, 5) - 8(3, 6)					(0,0,0)	305038.55	(0.11)	[71037]
	5(2, 3) - 5(2, 4)					(0,0,0)	310533.29	(0.05)	[71037]
	6(2, 5) - 5(3, 2)					(0,0,0)	313750.62	(0.03)	[71037]
	5(4, 2) - 6(3, 3)					(0,0,0)	317151.25	(0.05)	[71037]
	3(3, 1) - 4(2, 2)					(0,0,0)	335395.50	(0.03)	[71037]
	5(3, 2) - 6(1, 5)					(0,0,0)	356839.62	(*1.79)	[74005]
	5(4, 1) - 6(3, 4)					(0,0,0)	382065.10	(0.09)	[71037]
	1(0, 1) - 0(0, 0)					(0,0,0)	464924.52	(0.03)	[71037]
	3(3, 0) - 4(2, 3)					(0,0,0)	479947.37	(0.10)	[71037]
	3(1, 2) - 3(1, 3)					(0,0,0)	481779.50	(0.28)	[71037]
	2(0, 2) - 1(1, 1)					(0,0,0)	490596.64	(0.06)	[71037]
	8(1, 7) - 7(3, 4)					(0,0,0)	497675.668	(*4.53)	[74005]
	1(1, 0) - 1(0, 1)					(0,0,0)	509292.42	(0.05)	[71037]
	2(2, 0) - 3(0, 3)					(0,0,0)	537792.770	(*0.24)	[74005]
	8(3, 6) - 7(4, 3)					(0,0,0)	539935.90	(0.34)	[71037]
	9(3, 6) - 9(3, 7)					(0,0,0)	540375.466	(*0.94)	[74005]
	8(2, 6) - 9(1, 9)					(0,0,0)	548552.311	(*1.77)	[74005]
	8(2, 6) - 9(0, 9)					(0,0,0)	559427.696	(*1.96)	[74005]
	6(2, 4) - 6(2, 5)					(0,0,0)	559816.74	(0.29)	[71037]
	2(1, 1) - 2(0, 2)					(0,0,0)	599926.71	(0.12)	[71037]
	7(2, 6) - 6(3, 3)					(0,0,0)	622483.456	(*0.61)	[74005]
	3(1, 2) - 3(0, 3)					(0,0,0)	753411.15	(0.38)	[71037]
	6(5, 2) - 7(4, 3)					(0,0,0)	766163.057	(*2.14)	[74005]
	6(5, 1) - 7(4, 4)					(0,0,0)	774776.302	(*2.12)	[74005]
	4(1, 3) - 4(1, 4)					(0,0,0)	797486.719	(*0.25)	[74005]
$D_2{}^{16}O$	3(1, 3) - 2(2, 0)	3	0	2	0	(0,0,0)	10919.301	(1E-3)	[57009]
	3(1, 3) - 2(2, 0)	5	2	4	2	(0,0,0)	10919.357	(1E-3)	[57009]
	3(1, 3) - 2(2, 0)					(0,0,0)	10919.420	(*1E-4)	[70024]
	3(1, 3) - 2(2, 0)	4	2	3	2	(0,0,0)	10919.521	(1E-3)	[57009]
	3(1, 3) - 2(2, 0)	3	2	2	2	(0,0,0)	10919.603	(1E-3)	[57009]
	4(4, 1) - 5(3, 2)					(0,0,0)	10947.113	(1E-4)	[70024]
	4(1, 4) - 3(2, 1)					(0,1,0)	29695.58	(0.10)	[71038]
	8(7, 2) - 9(6, 3)					(0,0,0)	30182.49	(0.03)	[73056]
	8(7, 1) - 9(6, 4)					(0,0,0)	30778.50	(0.03)	[73056]
	4(2, 3) - 3(3, 0)					(0,0,0)	43414.57	(0.03)	[56016]
	5(2, 3) - 6(1, 6)					(0,1,0)	50538.74	(0.10)	[71038]
	5(1, 5) - 4(2, 2)					(0,1,0)	51436.58	(0.10)	[71038]
	4(2, 2) - 3(3, 1)					(0,1,0)	54216.60	(0.10)	[71038]
	4(4, 0) - 5(3, 3)					(0,0,0)	55482.32	(0.03)	[56016]
	8(5, 4) - 7(6, 1)					(0,0,0)	70240.63	(0.03)	[70028]
	8(5, 3) - 7(6, 2)					(0,0,0)	74471.69	(0.03)	[70028]

TABLE 45.10. The microwave spectrum of H_2O—Continued

Isotopic species	$J'(K'_-,K'_+)$ – $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$D_2{}^{16}O$	6(1, 6) – 5(2, 3)					(0,0,0)	93350.06	(0.03)	[70028]
	9(8, 2) – 10(7, 3)					(0,0,0)	103076.40	(0.06)	[70028]
	9(8, 1) – 10(7, 4)					(0,0,0)	103152.89	(0.06)	[70028]
	6(2, 4) – 7(1, 7)					(0,0,0)	104875.71	(0.06)	[70028]
	11(2,10) – 10(3, 7)					(0,0,0)	120183.28	(0.06)	[70026]
	10(9, 2) – 11(8, 3)					(0,0,0)	145134.80	(0.06)	[70023]
	10(9, 1) – 11(8, 4)					(0,0,0)	145143.82	(0.06)	[70023]
	4(1, 4) – 3(2, 1)					(0,0,0)	151710.40	(0.06)	[70028]
	5(5, 1) – 6(4, 2)					(0,0,0)	180171.22	(0.09)	[70028]
	5(1, 5) – 4(2, 2)					(0,0,0)	181883.02	(0.09)	[70028]
	5(5, 0) – 6(4, 3)					(0,0,0)	187633.10	(0.09)	[70028]
	7(4, 4) – 6(5, 1)					(0,0,0)	192519.44	(0.09)	[70028]
	12(8, 5) – 11(9, 2)					(0,0,0)	215689.00	(0.09)	[70023]
	12(8, 4) – 11(9, 3)					(0,0,0)	215731.72	(0.09)	[70023]
	7(4, 3) – 6(5, 2)					(0,0,0)	218442.50	(0.09)	[70028]
	4(2, 2) – 3(3, 1)					(0,0,0)	227010.50	(0.09)	[70028]
	11(3, 8) – 12(2,11)					(0,0,0)	254484.27	(0.12)	[70026]
	11(7, 5) – 10(8, 2)					(0,0,0)	265060.07	(0.12)	[73057]
	11(7, 4) – 10(8, 3)					(0,0,0)	265381.30	(0.12)	[73057]
	6(6, 1) – 7(5, 2)					(0,0,0)	307107.53	(0.12)	[70028]
	6(3, 4) – 5(4, 1)					(0,0,0)	307743.14	(0.12)	[70028]
	6(6, 0) – 7(5, 3)					(0,0,0)	308133.65	(0.12)	[70028]
	1(1, 0) – 1(0, 1)					(0,0,0)	316799.81	(0.12)	[70028]
	5(2, 4) – 4(3, 1)					(0,0,0)	339035.26	(0.15)	[70028]
	2(1, 1) – 2(0, 2)					(0,0,0)	403561.82	(0.15)	[73057]
	3(1, 2) – 2(2, 1)					(0,0,0)	458531.45	(0.15)	[73057]
	2(0, 2) – 1(1, 1)					(0,0,0)	468246.57	(0.15)	[73057]
	1(1, 1) – 0(0, 0)					(0,0,0)	607349.6	(0.2)	[70027]
	6(2, 4) – 6(1, 5)					(0,0,0)	890395.0	(3.0)	[72051]
$D_2{}^{17}O$	4(4, 0) – 5(3, 3)		3/2		5/2	(0,0,0)	21311.05	(0.03)	[73056]
	4(4, 0) – 5(3, 3)		13/2		15/2	(0,0,0)	21312.20	(0.03)	[73056]
	4(4, 0) – 5(3, 3)		7/2		9/2	(0,0,0)	21313.80	(0.03)	[73056]
	4(4, 0) – 5(3, 3)		11/2		13/2	(0,0,0)	21314.50	(0.03)	[73056]
	4(4, 0) – 5(3, 3)		9/2		11/2	(0,0,0)	21314.80	(0.03)	[73056]
	3(1, 3) – 2(2, 0)		9/2		7/2	(0,0,0)	22454.04	(0.03)	[73056]
	3(1, 3) – 2(2, 0)		7/2		7/2	(0,0,0)	22454.04	(0.03)	[73056]
	3(1, 3) – 2(2, 0)		7/2		5/2	(0,0,0)	22454.60	(0.03)	[73056]
	3(1, 3) – 2(2, 0)		5/2		7/2	(0,0,0)	22455.3	(0.1)	[73056]
	3(1, 3) – 2(2, 0)		5/2		5/2	(0,0,0)	22455.64	(0.03)	[73056]
	3(1, 3) – 2(2, 0)		5/2		3/2	(0,0,0)	22457.09	(0.03)	[73056]
	3(1, 3) – 2(2, 0)		3/2		5/2	(0,0,0)	22457.09	(0.03)	[73056]
	3(1, 3) – 2(2, 0)		11/2		9/2	(0,0,0)	22458.24	(0.03)	[73056]
	3(1, 3) – 2(2, 0)		3/2		1/2	(0,0,0)	22460.03	(0.03)	[73056]
	3(1, 3) – 2(2, 0)		1/2		1/2	(0,0,0)	22461.10	(0.03)	[73056]
	5(3, 2) – 4(4, 1)		13/2		11/2	(0,0,0)	25835.35	(0.03)	[73056]
	5(3, 2) – 4(4, 1)		9/2		7/2	(0,0,0)	25836.10	(0.03)	[73056]
	5(3, 2) – 4(4, 1)		15/2		13/2	(0,0,0)	25837.40	(0.03)	[73056]
	5(3, 2) – 4(4, 1)		5/2		3/2	(0,0,0)	25838.55	(0.03)	[73056]
	9(6, 4) – 8(7, 1)		21/2		19/2	(0,0,0)	30414.69	(0.03)	[73056]
	9(6, 4) – 8(7, 1)		15/2		13/2	(0,0,0)	30415.38	(0.03)	[73056]
	9(6, 4) – 8(7, 1)		23/2		21/2	(0,0,0)	30415.90	(0.03)	[73056]
	9(6, 3) – 8(7, 2)		21/2		19/2	(0,0,0)	31099.88	(0.03)	[73056]
	9(6, 3) – 8(7, 2)		15/2		13/2	(0,0,0)	31100.57	(0.03)	[73056]
	9(6, 3) – 8(7, 2)		23/2		21/2	(0,0,0)	31101.09	(0.03)	[73056]
	9(8, 2) – 10(7, 3)		13/2		15/2	(0,0,0)	34453.65	(0.03)	[73056]
	9(8, 2) – 10(7, 3)		23/2		25/2	(0,0,0)	34453.89	(0.03)	[73056]
	9(8, 2) – 10(7, 3)		15/2		17/2	(0,0,0)	34454.47	(0.03)	[73056]
	9(8, 2) – 10(7, 3)		21/2		23/2	(0,0,0)	34455.07	(0.03)	[73056]
	9(8, 2) – 10(7, 3)		19/2		21/2	(0,0,0)	34455.25	(0.03)	[73056]
	9(8, 1) – 10(7, 4)		13/2		15/2	(0,0,0)	34544.00	(0.03)	[73056]
	9(8, 1) – 10(7, 4)		23/2		25/2	(0,0,0)	34544.30	(0.03)	[73056]
	9(8, 1) – 10(7, 4)		15/2		17/2	(0,0,0)	34544.86	(0.03)	[73056]
	9(8, 1) – 10(7, 4)		21/2		23/2	(0,0,0)	34545.42	(0.03)	[73056]
	9(8, 1) – 10(7, 4)		19/2		21/2	(0,0,0)	34545.66	(0.03)	[73056]
	4(2, 3) – 3(3, 0)		11/2		9/2	(0,0,0)	66237.71	(0.03)	[73056]

TABLE 45.10. The microwave spectrum of H_2O—Continued

Isotopic species	$J'(K'_-,K'_+)$ – $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$D_2{}^{17}O$	4(2, 3) – 3(3, 0)		7/2		5/2	(0,0,0)	66239.06	(0.03)	[73056]
	4(2, 3) – 3(3, 0)		13/2		11/2	(0,0,0)	66240.57	(0.03)	[73056]
	4(2, 3) – 3(3, 0)		3/2		1/2	(0,0,0)	66242.26	(0.03)	[73056]
	8(5, 4) – 7(6, 1)		19/2		17/2	(0,0,0)	123366.05	(0.06)	[73056]
	8(5, 4) – 7(6, 1)		21/2		19/2	(0,0,0)	123367.39	(0.06)	[73056]
	8(5, 3) – 7(6, 2)		19/2		17/2	(0,0,0)	128097.22	(0.06)	[73056]
	8(5, 3) – 7(6, 2)		21/2		19/2	(0,0,0)	128098.61	(0.06)	[73056]
	5(5, 1) – 6(4, 2)		5/2		7/2	(0,0,0)	135432.50	(0.06)	[73056]
	5(5, 1) – 6(4, 2)		15/2		17/2	(0,0,0)	135433.57	(0.06)	[73056]
	5(5, 1) – 6(4, 2)		13/2		15/2	(0,0,0)	135435.29	(0.06)	[73056]
	5(5, 0) – 6(4, 3)		5/2		7/2	(0,0,0)	143561.15	(0.06)	[73056]
	5(5, 0) – 6(4, 3)		15/2		17/2	(0,0,0)	143562.09	(0.06)	[73056]
	5(5, 0) – 6(4, 3)		13/2		15/2	(0,0,0)	143564.01	(0.06)	[73056]
	4(1, 4) – 3(2, 1)		11/2		9/2	(0,0,0)	159238.51	(0.06)	[73056]
	4(1, 4) – 3(2, 1)		7/2		5/2	(0,0,0)	159239.56	(0.06)	[73056]
	4(1, 4) – 3(2, 1)		13/2		11/2	(0,0,0)	159241.68	(0.06)	[73056]
	4(1, 4) – 3(2, 1)		3/2		1/2	(0,0,0)	159243.21	(0.06)	[73056]
	5(1, 5) – 4(2, 2)		13/2		11/2	(0,0,0)	183551.83	(0.09)	[73056]
	5(1, 5) – 4(2, 2)		15/2		13/2	(0,0,0)	183554.34	(0.09)	[73056]
	7(4, 4) – 6(5, 1)		17/2		15/2	(0,0,0)	236524.84	(0.09)	[73056]
	4(2, 2) – 3(3, 1)		11/2		9/2	(0,0,0)	255077.37	(0.12)	[73056]
	4(2, 2) – 3(3, 1)		13/2		11/2	(0,0,0)	255079.26	(0.12)	[73056]
	7(4, 3) – 6(5, 2)		17/2		15/2	(0,0,0)	264698.58	(0.12)	[73056]
	1(1, 0) – 1(0, 1)		7/2		7/2	(0,0,0)	311850.63	(0.12)	[73056]
	1(1, 0) – 1(0, 1)		7/2		5/2	(0,0,0)	311852.38	(0.12)	[73056]
	2(1, 1) – 2(0, 2)		9/2		9/2	(0,0,0)	399650.88	(0.15)	[73056]
	2(1, 1) – 2(0, 2)		7/2		9/2	(0,0,0)	399650.88	(0.15)	[73056]
$D_2{}^{18}O$	5(3, 3) – 4(4, 0)					(0,0,0)	8898.45	(0.03)	[73056]
	10(7, 4) – 9(8, 1)					(0,0,0)	26281.93	(0.03)	[73056]
	10(7, 3) – 9(8, 2)					(0,0,0)	26386.88	(0.03)	[73056]
	3(1, 3) – 2(2, 0)					(0,0,0)	32581.33	(0.03)	[73056]
	11(2,10) – 10(3, 7)					(0,0,0)	50052.17	(0.03)	[73056]
	5(3, 2) – 4(4, 1)					(0,0,0)	58514.58	(0.03)	[73056]
	5(5, 1) – 6(4, 2)					(0,0,0)	95762.68	(0.06)	[73056]
	5(5, 0) – 6(4, 3)					(0,0,0)	104538.60	(0.06)	[73056]
	6(2, 4) – 7(1, 7)					(0,0,0)	127557.38	(0.06)	[73056]
	4(1, 4) – 3(2, 1)					(0,0,0)	165718.23	(0.06)	[73056]
	8(5, 3) – 7(6, 2)					(0,0,0)	175676.75	(0.09)	[73056]
	5(1, 5) – 4(2, 2)					(0,0,0)	184774.74	(0.09)	[73056]
	6(6, 1) – 7(5, 2)					(0,0,0)	207185.02	(0.09)	[73056]
	6(6, 0) – 7(5, 3)					(0,0,0)	208456.35	(0.09)	[73056]
	7(4, 4) – 6(5, 1)					(0,0,0)	275475.39	(0.12)	[73056]
	4(2, 2) – 3(3, 1)					(0,0,0)	279987.59	(0.12)	[73056]
	7(7, 1) – 8(6, 2)					(0,0,0)	288294.20	(0.12)	[73056]
	7(7, 0) – 8(6, 3)					(0,0,0)	288458.26	(0.12)	[73056]
	7(4, 3) – 6(5, 2)					(0,0,0)	305827.11	(0.12)	[73056]
	1(1, 0) – 1(0, 1)					(0,0,0)	307480.60	(0.12)	[73056]
	5(2, 4) – 4(3, 1)					(0,0,0)	376411.11	(0.15)	[73056]
$H^{16}OT$	6(3, 3) – 6(3, 4)					(0,0,0)	11953.20	(0.10)	[72048]
	3(2, 1) – 3(2, 2)					(0,0,0)	16562.53	(0.10)	[72048]
	7(3, 4) – 7(3, 5)					(0,0,0)	29356.41	(0.10)	[72048]
	11(4, 7) – 11(4, 8)					(0,0,0)	30786.40	(0.10)	[72048]
	1(1, 0) – 1(1, 1)					(0,0,0)	47520.71	(0.10)	[72048]
	10(3, 8) – 9(4, 5)					(0,0,0)	48598.40	(0.10)	[72048]
	4(2, 2) – 4(2, 3)					(0,0,0)	48889.95	(0.10)	[72048]
	5(2, 3) – 6(1, 6)					(0,0,0)	56425.59	(0.10)	[72048]
	12(4, 8) – 12(4, 9)					(0,0,0)	59615.35	(0.10)	[72048]
	8(3, 5) – 8(3, 6)					(0,0,0)	62890.66	(0.10)	[72048]
	11(5, 7) – 12(4, 8)					(0,0,0)	77009.15	(0.10)	[72048]
	7(2, 5) – 8(0, 8)					(0,0,0)	88680.414	(0.06)	[74037]
	13(4, 9) – 13(4,10)					(0,0,0)	107979.061	(0.06)	[74037]
	5(2, 3) – 5(2, 4)					(0,0,0)	110811.643	(0.06)	[74037]
	4(1, 3) – 3(2, 2)					(0,0,0)	116130.270	(0.06)	[72048]
	6(2, 4) – 7(0, 7)					(0,0,0)	116405.330	(0.06)	[74037]
	9(3, 6) – 9(3, 7)					(0,0,0)	121066.84	(0.06)	[72048]

TABLE 45.10. The microwave spectrum of H_2O—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$H^{16}OT$	8(2, 7) - 7(3, 4)					(0,0,0)	121264.40	(0.06)	[72048]
	11(5, 6) - 12(4, 9)					(0,0,0)	137892.64	(0.06)	[72048]
	2(1, 1) - 2(1, 2)					(0,0,0)	142495.10	(0.06)	[72048]
	6(3, 3) - 7(2, 6)					(0,0,0)	151984.194	(0.06)	[74037]
	8(4, 5) - 9(3, 6)					(0,0,0)	172464.74	(0.09)	[72048]
	4(2, 2) - 5(1, 5)					(0,0,0)	185982.72	(0.09)	[72048]
	6(2, 4) - 6(2, 5)					(0,0,0)	211927.55	(0.09)	[72048]
	10(3, 7) - 10(3, 8)					(0,0,0)	213290.392	(0.09)	[74037]
	2(0, 2) - 1(1, 1)					(0,0,0)	214424.62	(0.09)	[72048]
	7(2, 5) - 6(3, 4)					(0,0,0)	218846.85	(0.09)	[72048]
	5(2, 3) - 6(0, 6)					(0,0,0)	230097.908	(0.09)	[74037]
	5(3, 3) - 6(2, 4)					(0,0,0)	237740.32	(0.09)	[72048]
	9(2, 7) - 10(1,10)					(0,0,0)	252373.246	(0.12)	[74037]
	10(3, 7) - 9(4, 6)					(0,0,0)	268317.973	(0.12)	[74037]
	3(1, 2) - 3(1, 3)					(0,0,0)	284644.07	(0.12)	[72048]
	8(4, 4) - 9(3, 7)					(0,0,0)	296038.757	(0.12)	[74037]
	2(2, 1) - 3(1, 2)					(0,0,0)	320262.772	(0.15)	[74037]
	11(3, 8) - 11(3, 9)					(0,0,0)	348183.910	(0.15)	[74037]
	1(0, 1) - 0(0, 0)					(0,0,0)	348639.061	(0.15)	[74037]
	9(2, 8) - 8(3, 5)					(0,0,0)	355877.351	(0.15)	[74037]
	7(2, 5) - 7(2, 6)					(0,0,0)	358877.810	(0.15)	[74037]
	3(2, 1) - 4(1, 4)					(0,0,0)	373621.836	(0.15)	[74037]
	11(3, 9) - 10(4, 6)					(0,0,0)	379032.308	(0.15)	[74037]
	5(3, 2) - 6(2, 5)					(0,0,0)	453697.802	(0.18)	[74037]
	4(1, 3) - 4(1, 4)					(0,0,0)	473189.609	(0.18)	[74037]
	1(1, 0) - 1(0, 1)					(0,0,0)	526911.988	(0.21)	[74037]
	5(1, 4) - 4(2, 3)					(0,0,0)	569350.080	(0.21)	[74037]
	2(1, 1) - 2(0, 2)					(0,0,0)	577543.126	(0.21)	[74037]
	3(0, 3) - 2(1, 2)					(0,0,0)	597144.023	(0.30)	[74037]
	2(1, 2) - 1(1, 1)					(0,0,0)	649472.828	(0.30)	[74037]
	2(0, 2) - 1(0, 1)					(0,0,0)	693816.158	(0.30)	[74037]
$D^{16}OT$	6(3, 3) - 5(4, 2)					(0,0,0)	16797.78	(0.10)	[74037]
	3(2, 1) - 3(2, 2)					(0,0,0)	38186.45	(0.10)	[74037]
	5(4, 1) - 6(3, 4)					(0,0,0)	40136.05	(0.10)	[74037]
	3(3, 1) - 4(2, 2)					(0,0,0)	51025.424	(0.03)	[74037]
	4(1, 4) - 3(2, 1)					(0,0,0)	51905.572	(0.03)	[74037]
	2(2, 0) - 3(1, 3)					(0,0,0)	88991.395	(0.06)	[74037]
	5(2, 4) - 4(3, 1)					(0,0,0)	94713.289	(0.06)	[74037]
	8(4, 4) - 7(5, 3)					(0,0,0)	101466.243	(0.06)	[74037]
	6(1, 6) - 5(2, 3)					(0,0,0)	102708.147	(0.06)	[74037]
	4(2, 2) - 4(2, 3)					(0,0,0)	107763.229	(0.06)	[74037]
	8(6, 3) - 9(5, 4)					(0,0,0)	110556.548	(0.06)	[74037]
	8(6, 2) - 9(5, 5)					(0,0,0)	114308.159	(0.06)	[74037]
	5(1, 5) - 4(2, 2)					(0,0,0)	119425.985	(0.06)	[74037]
	7(3, 4) - 7(3, 5)					(0,0,0)	129854.072	(0.06)	[74037]
	2(1, 1) - 2(1, 2)					(0,0,0)	158629.161	(0.06)	[74037]
	3(3, 0) - 4(2, 3)					(0,0,0)	159531.785	(0.06)	[74037]
	7(2, 5) - 8(1, 8)					(0,0,0)	177050.655	(0.09)	[74037]
	10(5, 6) - 9(6, 3)					(0,0,0)	194595.352	(0.09)	[74037]
	10(5, 5) - 9(6, 4)					(0,0,0)	205353.409	(0.09)	[74037]
	6(5, 2) - 7(4, 3)					(0,0,0)	221366.024	(0.09)	[74037]
	5(2, 3) - 5(2, 4)					(0,0,0)	228651.098	(0.09)	[74037]
	6(5, 1) - 7(4, 4)					(0,0,0)	230350.066	(0.09)	[74037]
	3(1, 2) - 2(2, 1)					(0,0,0)	235116.740	(0.09)	[74037]
	7(3, 5) - 6(4, 2)					(0,0,0)	248085.412	(0.12)	[74037]
	8(3, 5) - 8(3, 6)					(0,0,0)	253758.145	(0.12)	[74037]
	1(1, 0) - 1(0, 1)					(0,0,0)	290863.828	(0.12)	[74037]
	1(0, 1) - 0(0, 0)					(0,0,0)	291209.062	(0.12)	[74037]
	6(2, 5) - 5(3, 2)					(0,0,0)	314556.550	(0.12)	[74037]
	3(1, 2) - 3(1, 3)					(0,0,0)	316236.877	(0.12)	[74037]
	4(4, 1) - 5(3, 2)					(0,0,0)	316612.544	(0.12)	[74037]
	5(2, 3) - 4(3, 2)					(0,0,0)	328477.447	(0.15)	[74037]
	2(0, 2) - 1(1, 1)					(0,0,0)	336465.493	(0.15)	[74037]
	4(4, 0) - 5(3, 3)					(0,0,0)	336494.646	(0.15)	[74037]
	2(1, 1) - 2(0, 2)					(0,0,0)	351658.116	(0.15)	[74037]

TABLE 45.10. The microwave spectrum of H_2O—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$D^{16}OT$	7(3, 4) - 6(4, 3)					(0,0,0)	380461.686	(0.15)	[74037]
	9(4, 6) - 8(5, 3)					(0,0,0)	380780.494	(0.15)	[74037]
	9(4, 5) - 8(5, 4)					(0,0,0)	443970.391	(0.18)	[74037]
	3(1, 2) - 3(0, 3)					(0,0,0)	455915.048	(0.18)	[74037]
	7(2, 6) - 6(3, 3)					(0,0,0)	482874.751	(0.18)	[74037]
	8(3, 6) - 7(4, 3)					(0,0,0)	518999.582	(0.21)	[74037]
	1(1, 1) - 0(0, 0)					(0,0,0)	529165.461	(0.21)	[74037]
	4(1, 3) - 3(2, 2)					(0,0,0)	612661.581	(0.30)	[74037]
	4(1, 3) - 4(0, 4)					(0,0,0)	612999.562	(0.30)	[74037]
	3(2, 1) - 3(1, 2)					(0,0,0)	676566.044	(0.30)	[74037]
$T_2{}^{16}O$	2(2, 0) - 3(1, 3)					(0,0,0)	55476.17	(0.03)	[72048]
	4(1, 4) - 3(2, 1)					(0,0,0)	59651.20	(0.03)	[72048]
	6(3, 3) - 5(4, 2)					(0,0,0)	71474.10	(0.03)	[72048]
	6(1, 6) - 5(2, 3)					(0,0,0)	88572.829	(0.06)	[73058]
	3(3, 0) - 4(2, 3)					(0,0,0)	98341.697	(0.06)	[73058]
	11(6, 6) - 10(7, 3)					(0,0,0)	104033.722	(0.06)	[73058]
	11(6, 5) - 10(7, 4)					(0,0,0)	105665.015	(0.06)	[73058]
	5(1, 5) - 4(2, 2)					(0,0,0)	110559.438	(0.06)	[73058]
	5(2, 4) - 4(3, 1)					(0,0,0)	113867.814	(0.06)	[73058]
	6(5, 2) - 7(4, 3)					(0,0,0)	118267.919	(0.06)	[73058]
	6(5, 1) - 7(4, 4)					(0,0,0)	127190.298	(0.06)	[73058]
	9(7, 3) - 10(6, 4)					(0,0,0)	151748.917	(0.06)	[73058]
	9(7, 2) - 10(6, 5)					(0,0,0)	152252.873	(0.06)	[73058]
	8(4, 4) - 7(5, 3)					(0,0,0)	156035.976	(0.06)	[73058]
	7(2, 5) - 8(1, 8)					(0,0,0)	164473.211	(0.09)	[73058]
	4(4, 1) - 5(3, 2)					(0,0,0)	212606.619	(0.09)	[73058]
	3(1, 2) - 2(2, 1)					(0,0,0)	222756.07	(0.09)	[72048]
	4(4, 0) - 5(3, 3)					(0,0,0)	231386.797	(0.09)	[73058]
	1(1, 0) - 1(0, 1)					(0,0,0)	238434.50	(0.09)	[72048]
	10(5, 6) - 9(6, 3)					(0,0,0)	244191.923	(0.12)	[73058]
	10(5, 5) - 9(6, 4)					(0,0,0)	255351.462	(0.12)	[73058]
	7(3, 5) - 6(4, 2)					(0,0,0)	259297.645	(0.12)	[73058]
	11(2,10) - 10(3, 7)					(0,0,0)	265426.974	(0.12)	[73058]
	10(8, 3) - 11(7, 4)					(0,0,0)	271832.579	(0.12)	[73058]
	10(8, 2) - 11(7, 5)					(0,0,0)	271890.246	(0.12)	[73058]
	7(6, 2) - 8(5, 3)					(0,0,0)	272210.475	(0.12)	[73058]
	7(6, 1) - 8(5, 4)					(0,0,0)	273375.898	(0.12)	[73058]
	2(1, 1) - 2(0, 2)					(0,0,0)	290949.739	(0.12)	[73058]
	2(0, 2) - 1(1, 1)					(0,0,0)	291559.959	(0.12)	[73058]
	6(2, 5) - 5(3, 2)					(0,0,0)	294861.853	(0.12)	[73058]
	5(2, 3) - 4(3, 2)					(0,0,0)	321804.342	(0.15)	[73058]
	12(6, 7) - 11(7, 4)					(0,0,0)	362915.855	(0.15)	[73058]
	5(5, 1) - 6(4, 2)					(0,0,0)	381138.787	(0.15)	[73058]
	3(1, 2) - 3(0, 3)					(0,0,0)	381371.073	(0.15)	[73058]
	7(3, 4) - 6(4, 3)					(0,0,0)	382676.413	(0.15)	[73058]
	5(5, 0) - 6(4, 3)					(0,0,0)	383658.221	(0.15)	[73058]
	9(4, 6) - 8(5, 3)					(0,0,0)	386705.220	(0.15)	[73058]
	8(7, 2) - 9(6, 3)					(0,0,0)	406009.486	(0.18)	[73058]
	10(2, 9) - 9(3, 6)					(0,0,0)	417701.411	(0.18)	[73058]
	7(2, 6) - 6(3, 3)					(0,0,0)	429290.199	(0.18)	[73058]
	1(1, 1) - 0(0, 0)					(0,0,0)	438971.144	(0.18)	[73058]
	9(4, 5) - 8(5, 4)					(0,0,0)	448637.909	(0.18)	[73058]
	8(3, 6) - 7(4, 3)					(0,0,0)	484020.760	(0.21)	[73058]
	4(2, 2) - 4(1, 3)					(0,0,0)	532458.020	(0.24)	[73058]
	4(1, 3) - 3(2, 2)					(0,0,0)	541681.258	(0.24)	[73058]
	3(2, 1) - 3(1, 2)					(0,0,0)	549412.662	(0.24)	[73058]
	5(2, 3) - 5(1, 4)					(0,0,0)	549846.414	(0.24)	[73058]
	3(0, 3) - 2(1, 2)					(0,0,0)	555193.929	(0.24)	[73058]
	2(2, 0) - 2(1, 1)					(0,0,0)	584865.821	(0.30)	[73058]
	6(2, 4) - 6(1, 5)					(0,0,0)	612876.470	(0.30)	[73058]
	2(1, 2) - 1(0, 1)					(0,0,0)	639534.877	(0.30)	[73058]
$H^{17}OD$	7(4, 3) - 7(4, 4)					(0,0,0)	8817.35	(0.10)	[71038]
	10(5, 5) - 10(5, 6)					(0,0,0)	9172.80	(0.10)	[71038]
	2(2, 0) - 2(2, 1)		9/2		9/2	(0,0,0)	10374.31	(0.10)	[57010]
	2(2, 0) - 2(2, 1)					(0,0,0)	10374.56	(*0.10)	[57010]

TABLE 45.10. The microwave spectrum of H_2O—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	F'	F_1'	F''	F_1''	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$H^{17}OD$	3(2, 1) - 4(1, 4)					(0,0,0)	14597.65	(0.10)	[71038]
	3(2, 1) - 4(1, 4)					(0,0,0)	14599.17	(0.10)	[71038]
	3(2, 1) - 4(1, 4)					(0,0,0)	14599.43	(0.10)	[71038]
	3(2, 1) - 4(1, 4)					(0,0,0)	14599.64	(0.10)	[71038]
	3(2, 1) - 4(1, 4)					(0,0,0)	14601.10	(0.10)	[71038]
	3(2, 1) - 4(1, 4)					(0,0,0)	14602.04	(0.10)	[71038]
	3(2, 1) - 4(1, 4)					(0,0,0)	14602.37	(0.10)	[71038]
	5(3, 2) - 5(3, 3)					(0,0,0)	22716.80	(0.10)	[71038]
	11(5, 6) - 11(5, 7)					(0,0,0)	23440.046	(0.10)	[71038]
	7(1, 7) - 6(2, 4)					(0,0,0)	24698.586	(0.10)	[71038]
	7(1, 7) - 6(2, 4)					(0,0,0)	24699.322	(0.10)	[71038]
	7(1, 7) - 6(2, 4)					(0,0,0)	24700.718	(0.10)	[71038]
	7(1, 7) - 6(2, 4)					(0,0,0)	24701.892	(0.10)	[71038]
	7(1, 7) - 6(2, 4)					(0,0,0)	24702.675	(0.10)	[71038]
	8(4, 4) - 8(4, 5)					(0,0,0)	25576.42	(0.10)	[71038]
	4(3, 1) - 5(2, 4)					(0,0,0)	48713.700	(0.10)	[71038]
	4(3, 1) - 5(2, 4)					(0,0,0)	48714.437	(0.10)	[71038]
	4(3, 1) - 5(2, 4)					(0,0,0)	48714.774	(0.10)	[71038]
	4(3, 1) - 5(2, 4)					(0,0,0)	48715.175	(0.10)	[71038]
	4(3, 1) - 5(2, 4)					(0,0,0)	48715.700	(0.10)	[71038]
	4(3, 1) - 5(2, 4)					(0,0,0)	48716.016	(0.10)	[71038]
	4(3, 1) - 5(2, 4)					(0,0,0)	48716.301	(0.10)	[71038]
	3(2, 1) - 3(2, 2)					(0,0,0)	50690.104	(0.10)	[71038]
	3(2, 1) - 3(2, 2)					(0,0,0)	50690.561	(0.10)	[71038]
	9(4, 5) - 9(4, 6)					(0,0,0)	63394.332	(0.10)	[71038]
	6(3, 3) - 6(3, 4)					(0,0,0)	65579.878	(0.10)	[71038]
	6(0, 6) - 5(2, 3)					(0,0,0)	72070.32	(0.10)	[71038]
	6(0, 6) - 5(2, 3)					(0,0,0)	72070.94	(0.10)	[71038]
	6(0, 6) - 5(2, 3)					(0,0,0)	72072.55	(0.10)	[71038]
	6(0, 6) - 5(2, 3)					(0,0,0)	72073.50	(0.10)	[71038]
	6(0, 6) - 5(2, 3)					(0,0,0)	72074.30	(0.10)	[71038]
	1(1, 0) - 1(1, 1)					(0,0,0)	80600.230	(0.10)	[71038]
	1(1, 0) - 1(1, 1)					(0,0,0)	80600.926	(0.10)	[71038]
	1(1, 0) - 1(1, 1)					(0,0,0)	80601.318	(0.10)	[71038]
	1(1, 0) - 1(1, 1)					(0,0,0)	80601.775	(0.10)	[71038]
	1(1, 0) - 1(1, 1)					(0,0,0)	80603.217	(0.10)	[71038]
	1(1, 0) - 1(1, 1)					(0,0,0)	80603.547	(0.10)	[71038]
	5(1, 5) - 4(2, 2)					(0,0,0)	124250.848	(0.10)	[71038]
	5(1, 5) - 4(2, 2)					(0,0,0)	124251.634	(0.10)	[71038]
	5(1, 5) - 4(2, 2)					(0,0,0)	124253.258	(0.10)	[71038]
	5(1, 5) - 4(2, 2)					(0,0,0)	124254.075	(0.10)	[71038]
	5(1, 5) - 4(2, 2)					(0,0,0)	124255.200	(0.10)	[71038]
	10(4, 6) - 10(4, 7)					(0,0,0)	138348.654	(0.10)	[71038]
	6(1, 6) - 5(2, 3)					(0,0,0)	139237.861	(0.10)	[71038]
	6(1, 6) - 5(2, 3)					(0,0,0)	139238.584	(0.10)	[71038]
	6(1, 6) - 5(2, 3)					(0,0,0)	139240.132	(0.10)	[71038]
	6(1, 6) - 5(2, 3)					(0,0,0)	139241.103	(0.10)	[71038]
	6(1, 6) - 5(2, 3)					(0,0,0)	139242.010	(0.10)	[71038]
	4(2, 2) - 4(2, 3)					(0,0,0)	144932.098	(0.10)	[71038]
	4(2, 2) - 4(2, 3)					(0,0,0)	144932.852	(0.10)	[71038]
	7(3, 4) - 7(3, 5)					(0,0,0)	145195.756	(0.10)	[71038]
	3(1, 2) - 2(2, 1)					(0,0,0)	233919.888	(0.10)	[71038]
	3(1, 2) - 2(2, 1)					(0,0,0)	233921.286	(0.10)	[71038]
	2(1, 1) - 2(1, 2)					(0,0,0)	241632.672	(0.10)	[71038]
	2(1, 1) - 2(1, 2)					(0,0,0)	241634.238	(0.10)	[71038]
	2(1, 1) - 2(1, 2)					(0,0,0)	241635.771	(0.10)	[71038]
	2(1, 1) - 2(1, 2)					(0,0,0)	241636.455	(0.10)	[71038]
$H^{18}OD$	4(4, 1) - 4(3, 2)					(0,0,0)	5902.38	(0.10)	[71038]
	7(4, 3) - 7(4, 4)					(0,0,0)	9032.2	(0.2)	[71038]
	10(5, 5) - 10(5, 6)					(0,0,0)	9477.1	(0.2)	[71038]
	3(2, 1) - 4(1, 4)					(0,0,0)	9526.6	(0.2)	[71038]
	2(2, 0) - 2(2, 1)					(0,0,0)	10458.6	(0.2)	[71038]
	7(1, 7) - 6(2, 4)					(0,0,0)	22733.2	(0.2)	[71038]
	5(3, 2) - 5(3, 3)					(0,0,0)	23080.25	(0.10)	[71038]
	11(5, 6) - 11(5, 7)					(0,0,0)	24218.4	(0.2)	[71038]

TABLE 45.10. The microwave spectrum of H_2O—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$H^{18}OD$	8(4, 4) - 8(4, 5)					(0,0,0)	26196.85	(0.10)	[71038]
	4(3, 1) - 5(2, 4)					(0,0,0)	37889.87	(0.10)	[71038]
	3(2, 1) - 3(2, 2)					(0,0,0)	51087.68	(0.10)	[71038]
	12(5, 7) - 12(5, 8)					(0,0,0)	55658.94	(0.10)	[71038]
	9(4, 5) - 9(4, 6)					(0,0,0)	64908.69	(0.10)	[71038]
	6(3, 3) - 6(3, 4)					(0,0,0)	66601.94	(0.10)	[71038]
	6(0, 6) - 5(2, 3)					(0,0,0)	74187.30	(0.10)	[71038]
	1(1, 0) - 1(1, 1)					(0,0,0)	80616.30	(0.10)	[71038]
	7(3, 5) - 6(4, 2)					(0,0,0)	121185.97	(0.15)	[71038]
	5(1, 5) - 4(2, 2)					(0,0,0)	127224.80	(0.15)	[71038]
	6(1, 6) - 5(2, 3)					(0,0,0)	139788.66	(0.15)	[71038]
	10(4, 6) - 10(4, 7)					(0,0,0)	141550.34	(0.15)	[71038]
	4(2, 2) - 4(2, 3)					(0,0,0)	145984.85	(0.15)	[71038]
	7(3, 4) - 7(3, 5)					(0,0,0)	156478.35	(0.15)	[71038]
	7(5, 3) - 8(4, 4)					(0,0,0)	212375.51	(0.20)	[71038]
	7(2, 5) - 8(1, 8)					(0,0,0)	216553.11	(0.20)	[71038]
	7(5, 2) - 8(4, 5)					(0,0,0)	238797.23	(0.20)	[71038]
	3(1, 2) - 2(2, 1)					(0,0,0)	240872.00	(0.20)	[71038]
	2(1, 1) - 2(1, 2)					(0,0,0)	241680.38	(0.20)	[71038]

*Calculated transition frequency.

Table 46. Rotational and centrifugal distortion constants for $H_2{}^{32}S$, $HD^{32}S$ and $D_2{}^{32}S$.

Parameters	$H_2{}^{32}S$ Value (MHz)[a] [73040][b]	$HD^{32}S$ Value (MHz)[a] [73040][c]	$D_2{}^{32}S$ Value (MHz) [72047]
A	310 180.24(60)	292 351.302(135)	164 571.118(45)
B	270 884.05(51)	147 861.801(54)	135 380.313(45)
C	141 705.88(51)	96 704.120(54)	73 244.068(71)
Δ_J	49.85131(3800)	2.61341(150)	13.0763(26)
Δ_{JK}	-159.69566(6900)	28.6933(97)	-41.7800(66)
Δ_K	111.8505(680)	-11.2972(190)	29.2170(113)
δ_J	-6.01908(500)	0.855403(770)	-1.95725(68)
δ_K	262.1654±0.21	19.4078(85)	47.2516(37)
H_J	$(2.81317\pm0.105)\times10^{-2}$		$3.783(41)\times10^{-3}$
H_{JK}	$(-2.282819\pm0.027)\times10^{-1}$	$(1.3266\pm0.044)\times10^{-2}$	$-3.206(20)\times10^{-2}$
H_{KJ}	$(4.594148\pm0.16)\times10^{-1}$	$(-2.028\pm0.096)\times10^{-2}$	$6.373(44)\times10^{-2}$
H_K	$(-2.76462\pm0.141)\times10^{-1}$	$(1.304\pm0.104)\times10^{-2}$	$-3.620(75)\times10^{-2}$
h_J	$(-5.8411\pm0.081)\times10^{-3}$	$(1.069\pm0.22)\times10^{-4}$	$-9.84(16)\times10^{-4}$
h_{JK}	$(2.42811\pm0.052)\times10^{-1}$	$(5.3237\pm0.41)\times10^{-3}$	$2.443(19)\times10^{-2}$
h_K	2.870195±0.039	$(2.8365\pm0.134)\times10^{-2}$	$8.804(65)\times10^{-2}$
L_{KKJ}	$(2.19929\pm1.19)\times10^{-3}$		$7.8(21)\times10^{-5}$
L_K	$(-2.34287\pm1.26)\times10^{-3}$		$-5.76(25)\times10^{-4}$
ℓ_{KJ}	$(-5.32671\pm0.99)\times10^{-3}$		
ℓ_K	$(-4.164750\pm0.19)\times10^{-2}$		
P_{KJ}	$(-3.040037\pm0.70)\times10^{-4}$		
P_{KKJ}	$(8.034210\pm1.8)\times10^{-4}$		
P_K	$(-5.152582\pm1.14)\times10^{-4}$		
p_{JK}	$(-1.2260\pm0.52)\times10^{-5}$		
p_{KKJ}	$(1.29628\pm0.133)\times10^{-4}$		
L_{JK}			$-8.85(107)\times10^{-5}$
L_{JJK}			$2.747(101)\times10^{-5}$
ℓ_J			$7.72(102)\times10^{-7}$
ℓ_{JK}			$-1.750(131)\times10^{-5}$
p_K			$1.95(32)\times10^{-6}$

[a] The number of significant figures quoted are needed to calculate the transition frequencies within their standard deviations.

[b] See also reference [72046].

[c] See also reference [71034].

Table 46.1. Hyperfine constants and electric dipole moment for H_2S.

Isotopic Species	Rotational level $J_{K,K}$	eqQ (D) (kHz)	c (H)[a] (kHz)	c (D)[a] (kHz)	$eqQ_{aa}(^{33}S)$ (kHz)	$eqQ_{bb}(^{33}S)$ (kHz)	$eqQ_{cc}(^{33}S)$ (kHz)	Reference
$H_2{}^{32}S$	$1_{1,0}$		-16.239(10)[b]					[68039]
	$1_{0,1}$		-15.885(10)					[68039]
$H_2{}^{34}S$	$1_{1,0}$		-15.97(15)					[71032]
	$1_{0,1}$		-15.66(25)					[71032]
$H_2{}^{33}S$	$1_{1,0} \leftarrow 1_{0,1}$				-32.	-8.	40.	[53012]
$HD^{33}S$	$1_{1,0} \leftarrow 1_{0,1}$				-31.0	-10.0	41.0	[54008]
$HD^{32}S$	$2_{2,0}$	42.9(4)	-25.03(13)	-0.47(2)				[64020]
	$2_{2,1}$	43.3(4)	-25.45(13)	-0.22(2)				[64020]
$D_2{}^{32}S$	$1_{1,0}$	17.83(15)		-1.24				[71033]
	$1_{0,1}$	-10.82(28)		-1.21				[71033]
Electric dipole moments:								
	μ_b (H_2S) = 0.974(5) D [65020]							
	μ_a (HDS) = 1.02(2) D [51017]							

[a] Spin-rotation constants.

[b] The spin-spin constant was determined: c_{SS} = 16.726 (30) kHz [68039].

Table 46.2. The molecular g-factors[a] for H_2S [59005].

Isotopic Species	Rotational level $J_{K,K}$	$g_J(\mu_N)$	$g_{aa}(\mu_N)$	$g_{bb}(\mu_N)$	$g_{cc}(\mu_N)$
H_2S	$1_{0,1}$	0.202(7)	0.355(8)	0.195(8)	0.209
	$1_{1,0}$	0.275(7)			
	$2_{1,1}$	0.224(10)			
	$2_{2,0}$	0.296(10)			
HDS	$1_{0,1}$	0.141(10)	0.261(10)	0.155(10)	0.127(10)
	$1_{1,0}$	0.208(10)			
	$2_{1,1}$	0.168(10)			
D_2S	$1_{0,1}$	0.105(10)	0.194(10)	0.086(10)	0.124(10)
	$1_{1,1}$	0.159(10)			
	$1_{1,0}$	0.140(10)			

[a] The sign of the g-factors has not been determined.

TABLE 46.3. The microwave spectrum of H_2S

Isotopic species	$J'(K'_-,K'_+)$ – $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$H_2{}^{32}S$	3(3, 1) – 4(0, 4)					(0,0,0)	35028.15	(0.10)	[72046]
	7(1, 6) – 6(4, 3)					(0,0,0)	89497.99	(0.03)	[72046]
	4(2, 2) – 5(1, 5)					(0,0,0)	119664.42	(0.02)	[72046]
	7(3, 4) – 8(2, 7)					(0,0,0)	161438.45	(0.03)	[72046]
	1(1, 0) – 1(0, 1)	0		1		(0,0,0)	168762.734	(1E–3)	[68039]
	1(1, 0) – 1(0, 1)	1		2		(0,0,0)	168762.738	(1E–3)	[68039]
	1(1, 0) – 1(0, 1)	2		2		(0,0,0)	168762.760	(1E–3)	[68039]
	1(1, 0) – 1(0, 1)					(0,0,0)	168762.762	(*2E–5)	[68039]
	1(1, 0) – 1(0, 1)	1		1		(0,0,0)	168762.775	(1E–3)	[68039]
	1(1, 0) – 1(0, 1)	1		0		(0,0,0)	168762.779	(1E–3)	[68039]
	1(1, 0) – 1(0, 1)	2		1		(0,0,0)	168762.797	(1E–3)	[68039]
	7(2, 6) – 6(3, 3)					(0,0,0)	175009.58	(0.02)	[72046]
	7(4, 4) – 8(1, 7)					(0,0,0)	185099.88	(0.02)	[72046]
	4(1, 4) – 3(2, 1)					(0,0,0)	204140.17	(0.02)	[72046]
	2(2, 0) – 2(1, 1)					(0,0,0)	216710.437	(2E–3)	[71032]
	4(3, 2) – 5(0, 5)					(0,0,0)	228556.27	(0.03)	[72046]
	3(3, 0) – 3(2, 1)					(0,0,0)	300505.56	(0.10)	[68039]
	6(1, 5) – 5(4, 2)					(0,0,0)	314437.79	(0.18)	[72046]
	3(2, 1) – 3(1, 2)					(0,0,0)	369101.45	(0.01)	[72046]
	4(3, 1) – 4(2, 2)					(0,0,0)	369126.91	(0.10)	[68039]
	3(1, 3) – 2(2, 0)					(0,0,0)	392617.84	(0.07)	[72046]
	2(1, 1) – 2(0, 2)					(0,0,0)	393450.49	(0.02)	[72046]
	5(4, 1) – 5(3, 2)					(0,0,0)	407676.73	(0.03)	[72046]
	4(4, 0) – 4(3, 1)					(0,0,0)	424314.82	(0.04)	[72046]
	5(1, 4) – 4(4, 1)					(0,0,0)	436373.36	(0.28)	[72046]
	1(1, 1) – 0(0, 0)					(0,0,0)	452390.33	(0.04)	[72046]
	6(5, 1) – 6(4, 2)					(0,0,0)	493362.16	(0.07)	[72046]
	2(2, 1) – 2(1, 2)					(0,0,0)	505565.23	(0.06)	[72046]
	6(2, 5) – 5(3, 2)					(0,0,0)	535531.83	(*1.55)	[73040]
	7(5, 2) – 7(4, 3)					(0,0,0)	555254.03	(0.06)	[72046]
	6(4, 2) – 6(3, 3)					(0,0,0)	567079.48	(0.03)	[72046]
	3(3, 1) – 3(2, 2)					(0,0,0)	568050.55	(0:05)	[72046]
	5(5, 0) – 5(4, 1)					(0,0,0)	579799.00	(0.13)	[72046]
	8(6, 2) – 8(5, 3)					(0,0,0)	593170.23	(0.13)	[72046]
	5(3, 2) – 5(2, 3)					(0,0,0)	611441.63	(0.08)	[72046]
	7(6, 1) – 7(5, 2)					(0,0,0)	626474.55	(0.19)	[72046]
	4(4, 1) – 4(3, 2)					(0,0,0)	650374.47	(0.40)	[72046]
	4(2, 2) – 4(1, 3)					(0,0,0)	665393.70	(0.25)	[72046]
	2(0, 2) – 1(1, 1)					(0,0,0)	687303.48	(0.38)	[72046]
	9(7, 2) – 9(6, 3)					(0,0,0)	689120.17	(0.33)	[72046]
	3(1, 2) – 3(0, 3)					(0,0,0)	708470.43	(0.41)	[72046]
	2(1, 2) – 1(0, 1)					(0,0,0)	736033.65	(0.89)	[72046]
	3(2, 2) – 3(1, 3)					(0,0,0)	747301.89	(0.45)	[72046]
	6(6, 0) – 6(5, 1)					(0,0,0)	748241.49	(0.38)	[72046]
	5(5, 1) – 5(4, 2)					(0,0,0)	749432.28	(0.45)	[72046]
	4(3, 2) – 4(2, 3)					(0,0,0)	765937.91	(0.65)	[72046]
	5(4, 2) – 5(3, 3)					(0,0,0)	800855.96	(*1.63)	[73040]
	5(2, 4) – 4(3, 1)					(0,0,0)	827915.49	(*0.98)	[73040]
	6(5, 2) – 6(4, 3)					(0,0,0)	854974.90	(*3.80)	[73040]
	6(6, 1) – 6(5, 2)					(0,0,0)	860129.55	(*2.30)	[73040]
	7(6, 2) – 7(5, 3)					(0,0,0)	928657.77	(*4.65)	[73040]
	4(2, 3) – 3(3, 0)					(0,0,0)	930145.62	(*1.17)	[73040]
	5(2, 3) – 5(1, 4)					(0,0,0)	993100.36	(*4.71)	[73040]
	3(0, 3) – 2(1, 2)					(0,0,0)	993108.47	(*0.96)	[73040]
$H_2{}^{33}S$	1(1, 0) – 1(0, 1)		5/2		5/2	(0,0,0)	168318.93	(0.10)	[53012]
	1(1, 0) – 1(0, 1)		3/2		1/2	(0,0,0)	168318.93	(0.10)	[53012]
	1(1, 0) – 1(0, 1)		1/2		3/2	(0,0,0)	168322.63	(0.10)	[53012]
	1(1, 0) – 1(0, 1)		5/2		3/2	(0,0,0)	168326.90	(0.10)	[53012]
	1(1, 0) – 1(0, 1)		3/2		5/2	(0,0,0)	168329.03	(0.10)	[53012]
	2(2, 0) – 2(1, 1)		1/2		3/2	(0,0,0)	215494.428	(0.10)	[63019]
	2(2, 0) – 2(1, 1)		1/2		1/2	(0,0,0)	215496.600	(0.10)	[63019]
	2(2, 0) – 2(1, 1)		7/2		5/2	(0,0,0)	215500.728	(0.10)	[63019]
	2(2, 0) – 2(1, 1)		7/2		7/2	(0,0,0)	215502.768	(0.10)	[63019]
	2(2, 0) – 2(1, 1)		3/2		3/2	(0,0,0)	215505.300	(0.10)	[63019]
	2(2, 0) – 2(1, 1)		3/2		1/2	(0,0,0)	215507.508	(0.10)	[63019]

TABLE 46.3. The microwave spectrum of H_2S—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$H_2{}^{33}S$	2(2, 0) - 2(1, 1)		5/2		5/2	(0,0,0)	215511.444	(0.10)	[63019]
	2(2, 0) - 2(1, 1)		5/2		7/2	(0,0,0)	215513.316	(0.10)	[63019]
$H_2{}^{34}S$	1(1, 0) - 1(0, 1)	0		1		(0,0,0)	167910.491	(1E-3)	[71032]
	1(1, 0) - 1(0, 1)	1		2		(0,0,0)	167910.491	(1E-3)	[71032]
	1(1, 0) - 1(0, 1)	2		2		(0,0,0)	167910.514	(1E-3)	[71032]
	1(1, 0) - 1(0, 1)					(0,0,0)	167910.516	(2E-3)	[71032]
	1(1, 0) - 1(0, 1)	1		1		(0,0,0)	167910.530	(1E-3)	[71032]
	1(1, 0) - 1(0, 1)	1		0		(0,0,0)	167910.530	(1E-3)	[71032]
	1(1, 0) - 1(0, 1)	2		1		(0,0,0)	167910.550	(1E-3)	[71032]
	2(2, 0) - 2(1, 1)					(0,0,0)	213376.924	(2E-3)	[71032]
$H^{32}SD$	6(6, 0) - 6(6, 1)					(0,0,0)	1.827	(*0.00)	[73040]
	5(5, 0) - 5(5, 1)					(0,0,0)	19.100	(*1E-3)	[73040]
	7(6, 1) - 7(6, 2)					(0,0,0)	23.666	(*2E-3)	[73040]
	8(6, 2) - 8(6, 3)					(0,0,0)	164.153	(*0.01)	[73040]
	4(4, 0) - 4(4, 1)					(0,0,0)	184.781	(*4E-3)	[73040]
	6(5, 1) - 6(5, 2)					(0,0,0)	208.200	(*0.01)	[73040]
	5(5, 1) - 6(4, 2)					(0,0,0)	435.42	(*3.51)	[73040]
	7(5, 2) - 7(5, 3)					(0,0,0)	1227.41	(*0.03)	[73040]
	3(3, 0) - 3(3, 1)					(0,0,0)	1596.061	(*0.01)	[73040]
	5(4, 1) - 5(4, 2)					(0,0,0)	1636.82	(*0.02)	[73040]
	8(5, 3) - 8(5, 4)					(0,0,0)	5161.09	(*0.08)	[73040]
	6(4, 2) - 6(4, 3)					(0,0,0)	7936.74	(0.05)	[51017]
	5(5, 0) - 6(4, 3)					(0,0,0)	8390.39	(0.05)	[73062]
	11(6, 5) - 11(6, 6)					(0,0,0)	10235.81	(0.05)	[51017]
	2(2, 0) - 3(0, 3)					(0,0,0)	10835.62	(0.05)	[73062]
	4(3, 1) - 4(3, 2)					(0,0,0)	10861.07	(0.05)	[51017]
	2(2, 0) - 2(2, 1)	5/2	2	3/2	1	(0,0,0)	11283.741	(0.05)	[64020]
	2(2, 0) - 2(2, 1)	3/2	2	1/2	1	(0,0,0)	11283.741	(0.05)	[64020]
	2(2, 0) - 2(2, 1)	7/2	3	5/2	3	(0,0,0)	11283.768	(0.05)	[64020]
	2(2, 0) - 2(2, 1)	3/2	2	5/2	3	(0,0,0)	11283.768	(0.05)	[64020]
	2(2, 0) - 2(2, 1)	3/2	1	1/2	1	(0,0,0)	11283.784	(0.05)	[64020]
	2(2, 0) - 2(2, 1)	5/2	2	7/2	3	(0,0,0)	11283.784	(0.05)	[64020]
	2(2, 0) - 2(2, 1)	3/2	1	5/2	3	(0,0,0)	11283.813	(0.05)	[64020]
	2(2, 0) - 2(2, 1)	7/2	3	7/2	3	(0,0,0)	11283.83	(0.05)	[51017]
	2(2, 0) - 2(2, 1)	5/2	3	5/2	3	(0,0,0)	11283.83	(0.05)	[51017]
	2(2, 0) - 2(2, 1)	5/2	2	5/2	2	(0,0,0)	11283.83	(0.05)	[51017]
	2(2, 0) - 2(2, 1)	3/2	2	3/2	2	(0,0,0)	11283.83	(0.05)	[51017]
	2(2, 0) - 2(2, 1)	3/2	1	3/2	1	(0,0,0)	11283.83	(0.05)	[51017]
	2(2, 0) - 2(2, 1)	1/2	1	1/2	1	(0,0,0)	11283.83	(0.05)	[51017]
	2(2, 0) - 2(2, 1)	5/2	3	3/2	1	(0,0,0)	11283.846	(0.05)	[64020]
	2(2, 0) - 2(2, 1)	1/2	1	3/2	1	(0,0,0)	11283.876	(0.05)	[64020]
	2(2, 0) - 2(2, 1)	7/2	3	5/2	2	(0,0,0)	11283.876	(0.05)	[64020]
	2(2, 0) - 2(2, 1)	5/2	3	7/2	3	(0,0,0)	11283.892	(0.05)	[64020]
	2(2, 0) - 2(2, 1)	5/2	3	3/2	2	(0,0,0)	11283.892	(0.05)	[64020]
	2(2, 0) - 2(2, 1)	3/2	1	5/2	2	(0,0,0)	11283.922	(0.05)	[64020]
	2(2, 0) - 2(2, 1)	1/2	1	3/2	2	(0,0,0)	11283.922	(0.05)	[64020]
	9(5, 4) - 9(5, 5)					(0,0,0)	17212.61	(0.05)	[51017]
	10(7, 3) - 9(8, 2)					(0,0,0)	25764.05	(0.10)	[73062]
	10(7, 4) - 9(8, 1)					(0,0,0)	25875.15	(0.10)	[73062]
	7(4, 3) - 7(4, 4)					(0,0,0)	27566.31	(0.05)	[51017]
	12(6, 6) - 12(6, 7)					(0,0,0)	28842.84	(0.05)	[51017]
	5(3, 2) - 5(3, 3)					(0,0,0)	40929.20	(0.05)	[51017]
	15(7, 8) - 15(7, 9)					(0,0,0)	42763.25	(0.10)	[73062]
	6(0, 6) - 5(2, 3)					(0,0,0)	45306.34	(*1.12)	[73040]
	10(5, 5) - 10(5, 6)					(0,0,0)	47905.36	(0.05)	[51017]
	1(1, 0) - 1(1, 1)					(0,0,0)	51073.27	(0.05)	[51017]
	6(1, 6) - 5(2, 3)					(0,0,0)	51823.14	(*1.14)	[73040]
	3(1, 3) - 2(2, 0)					(0,0,0)	52626.04	(*0.24)	[73040]
	3(2, 1) - 3(2, 2)					(0,0,0)	53200.93	(0.05)	[51017]
	5(3, 3) - 4(4, 0)					(0,0,0)	71571.44	(*0.41)	[73040]
	8(4, 4) - 8(4, 5)					(0,0,0)	75551.73	(0.05)	[51017]
	4(0, 4) - 3(2, 1)					(0,0,0)	102092.61	(*0.22)	[73040]
	6(2, 4) - 7(1, 7)					(0,0,0)	106836.71	(*3.17)	[73040]
	6(2, 4) - 7(0, 7)					(0,0,0)	109478.01	(*3.15)	[73040]
	5(1, 4) - 4(3, 1)					(0,0,0)	109928.54	(*0.38)	[73040]

TABLE 46.3. The microwave spectrum of H_2S—Continued

Isotopic species	$J'(K'_-,K'_+)$ – $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$H^{32}SD$	6(3, 3) – 6(3, 4)					(0,0,0)	110281.15	(0.02)	[71034]
	4(2, 3) – 3(3, 0)					(0,0,0)	110706.22	(0.02)	[71034]
	5(3, 2) – 4(4, 1)					(0,0,0)	112685.45	(0.04)	[71034]
	5(0, 5) – 4(2, 2)					(0,0,0)	120426.46	(*0.37)	[73040]
	4(1, 4) – 3(2, 1)					(0,0,0)	135017.27	(0.06)	[71034]
	5(1, 5) – 4(2, 2)					(0,0,0)	135654.99	(0.03)	[71034]
	4(2, 2) – 4(2, 3)					(0,0,0)	143034.72	(0.02)	[71034]
	2(1, 1) – 2(1, 2)					(0,0,0)	153179.16	(0.10)	[73040]
	7(2, 5) – 6(4, 2)					(0,0,0)	154523.40	(*1.14)	[73040]
	3(3, 0) – 4(1, 3)					(0,0,0)	169830.38	(*0.37)	[73040]
	9(4, 5) – 9(4, 6)					(0,0,0)	170641.23	(*0.30)	[73040]
	1(1, 0) – 1(0, 1)					(0,0,0)	195558.92	(0.10)	[73040]
	5(4, 1) – 6(2, 4)					(0,0,0)	204250.62	(*0.74)	[73040]
	7(3, 4) – 7(3, 5)					(0,0,0)	234044.87	(*0.24)	[73040]
	1(0, 1) – 0(0, 0)					(0,0,0)	244555.58	(0.10)	[73040]
	4(2, 2) – 3(3, 1)					(0,0,0)	255337.19	(*0.32)	[73040]
	2(1, 1) – 2(0, 2)					(0,0,0)	257781.41	(0.10)	[73040]
	7(4, 4) – 6(5, 1)					(0,0,0)	258733.87	(*3.17)	[73040]
	7(4, 3) – 6(5, 2)					(0,0,0)	286508.01	(*3.12)	[73040]
	5(2, 3) – 5(2, 4)					(0,0,0)	286920.91	(*0.18)	[73040]
	5(2, 4) – 4(3, 1)					(0,0,0)	303516.54	(0.03)	[71034]
	3(1, 2) – 3(1, 3)					(0,0,0)	304640.54	(0.10)	[73040]
	6(3, 4) – 5(4, 1)					(0,0,0)	319556.89	(*0.42)	[73040]
	10(4, 6) – 10(4, 7)					(0,0,0)	326381.48	(0.02)	[71034]
	6(1, 5) – 5(3, 2)					(0,0,0)	327272.77	(*0.51)	[73040]
	2(0, 2) – 1(1, 1)					(0,0,0)	333278.71	(0.10)	[73040]
	3(1, 2) – 3(0, 3)					(0,0,0)	368102.22	(0.02)	[71034]
	3(1, 2) – 2(2, 1)					(0,0,0)	368550.52	(0.03)	[71034]
	1(1, 1) – 0(0, 0)					(0,0,0)	389041.08	(0.04)	[71034]
	8(3, 5) – 8(3, 6)					(0,0,0)	415880.03	(0.03)	[71034]
	3(2, 1) – 3(1, 2)					(0,0,0)	417381.10	(0.02)	[71034]
	4(2, 2) – 4(1, 3)					(0,0,0)	423571.36	(0.03)	[71034]
	6(3, 3) – 5(4, 2)					(0,0,0)	431474.46	(0.07)	[71034]
	2(1, 2) – 1(1, 1)					(0,0,0)	437880.83	(0.04)	[71034]
	2(2, 0) – 2(1, 1)					(0,0,0)	444552.85	(0.02)	[71034]
	6(2, 5) – 5(3, 2)					(0,0,0)	445094.65	(0.05)	[71034]
	7(1, 6) – 6(3, 3)					(0,0,0)	448753.04	(*1.61)	[73040]
	8(1, 7) – 7(3, 4)					(0,0,0)	458109.94	(*3.55)	[73040]
	8(2, 6) – 7(4, 3)					(0,0,0)	471760.97	(*3.90)	[73040]
	7(4, 4) – 8(2, 7)					(0,0,0)	471864.23	(*2.82)	[73040]
	2(0, 2) – 1(0, 1)					(0,0,0)	477764.27	(0.05)	[71034]
	5(2, 3) – 5(1, 4)					(0,0,0)	480508.88	(0.06)	[71034]
	6(2, 4) – 6(2, 5)					(0,0,0)	480983.25	(0.08)	[71034]
	8(2, 7) – 7(3, 4)					(0,0,0)	489174.38	(*3.19)	[73040]
	4(1, 3) – 4(1, 4)					(0,0,0)	499262.13	(*0.25)	[73040]
	7(4, 4) – 8(1, 7)					(0,0,0)	502928.67	(*3.04)	[73040]
	7(2, 6) – 6(3, 3)					(0,0,0)	512298.41	(*1.37)	[73040]
	8(4, 5) – 7(5, 2)					(0,0,0)	525087.80	(*4.19)	[73040]
	4(1, 3) – 4(0, 4)					(0,0,0)	532187.04	(0.07)	[71034]
	2(1, 1) – 1(1, 0)					(0,0,0)	539986.65	(0.04)	[71034]
	7(3, 5) – 6(4, 2)					(0,0,0)	548497.04	(*1.11)	[73040]
	6(4, 3) – 7(2, 6)					(0,0,0)	552192.75	(*1.12)	[73040]
	4(4, 0) – 5(2, 3)					(0,0,0)	571260.98	(*0.63)	[73040]
	2(1, 2) – 1(0, 1)					(0,0,0)	582366.42	(0.05)	[71034]
	2(2, 1) – 2(1, 2)					(0,0,0)	586448.10	(*0.23)	[73040]
	3(0, 3) – 2(1, 2)					(0,0,0)	586896.20	(0.14)	[71034]
	5(3, 3) – 6(1, 6)					(0,0,0)	591009.27	(*1.39)	[73040]
	5(3, 3) – 6(0, 6)					(0,0,0)	597526.07	(*1.36)	[73040]
	6(2, 4) – 6(1, 5)					(0,0,0)	598805.17	(0.08)	[71034]
	5(2, 3) – 4(3, 2)					(0,0,0)	601298.59	(*0.29)	[73040]
	8(4, 4) – 7(5, 3)					(0,0,0)	601867.47	(*4.13)	[73040]
	4(3, 2) – 5(1, 5)					(0,0,0)	602940.09	(*0.62)	[73040]
	6(4, 3) – 7(1, 6)					(0,0,0)	615738.12	(*1.10)	[73040]
	4(3, 2) – 5(0, 5)					(0,0,0)	618168.56	(*0.60)	[73040]
	7(3, 4) – 7(2, 5)					(0,0,0)	628018.53	(0.05)	[71034]

TABLE 46.3. The microwave spectrum of H_2S—Continued

Isotopic species	$J'(K'_-,K'_+)$ – $J''(K''_-,K''_+)$	F	F_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$H^{32}SD$	6(3, 4) – 7(1, 7)					(0,0,0)	630644.22	(*3.43)	[73040]
	6(3, 4) – 7(0, 7)					(0,0,0)	633285.52	(*3.39)	[73040]
	6(3, 3) – 6(2, 4)					(0,0,0)	634088.27	(*0.51)	[73040]
	9(3, 6) – 9(3, 7)					(0,0,0)	648612.59	(*0.95)	[73040]
	3(1, 3) – 2(1, 2)					(0,0,0)	650358.15	(*0.17)	[73040]
	3(3, 1) – 4(1, 4)					(0,0,0)	667496.45	(*0.42)	[73040]
	3(2, 2) – 3(1, 3)					(0,0,0)	668820.61	(*0.23)	[73040]
	5(4, 2) – 6(2, 5)					(0,0,0)	683597.02	(*0.80)	[73040]
	5(3, 2) – 5(2, 3)					(0,0,0)	683761.62	(*0.60)	[73040]
	8(3, 5) – 8(2, 6)					(0,0,0)	684675.82	(*0.95)	[73040]
	4(1, 3) – 3(2, 2)					(0,0,0)	687480.43	(*0.25)	[73040]
	2(2, 1) – 2(0, 2)					(0,0,0)	691050.29	(*0.30)	[73040]
	3(0, 3) – 2(0, 2)					(0,0,0)	691498.51	(*0.18)	[73040]
$H^{33}SD$	4(3, 1) – 4(3, 2)		5/2		5/2	(0,0,0)	10830.54	(0.10)	[68038]
	4(3, 1) – 4(3, 2)		11/2		11/2	(0,0,0)	10830.83	(0.10)	[68038]
	4(3, 1) – 4(3, 2)		7/2		7/2	(0,0,0)	10831.37	(0.10)	[68038]
	4(3, 1) – 4(3, 2)		9/2		9/2	(0,0,0)	10831.63	(0.10)	[68038]
	2(2, 0) – 2(2, 1)		3/2		1/2	(0,0,0)	11251.28	(0.10)	[68038]
	2(2, 0) – 2(2, 1)		5/2		7/2	(0,0,0)	11252.85	(0.10)	[68038]
	2(2, 0) – 2(2, 1)		5/2		3/2	(0,0,0)	11254.82	(0.10)	[68038]
	2(2, 0) – 2(2, 1)		1/2		1/2	(0,0,0)	11257.16	(0.10)	[68038]
	2(2, 0) – 2(2, 1)		7/2		7/2	(0,0,0)	11258.55	(0.10)	[68038]
	2(2, 0) – 2(2, 1)		3/2		3/2	(0,0,0)	11259.09	(0.10)	[68038]
	2(2, 0) – 2(2, 1)		5/2		5/2	(0,0,0)	11260.52	(0.10)	[68038]
	2(2, 0) – 2(2, 1)		1/2		3/2	(0,0,0)	11264.78	(0.10)	[68038]
	2(2, 0) – 2(2, 1)		3/2		5/2	(0,0,0)	11264.78	(0.10)	[68038]
	2(2, 0) – 2(2, 1)		7/2		5/2	(0,0,0)	11266.35	(0.10)	[68038]
$H^{34}SD$	4(3, 1) – 4(3, 2)					(0,0,0)	10802.36	(0.10)	[51017]
	2(2, 0) – 2(2, 1)					(0,0,0)	11235.45	(0.10)	[51017]
	7(4, 3) – 7(4, 4)					(0,0,0)	27392.00	(0.10)	[51017]
	5(3, 2) – 5(3, 3)					(0,0,0)	40715.45	(0.10)	[73062]
	1(1, 0) – 1(1, 1)					(0,0,0)	50912.27	(0.10)	[51017]
	3(2, 1) – 3(2, 2)					(0,0,0)	52979.67	(0.10)	[51017]
$D_2{}^{32}S$	1(1, 0) – 1(0, 1)	0		1		(0,0,0)	91359.091	(1E–3)	[71033]
	1(1, 0) – 1(0, 1)	2		2		(0,0,0)	91359.114	(1E–3)	[71033]
	1(1, 0) – 1(0, 1)	2		1		(0,0,0)	91359.128	(1E–3)	[71033]
	1(1, 0) – 1(0, 1)	1		2		(0,0,0)	91359.143	(1E–3)	[71033]
	1(1, 0) – 1(0, 1)	1		1		(0,0,0)	91359.158	(1E–3)	[71033]
	2(2, 0) – 2(1, 1)					(0,0,0)	128815.31	(0.10)	[72047]
	3(2, 1) – 3(1, 2)					(0,0,0)	185591.87	(0.10)	[72047]
	2(1, 1) – 2(0, 2)					(0,0,0)	194189.30	(0.10)	[72047]
	3(3, 0) – 3(2, 1)					(0,0,0)	195692.13	(0.10)	[72047]
	3(1, 3) – 2(2, 0)					(0,0,0)	196900.84	(0.10)	[72047]
	4(3, 1) – 4(2, 2)					(0,0,0)	201306.58	(0.10)	[72047]
	1(1, 1) – 0(0, 0)					(0,0,0)	237903.80	(0.10)	[72047]
	5(4, 1) – 5(3, 2)					(0,0,0)	250390.95	(0.10)	[72047]
	2(2, 1) – 2(1, 2)					(0,0,0)	273879.18	(0.10)	[72047]
	6(4, 2) – 6(3, 3)					(0,0,0)	281788.08	(0.10)	[72047]
	5(3, 2) – 5(2, 3)					(0,0,0)	290043.86	(0.10)	[72047]
	4(4, 0) – 4(3, 1)					(0,0,0)	291340.25	(0.10)	[72047]
	7(5, 2) – 7(4, 3)					(0,0,0)	308863.56	(0.20)	[72047]
	4(2, 2) – 4(1, 3)					(0,0,0)	319555.99	(0.20)	[72047]
	3(3, 1) – 3(2, 2)					(0,0,0)	321784.13	(0.20)	[72047]
	6(2, 5) – 5(3, 2)					(0,0,0)	324356.04	(0.20)	[72047]
	6(5, 1) – 6(4, 2)					(0,0,0)	335350.27	(0.20)	[72047]
	2(0, 2) – 1(1, 1)					(0,0,0)	346782.36	(0.20)	[72047]
	3(1, 2) – 3(0, 3)					(0,0,0)	351473.87	(0.20)	[72047]
	8(5, 3) – 8(4, 4)					(0,0,0)	374158.37	(0.20)	[72047]
	9(6, 3) – 9(5, 4)					(0,0,0)	376492.75	(0.20)	[72047]
	8(6, 2) – 8(5, 3)					(0,0,0)	377560.13	(0.20)	[72047]
	2(1, 2) – 1(0, 1)					(0,0,0)	384452.14	(0.20)	[72047]
	4(4, 1) – 4(3, 2)					(0,0,0)	385315.93	(0.20)	[72047]
	3(2, 2) – 3(1, 3)					(0,0,0)	387843.70	(0.20)	[72047]
	5(5, 0) – 5(4, 1)					(0,0,0)	403291.63	(0.30)	[72047]
	7(4, 3) – 7(3, 4)					(0,0,0)	405800.95	(0.30)	[72047]

TABLE 46.3. The microwave spectrum of H_2S—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$D_2{}^{32}S$	4(3, 2) - 4(2, 3)					(0,0,0)	406857.82	(0.30)	[72047]
	10(7, 3) - 10(6, 4)					(0,0,0)	424386.25	(0.30)	[72047]
	5(4, 2) - 5(3, 3)					(0,0,0)	440500.74	(0.30)	[72047]
	5(2, 4) - 4(3, 1)					(0,0,0)	444159.43	(0.30)	[72047]
	7(6, 1) - 7(5, 2)					(0,0,0)	447210.35	(0.30)	[72047]
	6(3, 3) - 6(2, 4)					(0,0,0)	451575.89	(0.30)	[72047]
	4(2, 3) - 3(3, 0)					(0,0,0)	454804.75	(0.30)	[72047]
	11(7, 4) - 11(6, 5)					(0,0,0)	455365.73	(0.30)	[72047]
	5(5, 1) - 5(4, 2)					(0,0,0)	461763.49	(0.30)	[72047]
	10(6, 4) - 10(5, 5)					(0,0,0)	478255.25	(0.30)	[72047]
	12(8, 4) - 12(7, 5)					(0,0,0)	479524.47	(0.30)	[72047]
	9(7, 2) - 9(6, 3)					(0,0,0)	483402.85	(0.30)	[72047]
	6(5, 2) - 6(4, 3)					(0,0,0)	490325.67	(0.30)	[72047]
	5(2, 3) - 5(1, 4)					(0,0,0)	491247.75	(0.30)	[72047]
	3(0, 3) - 2(1, 2)					(0,0,0)	510025.44	(0.40)	[72047]
	4(1, 3) - 4(0, 4)					(0,0,0)	515114.05	(0.40)	[72047]
	6(6, 0) - 6(5, 1)					(0,0,0)	516361.89	(0.40)	[72047]
	11(8, 3) - 11(7, 4)					(0,0,0)	518317.29	(0.40)	[72047]
	3(1, 3) - 2(0, 2)					(0,0,0)	519905.23	(0.40)	[72047]
	4(2, 3) - 4(1, 4)					(0,0,0)	525317.63	(0.40)	[72047]
	5(3, 3) - 5(2, 4)					(0,0,0)	526701.22	(0.40)	[72047]
	9(5, 4) - 9(4, 5)					(0,0,0)	530145.51	(0.40)	[72047]
	6(4, 3) - 6(3, 4)					(0,0,0)	536003.85	(0.40)	[72047]
	6(6, 1) - 6(5, 2)					(0,0,0)	546989.47	(0.40)	[72047]
	7(6, 2) - 7(5, 3)					(0,0,0)	555378.25	(0.40)	[72047]
	7(5, 3) - 7(4, 4)					(0,0,0)	557878.11	(0.40)	[72047]
	2(2, 1) - 1(1, 0)					(0,0,0)	566972.29	(0.40)	[72047]
	8(7, 1) - 8(6, 2)					(0,0,0)	568408.12	(0.40)	[72047]
	8(4, 4) - 8(3, 5)					(0,0,0)	586926.59	(0.40)	[72047]
	3(1, 2) - 2(2, 1)					(0,0,0)	587620.04	(0.40)	[72047]
	8(6, 3) - 8(5, 4)					(0,0,0)	595505.25	(0.40)	[72047]
	10(8, 2) - 10(7, 3)					(0,0,0)	609672.97	(0.50)	[72047]
	7(3, 4) - 7(2, 5)					(0,0,0)	630485.63	(0.50)	[72047]
	8(7, 2) - 8(6, 3)					(0,0,0)	632477.80	(0.50)	[72047]
	4(0, 4) - 3(1, 3)					(0,0,0)	660418.18	(0.50)	[72047]
	4(1, 4) - 3(0, 3)					(0,0,0)	662245.07	(0.50)	[72047]
	2(2, 0) - 1(1, 1)					(0,0,0)	669787.00	(0.50)	[72047]
	5(2, 4) - 5(1, 5)					(0,0,0)	672337.45	(0.50)	[72047]

*Calculated transition frequency.

Table 47. Rotational and centrifugal distortion constants for $H_2{}^{78}Se$ and $H_2{}^{80}Se$ [75026].

Parameter	$H_2{}^{78}Se$ Value (MHz)	$H_2{}^{80}Se$ Value (MHz)
$\mathcal{A}$	244 259.14(119)	244 099.89(29)
$\mathcal{B}$	232 558.27(119)	232 561.95(29)
$\mathcal{C}$	116 910.11(514)	116 874.93(176)
A	245 122.14	244 967.32
B	231 593.37	231 593.31
C	117 012.00	116 976.14
Δ_J	35.042(100)	34.950(30)
Δ_{JK}	-118.184(150)	-118.189(70)
Δ_K	87.908(300)	88.1873(1300)
δ_J	-2.11491(1800)	-2.12091(1200)
δ_K	458.9872±3.	461.0394±1.
H_J	0.0198(40)	0.0217(14)
H_{JK}	-1.13758±0.03	-1.20193±0.013
H_{KJ}	2.4996±0.2	2.7535±0.06
H_K	-0.8681±0.2	-1.1067±0.06
h_J	$(-0.59680\pm0.02)\times10^{-2}$	$(-0.626116\pm0.012)\times10^{-2}$
h_{JK}	0.20764±0.01	0.20217±0.007
h_K	8.45190±0.4	8.27658±0.12
L_{JJK}	$(0.18122\pm0.017)\times10^{-2}$	$(0.17430\pm0.004)\times10^{-2}$
L_{JK}	0.135773±0.008	0.135488±0.002
L_{KKJ}	-0.365455±0.017	-0.366685±0.005
L_K	0.218064±0.009	0.221558±0.002
ℓ_{JK}	$(0.98799\pm0.2)\times10^{-3}$	$(0.89245\pm0.06)\times10^{-3}$
ℓ_K	$(0.8493\pm0.17)\times10^{-2}$	$(0.6860\pm0.12)\times10^{-2}$
P_{JK}	$(-0.2258\pm0.27)\times10^{-4}$	$(-0.43699\pm0.07)\times10^{-4}$
P_{KJ}	$(-0.248166\pm0.02)\times10^{-2}$	$(-0.226800\pm0.01)\times10^{-2}$
P_{KKJ}	$(0.647661\pm0.06)\times10^{-2}$	$(0.604766\pm0.02)\times10^{-2}$
P_K	$(-0.396067\pm0.04)\times10^{-2}$	$(-0.373530\pm0.013)\times10^{-2}$
Std. dev. MW	0.07	0.14
Std. dev. IR	387.59	354.76

Table 47.1. Rotational and centrifugal distortion constants for $H_2{}^{76}Se$, $H_2{}^{77}Se$ and $H_2{}^{82}Se$ [75026].[a]

Parameters	$H_2{}^{76}Se$ Value (MHz)	$H_2{}^{77}Se$ Value (MHz)	$H_2{}^{82}Se$ Value (MHz)
$\mathcal{A}$	244 434.91	244 348.74	243 945.78
$\mathcal{B}$	232 546.40	232 549.75	232 568.92
$\mathcal{C}$	116 945.72	116 927.29	116 841.45
Δ_J	35.146	35.122	34.906
Δ_{JK}	-118.341	-118.408	-118.264
Δ_K	86.5614	87.0799	88.9171
δ_J	-2.15431	-2.14838	-2.10903
δ_K	452.4169	454.1929	464.5726
H_{JK}	-1.14809	-1.16993	-1.23863
H_{KJ}	2.5035	2.5778	2.88624
h_J	-0.00610582	-0.00617029	-0.00636121
h_{JK}	0.20083	0.19872	0.19916
h_K	8.14709	8.12889	8.27415
Std. dev. MW	0.390	0.438	0.141

[a] *The distortion constants not shown in this table were fixed at their* $H_2{}^{80}Se$ *values in Table 46.*

Table 47.2. Rotational and centrifugal distortion constants for D_2Se [62011].

Parameters	$D_2{}^{76}Se$	$D_2{}^{77}Se$	$D_2{}^{78}Se$	$D_2{}^{80}Se$	$D_2{}^{82}Se$
A (MHz)	125 946.6(5)	125 864.1(5)	125 784.0(5)	125 629.5(5)	125 482.7(5)
B (MHz)	115 906.4(30)	115 906.2(30)	115 906.4(30)	115 906.1(30)	115 906.5(30)
C (MHz)	59 614.5(5)	59 596.0(5)	59 577.9(5)	59 542.9(5)	59 509.7(5)
τ_{aaaa} (MHz)[a]	-38.515	-38.465	-38.415	-38.321	-38.231
τ_{bbbb} (MHz)[a]	-32.759	-32.759	-32.759	-32.759	-32.759
τ_{aabb} (MHz)[a]	23.982	23.966	23.951	23.921	23.893
τ_{abab} (MHz)[a]	-5.694	-5.690	-5.687	-5.679	-5.673

[a] The τ's were derived from the vibrational frequencies.

Table 47.3. Rotational and centrifugal distortion constants for HDSe [59006].

Parameter	$HD^{76}Se$	$HD^{77}Se$	$HD^{78}Se$	$HD^{80}Se$	$HD^{82}Se$
(A-C)/2 (MHz)	79830	79812	79808	79785	79772
δ_J (Hz)	3.56	4.10	3.64	3.85	3.10
D_{JK} (kHz)	0.229	0.224	0.212	0.217	0.215
R_6 (Hz)	0.308	0.275	0.288	0.272	0.299
D_K (kHz)	-0.371	-0.357	-0.358	-0.338	-0.372
R_5 (kHz)	-0.0571	-0.0587	-0.0575	-0.0600	-0.0543

Table 47.4. Hyperfine constants and electric dipole moment for $HD^{80}Se$.

Parameters	Molecular Value	4_{32} level [72035]	4_{31} level [72035]	2_{21} level [67014]	2_{20} level [67014]	Reference
eq_JQ (D) (kHz)		15.69(26)	14.23(21)	35.04(12)	34.69(13)	
c_J (H) (kHz)[a]		-18.53(27)	-17.97(27)	-26.94(6)	-25.74(6)	
c_J (D) (kHz)[a]		- 1.05(2)	- 1.13(3)	- 0.43	- 0.48	
χ_{aa} (D) (kHz)	123.3(6)					[72035]
χ_{bb} (D) (kHz)	-56.5(60)					[72035]
χ_{cc} (D) (kHz)	-66.8(71)					[72035]
μ_b HDSe (Debye)	0.62					[59006]
μ_b D_2Se (Debye)	0.627(2)					[69037]

[a] The spin-rotation tensor elements derived in [72035] are:
for the proton $M_{aa}(H)$ = -38.77(10) kHz, $M_{bb}(H)$ = 2.37(49) kHz and $M_{cc}(H)$ = -8.95(95) kHz;
for the deuteron $M_{aa}(D)$ = 0.51 kHz, $M_{bb}(D)$ = -2.46(1) kHz and $M_{cc}(D)$ = -2.13(2) kHz.

TABLE 47.5. The microwave spectrum of H_2Se

Isotopic species	$J'(K'_-,K'_+)$ – $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$H_2{}^{82}Se$	1(1, 0) – 1(0, 1)					(0,0,0)	127860.35	(0.20)	[56011]
	2(2, 0) – 2(1, 1)					(0,0,0)	141889.02	(0.20)	[56011]
	3(3, 0) – 3(2, 1)					(0,0,0)	164663.10	(0.20)	[56011]
	4(4, 0) – 4(3, 1)					(0,0,0)	197748.81	(0.20)	[75026]
	5(5, 0) – 5(4, 1)					(0,0,0)	242112.28	(0.20)	[75026]
	6(6, 0) – 6(5, 1)					(0,0,0)	297106.08	(0.20)	[75026]
	5(4, 1) – 5(3, 2)					(0,0,0)	308016.04	(0.20)	[75026]
	6(5, 1) – 6(4, 2)					(0,0,0)	309251.68	(0.20)	[75026]
	4(3, 1) – 4(2, 2)					(0,0,0)	316392.66	(0.20)	[75026]
	7(6, 1) – 7(5, 2)					(0,0,0)	323624.01	(0.20)	[75026]
	3(2, 1) – 3(1, 2)					(0,0,0)	330181.47	(0.20)	[75026]
	2(1, 1) – 2(0, 2)					(0,0,0)	345030.44	(0.20)	[75026]
	8(7, 1) – 8(6, 2)					(0,0,0)	353768.27	(0.20)	[75026]
	7(7, 0) – 7(6, 1)					(0,0,0)	359829.07	(0.20)	[75026]
	1(1, 1) – 0(0, 0)					(0,0,0)	361698.54	(0.20)	[75026]
	2(2, 1) – 2(1, 2)					(0,0,0)	383125.26	(0.20)	[75026]
	9(8, 1) – 9(7, 2)					(0,0,0)	401087.63	(0.20)	[75026]
	3(3, 1) – 3(2, 2)					(0,0,0)	401983.80	(0.20)	[75026]
	4(4, 1) – 4(3, 2)					(0,0,0)	426414.26	(0.20)	[75026]
	5(5, 1) – 5(4, 2)					(0,0,0)	455560.94	(0.20)	[75026]
	2(1, 2) – 1(0, 1)					(0,0,0)	595552.80	(0.20)	[75026]
$H_2{}^{80}Se$	1(1, 0) – 1(0, 1)					(0,0,0)	127973.40	(0.20)	[56011]
	2(2, 0) – 2(1, 1)					(0,0,0)	142171.86	(0.20)	[56011]
	3(3, 0) – 3(2, 1)					(0,0,0)	165240.46	(0.20)	[56011]
	4(4, 0) – 4(3, 1)					(0,0,0)	198776.38	(0.20)	[75026]
	5(5, 0) – 5(4, 1)					(0,0,0)	243754.69	(0.20)	[75026]
	6(6, 0) – 6(5, 1)					(0,0,0)	299490.16	(0.20)	[75026]
	5(4, 1) – 5(3, 2)					(0,0,0)	307884.72	(0.20)	[75026]
	6(5, 1) – 6(4, 2)					(0,0,0)	309399.66	(0.20)	[75026]
	4(3, 1) – 4(2, 2)					(0,0,0)	316164.20	(0.20)	[75026]
	7(6, 1) – 7(5, 2)					(0,0,0)	324255.52	(0.20)	[75026]
	3(2, 1) – 3(1, 2)					(0,0,0)	329992.71	(0.20)	[75026]
	2(1, 1) – 2(0, 2)					(0,0,0)	344953.15	(0.20)	[75026]
	8(7, 1) – 8(6, 2)					(0,0,0)	355087.30	(0.20)	[75026]
	1(1, 1) – 0(0, 0)					(0,0,0)	361879.28	(0.20)	[75026]
	7(7, 0) – 7(6, 1)					(0,0,0)	362998.90	(0.20)	[75026]
	2(2, 1) – 2(1, 2)					(0,0,0)	383463.65	(0.20)	[75026]
	3(3, 1) – 3(2, 2)					(0,0,0)	402553.93	(0.20)	[75026]
	9(8, 1) – 9(7, 2)					(0,0,0)	403259.55	(0.20)	[75026]
	4(4, 1) – 4(3, 2)					(0,0,0)	427295.16	(0.20)	[75026]
	8(8, 0) – 8(7, 1)					(0,0,0)	429235.84	(0.20)	[75026]
	5(5, 1) – 5(4, 2)					(0,0,0)	456827.96	(0.20)	[75026]
	6(6, 1) – 6(5, 2)					(0,0,0)	489861.69	(0.20)	[75026]
	9(9, 0) – 9(8, 1)					(0,0,0)	492152.55	(0.20)	[75026]
	2(0, 2) – 1(1, 1)					(0,0,0)	581098.89	(0.20)	[75026]
	2(1, 2) – 1(0, 1)					(0,0,0)	595800.97	(0.20)	[75026]
$H_2{}^{78}Se$	2(2, 0) – 2(1, 1)					(0,0,0)	142469.58	(0.20)	[56011]
	3(3, 0) – 3(2, 1)					(0,0,0)	165847.57	(0.20)	[56011]
	4(4, 0) – 4(3, 1)					(0,0,0)	199858.66	(0.20)	[75026]
	5(5, 0) – 5(4, 1)					(0,0,0)	245484.52	(0.20)	[75026]
	6(6, 0) – 6(5, 1)					(0,0,0)	301999.28	(0.20)	[75026]
	5(4, 1) – 5(3, 2)					(0,0,0)	307754.78	(0.20)	[75026]
	6(5, 1) – 6(4, 2)					(0,0,0)	309568.45	(0.20)	[75026]
	4(3, 1) – 4(2, 2)					(0,0,0)	315928.10	(0.20)	[75026]
	7(6, 1) – 7(5, 2)					(0,0,0)	324938.27	(0.20)	[75026]
	3(2, 1) – 3(1, 2)					(0,0,0)	329795.90	(0.20)	[75026]
	2(1, 1) – 2(0, 2)					(0,0,0)	344872.29	(0.20)	[75026]
	8(7, 1) – 8(6, 2)					(0,0,0)	356498.41	(0.20)	[75026]
	1(1, 1) – 0(0, 0)					(0,0,0)	362069.14	(0.20)	[75026]
	7(7, 0) – 7(6, 1)					(0,0,0)	366331.05	(0.20)	[75026]
	2(2, 1) – 2(1, 2)					(0,0,0)	383819.46	(0.20)	[75026]
	3(3, 1) – 3(2, 2)					(0,0,0)	403153.22	(0.20)	[75026]
	9(8, 1) – 9(7, 2)					(0,0,0)	405571.85	(0.20)	[75026]
	4(4, 1) – 4(3, 2)					(0,0,0)	428221.28	(0.20)	[75026]
	5(5, 1) – 5(4, 2)					(0,0,0)	458160.01	(0.20)	[75026]

TABLE 47.5. The microwave spectrum of H_2Se—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$H_2{}^{78}Se$	2(0, 2) - 1(1, 1)					(0,0,0)	581180.62	(0.20)	[75026]
	2(1, 2) - 1(0, 1)					(0,0,0)	596061.86	(0.20)	[75026]
$H_2{}^{77}Se$	1(1, 0) - 1(0, 1)					(0,0,0)	128155.40	(0.20)	[56011]
	2(2, 0) - 2(1, 1)					(0,0,0)	142623.48	(0.20)	[56011]
	3(3, 0) - 3(2, 1)					(0,0,0)	166163.20	(0.20)	[56011]
	4(4, 0) - 4(3, 1)					(0,0,0)	200420.65	(0.20)	[75026]
	5(5, 0) - 5(4, 1)					(0,0,0)	246382.75	(0.20)	[75026]
	6(6, 0) - 6(5, 1)					(0,0,0)	303301.44	(0.20)	[75026]
	5(4, 1) - 5(3, 2)					(0,0,0)	307690.68	(0.20)	[75026]
	6(5, 1) - 6(4, 2)					(0,0,0)	309661.16	(0.20)	[75026]
	4(3, 1) - 4(2, 2)					(0,0,0)	315807.45	(0.20)	[75026]
	7(6, 1) - 7(5, 2)					(0,0,0)	325299.72	(0.20)	[75026]
	3(2, 1) - 3(1, 2)					(0,0,0)	329694.48	(0.20)	[75026]
	2(1, 1) - 2(0, 2)					(0,0,0)	344830.49	(0.20)	[75026]
	8(7, 1) - 8(6, 2)					(0,0,0)	357239.79	(0.20)	[75026]
	1(1, 1) - 0(0, 0)					(0,0,0)	362167.63	(0.20)	[75026]
	7(7, 0) - 7(6, 1)					(0,0,0)	368058.70	(0.20)	[75026]
	2(2, 1) - 2(1, 2)					(0,0,0)	384003.88	(0.20)	[75026]
	3(3, 1) - 3(2, 2)					(0,0,0)	403463.92	(0.20)	[75026]
	9(8, 1) - 9(7, 2)					(0,0,0)	406781.99	(0.20)	[75026]
	4(4, 1) - 4(3, 2)					(0,0,0)	428701.45	(0.20)	[75026]
	5(5, 1) - 5(4, 2)					(0,0,0)	458850.63	(0.20)	[75026]
	2(1, 2) - 1(0, 1)					(0,0,0)	596197.06	(0.20)	[75026]
$H_2{}^{76}Se$	1(1, 0) - 1(0, 1)					(0,0,0)	128219.10	(0.20)	[56011]
	2(2, 0) - 2(1, 1)					(0,0,0)	142783.02	(0.20)	[56011]
	3(3, 0) - 3(2, 1)					(0,0,0)	166488.14	(0.20)	[56011]
	4(4, 0) - 4(3, 1)					(0,0,0)	201000.01	(0.20)	[75026]
	5(5, 0) - 5(4, 1)					(0,0,0)	247308.71	(0.20)	[75026]
	6(6, 0) - 6(5, 1)					(0,0,0)	304643.20	(0.20)	[75026]
	5(4, 1) - 5(3, 2)					(0,0,0)	307626.96	(0.20)	[75026]
	6(5, 1) - 6(4, 2)					(0,0,0)	309760.43	(0.20)	[75026]
	4(3, 1) - 4(2, 2)					(0,0,0)	315684.32	(0.20)	[75026]
	7(6, 1) - 7(5, 2)					(0,0,0)	325677.38	(0.20)	[75026]
	3(2, 1) - 3(1, 2)					(0,0,0)	329590.51	(0.20)	[75026]
	2(1, 1) - 2(0, 2)					(0,0,0)	344787.62	(0.20)	[75026]
	8(7, 1) - 8(6, 2)					(0,0,0)	358010.12	(0.20)	[75026]
	1(1, 1) - 0(0, 0)					(0,0,0)	362268.84	(0.20)	[75026]
	7(7, 0) - 7(6, 1)					(0,0,0)	369837.86	(0.20)	[75026]
	2(2, 1) - 2(1, 2)					(0,0,0)	384193.75	(0.20)	[75026]
	3(3, 1) - 3(2, 2)					(0,0,0)	403783.97	(0.20)	[75026]
	9(8, 1) - 9(7, 2)					(0,0,0)	408036.27	(0.20)	[75026]
	4(4, 1) - 4(3, 2)					(0,0,0)	429195.99	(0.20)	[75026]
	5(5, 1) - 5(4, 2)					(0,0,0)	459562.13	(0.20)	[75026]
	2(1, 2) - 1(0, 1)					(0,0,0)	596336.52	(0.20)	[75026]
$HD^{82}Se$	11(6, 6) - 11(6, 5)					(0,0,0)	8215.8	(0.10)	[59006]
	4(3, 2) - 4(3, 1)					(0,0,0)	8756.7	(0.10)	[57006]
	2(2, 1) - 2(2, 0)					(0,0,0)	9127.75	(0.10)	[57006]
	9(5, 5) - 9(5, 4)					(0,0,0)	13827.7	(0.10)	[57006]
	7(4, 4) - 7(4, 3)					(0,0,0)	22184.4	(0.10)	[59006]
	5(3, 3) - 5(3, 2)					(0,0,0)	33023.0	(0.10)	[59006]
	1(1, 1) - 1(1, 0)					(0,0,0)	41476.1	(0.10)	[59006]
	3(2, 2) - 3(2, 1)					(0,0,0)	43058.4	(0.10)	[59006]
$HD^{80}Se$	11(6, 6) - 11(6, 5)					(0,0,0)	8240.6	(0.1)	[59006]
	4(3, 2) - 4(3, 1)	9/2	4	11/2	5	(0,0,0)	8770.928	(1E–3)	[72035]
	4(3, 2) - 4(3, 1)	5/2	3	7/2	4	(0,0,0)	8770.928	(1E–3)	[72035]
	4(3, 2) - 4(3, 1)	7/2	3	9/2	5	(0,0,0)	8770.928	(1E–3)	[72035]
	4(3, 2) - 4(3, 1)	5/2	3	7/2	3	(0,0,0)	8770.988	(1E–4)	[72035]
	4(3, 2) - 4(3, 1)	7/2	4	9/2	5	(0,0,0)	8770.990	(2E–4)	[72035]
	4(3, 2) - 4(3, 1)	9/2	4	7/2	3	(0,0,0)	8771.001	(3E–4)	[72035]
	4(3, 2) - 4(3, 1)	11/2	5	9/2	5	(0,0,0)	8771.003	(2E–4)	[72035]
	4(3, 2) - 4(3, 1)	9/2	4	9/2	4	(0,0,0)	8771.008	(1E–4)	[72035]
	4(3, 2) - 4(3, 1)	5/2	3	5/2	3	(0,0,0)	8771.008	(1E–4)	[72035]
	4(3, 2) - 4(3, 1)	7/2	3	7/2	3	(0,0,0)	8771.008	(1E–4)	[72035]
	4(3, 2) - 4(3, 1)	11/2	5	11/2	5	(0,0,0)	8771.011	(2E–4)	[72035]
	4(3, 2) - 4(3, 1)	7/2	4	7/2	4	(0,0,0)	8771.011	(2E–4)	[72035]

TABLE 47.5. The microwave spectrum of H_2Se—Continued

Isotopic species	$J'(K'_-,K'_+)$ – $J''(K''_-,K''_+)$	F'	F_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$HD^{80}Se$	4(3, 2) – 4(3, 1)	9/2	5	9/2	5	(0,0,0)	8771.011	(2E–4)	[72035]
	4(3, 2) – 4(3, 1)	7/2	3	9/2	4	(0,0,0)	8771.016	(4E–4)	[72035]
	4(3, 2) – 4(3, 1)	9/2	5	11/2	5	(0,0,0)	8771.019	(2E–4)	[72035]
	4(3, 2) – 4(3, 1)	7/2	3	5/2	3	(0,0,0)	8771.030	(4E–4)	[72035]
	4(3, 2) – 4(3, 1)	9/2	5	7/2	4	(0,0,0)	8771.032	(3E–4)	[72035]
	4(3, 2) – 4(3, 1)	11/2	5	9/2	4	(0,0,0)	8771.093	(1E–3)	[72035]
	4(3, 2) – 4(3, 1)	7/2	4	5/2	3	(0,0,0)	8771.093	(1E–3)	[72035]
	4(3, 2) – 4(3, 1)	9/2	5	7/2	3	(0,0,0)	8771.093	(1E–3)	[72035]
	2(2, 1) – 2(2, 0)	3/2	1	5/2	2	(0,0,0)	9138.425	(1E–4)	[67014]
	2(2, 1) – 2(2, 0)	5/2	3	3/2	2	(0,0,0)	9138.447	(2E–4)	[67014]
	2(2, 1) – 2(2, 0)	5/2	3	7/2	3	(0,0,0)	9138.441	(3E–4)	[67014]
	2(2, 1) – 2(2, 0)	7/2	3	5/2	2	(0,0,0)	9138.472	(1E–4)	[67014]
	2(2, 1) – 2(2, 0)	1/2	3	3/2	1	(0,0,0)	9138.463	(1E–4)	[67014]
	2(2, 1) – 2(2, 0)	5/2	3	3/2	1	(0,0,0)	9138.487	(2E–4)	[67014]
	2(2, 1) – 2(2, 0)	3/2	1	5/2	3	(0,0,0)	9138.524	(2E–4)	[67014]
	2(2, 1) – 2(2, 0)	3/2	1	1/2	1	(0,0,0)	9138.548	(2E–4)	[67014]
	2(2, 1) – 2(2, 0)	5/2	2	7/2	3	(0,0,0)	9138.544	(2E–4)	[67014]
	2(2, 1) – 2(2, 0)	7/2	3	5/2	3	(0,0,0)	9138.571	(3E–4)	[67014]
	2(2, 1) – 2(2, 0)	3/2	2	5/2	3	(0,0,0)	9138.565	(2E–4)	[67014]
	2(2, 1) – 2(2, 0)	5/2	2	3/2	1	(0,0,0)	9138.590	(2E–4)	[67014]
	2(2, 1) – 2(2, 0)	5/2	2	5/2	3	(0,0,0)	9138.608	(3E–4)	[67014]
	9(5, 5) – 9(5, 4)					(0,0,0)	13862.65	(0.10)	[57006]
	7(4, 4) – 7(4, 3)					(0,0,0)	22230.0	(0.10)	[59006]
	12(6, 7) – 12(6, 6)					(0,0,0)	23249.8	(0.10)	[59006]
	5(3, 3) – 5(3, 2)					(0,0,0)	33075.4	(0.10)	[59006]
	10(5, 6) – 10(5, 5)					(0,0,0)	38629.0	(0.10)	[59006]
	1(1, 1) – 1(1, 0)					(0,0,0)	41504.5	(0.10)	[59006]
	3(2, 2) – 3(2, 1)					(0,0,0)	43106.6	(0.10)	[59006]
$HD^{78}Se$	11(6, 6) – 11(6, 5)					(0,0,0)	8266.6	(0.10)	[59006]
	4(3, 2) – 4(3, 1)					(0,0,0)	8786.05	(0.10)	[57006]
	2(2, 1) – 2(2, 0)					(0,0,0)	9149.65	(0.10)	[57006]
	9(5, 5) – 9(5, 4)					(0,0,0)	13899.3	(0.10)	[57006]
	7(4, 4) – 7(4, 3)					(0,0,0)	22277.6	(0.10)	[59006]
	5(3, 3) – 5(3, 2)					(0,0,0)	33129.7	(0.10)	[59006]
	10(5, 6) – 10(5, 5)					(0,0,0)	38724.0	(0.10)	[59006]
	1(1, 1) – 1(1, 0)					(0,0,0)	41534.1	(0.10)	[59006]
	3(2, 2) – 3(2, 1)					(0,0,0)	43156.8	(0.10)	[59006]
$HD^{77}Se$	11(6, 6) – 11(6, 5)					(0,0,0)	8280.0	(0.10)	[59006]
	4(3, 2) – 4(3, 1)					(0,0,0)	8793.95	(0.10)	[57006]
	2(2, 1) – 2(2, 0)					(0,0,0)	9155.85	(0.10)	[57006]
	9(5, 5) – 9(5, 4)					(0,0,0)	13918.3	(0.10)	[57006]
	7(4, 4) – 7(4, 3)					(0,0,0)	22302.3	(0.10)	[59006]
	5(3, 3) – 5(3, 2)					(0,0,0)	33157.4	(0.10)	[59006]
	1(1, 1) – 1(1, 0)					(0,0,0)	41549.0	(0.10)	[59006]
	3(2, 2) – 3(2, 1)					(0,0,0)	43183.1	(0.10)	[59006]
$HD^{76}Se$	11(6, 6) – 11(6, 5)					(0,0,0)	8293.60	(0.10)	[59006]
	4(3, 2) – 4(3, 1)					(0,0,0)	8801.85	(0.10)	[57006]
	2(2, 1) – 2(2, 0)					(0,0,0)	9161.50	(0.10)	[57006]
	9(5, 5) – 9(5, 4)					(0,0,0)	13937.80	(0.10)	[57006]
	7(4, 4) – 7(4, 3)					(0,0,0)	22327.70	(0.10)	[59006]
	5(3, 3) – 5(3, 2)					(0,0,0)	33188.20	(0.10)	[59006]
	1(1, 1) – 1(1, 0)					(0,0,0)	41565.40	(0.10)	[59006]
	3(2, 2) – 3(2, 1)					(0,0,0)	43209.80	(0.10)	[59006]
$D_2{}^{82}Se$	1(1, 0) – 1(0, 1)					(0,0,0)	65971.71	(0.10)	[56011]
	2(2, 0) – 2(1, 1)					(0,0,0)	76612.14	(0.10)	[56011]
	3(3, 0) – 3(2, 1)					(0,0,0)	94462.12	(0.10)	[56011]
	2(1, 1) – 2(0, 2)					(0,0,0)	170277.03	(0.20)	[56011]
	1(1, 1) – 0(0, 0)					(0,0,0)	184981.28	(0.20)	[56011]
$D_2{}^{80}Se$	1(1, 0) – 1(0, 1)					(0,0,0)	66085.41	(0.10)	[56011]
	2(2, 0) – 2(1, 1)					(0,0,0)	76907.04	(0.10)	[56011]
	3(3, 0) – 3(2, 1)					(0,0,0)	95082.56	(0.10)	[56011]
	6(5, 1) – 6(4, 2)					(0,0,0)	160591.79	(0.20)	[69037]
	2(1, 1) – 2(0, 2)					(0,0,0)	170211.30	(0.20)	[56011]
	1(1, 1) – 0(0, 0)					(0,0,0)	185161.28	(0.20)	[56011]
$D_2{}^{78}Se$	1(1, 0) – 1(0, 1)					(0,0,0)	66204.87	(0.10)	[56011]

TABLE 47.5. The microwave spectrum of H_2Se—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$D_2{}^{78}Se$	2(2, 0) - 2(1, 1)					(0,0,0)	77216.40	(0.10)	[56011]
	3(3, 0) - 3(2, 1)					(0,0,0)	95733.92	(0.10)	[56011]
	2(1, 1) - 2(0, 2)					(0,0,0)	170142.70	(0.20)	[56011]
	1(1, 1) - 0(0, 0)					(0,0,0)	185350.80	(0.20)	[56011]
$D_2{}^{77}Se$	1(1, 0) - 1(0, 1)					(0,0,0)	66266.82	(0.10)	[56011]
	2(2, 0) - 2(1, 1)					(0,0,0)	77377.10	(0.10)	[56011]
	3(3, 0) - 3(2, 1)					(0,0,0)	96073.00	(0.10)	[56011]
	2(1, 1) - 2(0, 2)					(0,0,0)	170107.35	(0.20)	[56011]
	1(1, 1) - 0(0, 0)					(0,0,0)	185448.96	(0.20)	[56011]
$D_2{}^{76}Se$	1(1, 0) - 1(0, 1)					(0,0,0)	66330.78	(0.10)	[56011]
	2(2, 0) - 2(1, 1)					(0,0,0)	77542.71	(0.10)	[56011]
	3(3, 0) - 3(2, 1)					(0,0,0)	96423.40	(0.10)	[56011]
	2(1, 1) - 2(0, 2)					(0,0,0)	170071.51	(0.20)	[56011]
	1(1, 1) - 0(0, 0)					(0,0,0)	185549.92	(0.20)	[56011]

Table 48. Rotational and centrifugal distortion constants for NO_2.

Parameter	$^{14}N^{16}O_2$ Value (MHz)[a] [64008]	$^{15}N^{16}O_2$ Value (MHz) [64008]	$^{14}N^{16}O^{18}O$ Value (MHz) [64008]
A	239 868.7(110)	228 756.1(40)	235 802.5(150)
B	13 000.12(60)	13 003.06(20)	12 264.92(80)
C	12 303.45(60)	12 274.73(20)	11 632.71(80)
τ_{aaaa}	-299.4(4)	-273.4(40)	-284.4(40)
τ_{bbbb}	-0.04144(15)	-0.04144(15)	-0.03721(15)
τ_{aabb}	1.843(20)	1.761(20)	1.705(20)
τ_{abab}	-0.2453(10)	-0.2445(10)	-0.2188(10)
μ_b (D)	0.316(10)[b]	0.294(15)[c]	

[a] See Table 47.2 for constants derived from infrared and microwave spectra.

[b] Reference [63009].

[c] Reference [64009].

Table 48.1. Spin-rotation and hyperfine constants for NO_2.

Parameters	$^{14}N^{16}O_2$ Value (MHz) [66026]	$^{14}N^{16}O_2$ v_2=1 Value (MHz) [76019]	$^{15}N^{16}O_2$ Value (MHz) [66026]	$^{14}N^{16}O^{18}O$ Value (MHz) [64008]	$^{14}N^{16}O^{17}O$ Value (MHz) [66025]
A_s	5 401.76(7)	5 920.4(13)	5 149.07(10)	5 326.08(460)	5 369.58(250)
B_s	7.65(2)	6.4(3)	7.70(3)	7.72(5)	8.05(260)
C_s	-95.24(2)	-97.1(3)	-94.99(10)	-90.58(6)	-92.92(90)
$(0)_I$ (^{14}N or ^{15}N)	147.23(3)	147.0(2)	-206.46(6)	146.62(60)	147.28(5)
$(aa)_I$ (^{14}N or ^{15}N)	-22.16(7)	-22.2(4)	30.89(20)	-19.92(220)	-21.93(14)
$(cc)_I$ (^{14}N or ^{15}N)	-17.69(8)	-18.1(4)	25.11(20)	-18.85(130)	-17.00(24)
$(aa)_Q$ (^{14}N)	0.45(6)	0.45[a]		1.69(120)	0.41(8)
$(cc)_Q$ (^{14}N)	1.26(5)	1.26[a]		0.92(60)	1.33(15)
$(0)_I$ (^{17}O)					-63.76(3)
$(aa)_I$ (^{17}O)					50.48(8)
$(cc)_I$ (^{17}O)					55.85(10)
$(aa)_Q$ (^{17}O)					-0.202(14)
$(cc)_Q$ (^{17}O)					-0.009(16)

[a] Assumed value.

Additional references: [50018], [51014], [58004], [59010], [62003], [62004], [72042], [72043], [73049], [73065], [74008], [74016], [74017], [74018], [74019], [74020], [74023], [75015], [75016], [75027], [75028], [75029].

Table 48.2. Rotational constants for $^{14}NO_2$ ground state and (0,1,0) state from combined infrared and microwave spectra.

Parameters	Ground State Value (MHz) [76020][a]	(0,1,0) State Value (MHz) [75036][b]
$\mathcal{A}$	239 905.41(63)	251 027.(23)
$\mathcal{B}$	13 002.262(123)	13 000.13(234)
$\mathcal{C}$	12 304.888(66)	12 278.87(192)
Δ_K	80.94(39)	101.45(183)
Δ_{NK}	-0.5903(90)	-0.668(35)
Δ_N	9.033(90) 10^{-3}	9.033(90) 10^{-3}
δ_K	0.12(5)	0.12(5)
δ_N	9.303(288)$\times 10^{-4}$	9.303(288)$\times 10^{-4}$
H_K	0.0977(138)	0.0977(138)
H_{KN}	-7.26(165)$\times 10^{-4}$	-7.26(165)$\times 10^{-4}$
H_N	1.6(18)$\times 10^{-8}$	1.6(18)$\times 10^{-8}$
L_K	1.7(12)$\times 10^{-4}$	1.7(12)$\times 10^{-4}$

[a] See this reference for molecular constants for ν_3=1 also.

[b] The change in parameters between the ground state and ν_2=1 are reported. These changes are significant only for the values of $\mathcal{A}$, $\mathcal{B}$, $\mathcal{C}$, Δ_K and Δ_{NK} when compared to the uncertainty in the ground state constants.

TABLE 48.3. The microwave spectrum of NO_2

Isotopic species	$N'(K'_-,K'_+)$ – $N''(K''_-,K''_+)$	J'	F'	J''	F''	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{14}N^{16}O$	7(1, 7) – 8(0, 8)	13/2	13/2	15/2	15/2	(0,0,0)	14929.90	(0.20)	[56015]
	7(1, 7) – 8(0, 8)	13/2	15/2	15/2	17/2	(0,0,0)	14961.00	(0.20)	[56015]
	7(1, 7) – 8(0, 8)	13/2	11/2	15/2	13/2	(0,0,0)	15025.37	(0.20)	[56015]
	7(1, 7) – 8(0, 8)	15/2	13/2	15/2	15/2	(0,0,0)	15136.42	(0.20)	[56015]
	7(1, 7) – 8(0, 8)	15/2	15/2	15/2	17/2	(0,0,0)	15242.90	(0.20)	[56015]
	7(1, 7) – 8(0, 8)	13/2	15/2	17/2	17/2	(0,0,0)	15342.75	(0.20)	[56015]
	7(1, 7) – 8(0, 8)	13/2	13/2	17/2	15/2	(0,0,0)	15447.25	(0.20)	[56015]
	7(1, 7) – 8(0, 8)	15/2	17/2	17/2	19/2	(0,0,0)	15539.32	(0.20)	[56015]
	7(1, 7) – 8(0, 8)	15/2	15/2	17/2	17/2	(0,0,0)	15624.90	(0.20)	[56015]
	7(1, 7) – 8(0, 8)	15/2	13/2	17/2	15/2	(0,0,0)	15653.98	(0.20)	[56015]
	39(3,37) – 40(2,38)	77/2	75/2	79/2	77/2	(0,0,0)	16008.35	(0.50)	[56015]
	39(3,37) – 40(2,38)	77/2	77/2	79/2	79/2	(0,0,0)	16014.05	(0.50)	[56015]
	39(3,37) – 40(2,38)	77/2	79/2	79/2	81/2	(0,0,0)	16019.90	(0.50)	[56015]
	39(3,37) – 40(2,38)	79/2	81/2	81/2	83/2	(0,0,0)	16023.65	(0.50)	[56015]
	39(3,37) – 40(2,38)	79/2	79/2	81/2	81/2	(0,0,0)	16025.95	(0.50)	[56015]
	39(3,37) – 40(2,38)	79/2	77/2	81/2	79/2	(0,0,0)	16031.85	(0.50)	[56015]
	24(1,23) – 23(2,22)	49/2	47/2	47/2	45/2	(0,0,0)	26563.25	(0.50)	[64008]
	24(1,23) – 23(2,22)	49/2	51/2	47/2	49/2	(0,0,0)	26569.21	(0.50)	[64008]
	7(1, 7) – 8(0, 8)	13/2	13/2	15/2	15/2	(0,1,0)	25955.17	(0.50)	[76019]
	7(1, 7) – 8(0, 8)	13/2	15/2	15/2	17/2	(0,1,0)	25978.63	(0.50)	[76019]
	7(1, 7) – 8(0, 8)	13/2	11/2	15/2	13/2	(0,1,0)	26034.95	(0.50)	[76019]
	7(1, 7) – 8(0, 8)	15/2	13/2	15/2	15/2	(0,1,0)	26173.67	(0.50)	[76019]
	7(1, 7) – 8(0, 8)	15/2	15/2	15/2	17/2	(0,1,0)	26288.52	(0.50)	[76019]
	7(1, 7) – 8(0, 8)	13/2	15/2	17/2	17/2	(0,1,0)	26371.83	(0.50)	[76019]
	7(1, 7) – 8(0, 8)	13/2	13/2	17/2	15/2	(0,1,0)	26484.73	(0.50)	[76019]
	24(1,23) – 23(2,22)	49/2	49/2	47/2	47/2	(0,0,0)	26577.02	(0.50)	[64008]
	7(1, 7) – 8(0, 8)	15/2	17/2	17/2	19/2	(0,1,0)	26603.65	(0.50)	[76019]
	24(1,23) – 23(2,22)	47/2	49/2	45/2	47/2	(0,0,0)	26619.38	(0.50)	[64008]
	24(1,23) – 23(2,22)	47/2	47/2	45/2	45/2	(0,0,0)	26633.83	(0.50)	[64008]
	24(1,23) – 23(2,22)	47/2	45/2	45/2	43/2	(0,0,0)	26647.17	(0.50)	[64008]
	7(1, 7) – 8(0, 8)	15/2	15/2	17/2	17/2	(0,1,0)	26681.41	(0.50)	[76019]
	7(1, 7) – 8(0, 8)	15/2	13/2	17/2	15/2	(0,1,0)	26702.85	(0.50)	[76019]
	10(0,10) – 9(1, 9)	21/2	19/2	17/2	17/2	(0,1,0)	29460.85	(0.50)	[76019]
	10(0,10) – 9(1, 9)	21/2	21/2	17/2	19/2	(0,1,0)	29564.82	(0.50)	[76019]
	10(0,10) – 9(1, 9)	21/2	23/2	19/2	21/2	(0,1,0)	29740.56	(0.50)	[76019]
	10(0,10) – 9(1, 9)	21/2	19/2	19/2	17/2	(0,1,0)	29753.64	(0.50)	[76019]
	10(0,10) – 9(1, 9)	21/2	21/2	19/2	19/2	(0,1,0)	29791.65	(0.50)	[76019]
	10(0,10) – 9(1, 9)	19/2	21/2	17/2	19/2	(0,1,0)	30042.52	(0.50)	[76019]
	10(0,10) – 9(1, 9)	19/2	19/2	17/2	17/2	(0,1,0)	30081.49	(0.50)	[76019]
	10(0,10) – 9(1, 9)	19/2	17/2	17/2	15/2	(0,1,0)	30113.90	(0.50)	[76019]
	10(0,10) – 9(1, 9)	19/2	21/2	19/2	19/2	(0,1,0)	30268.69	(0.50)	[76019]
	10(0,10) – 9(1, 9)	19/2	19/2	19/2	17/2	(0,1,0)	30374.98	(0.50)	[76019]
	21(2,20) – 22(1,21)	41/2	39/2	43/2	41/2	(0,0,0)	39066.7	(0.50)	[64008]
	21(2,20) – 22(1,21)	41/2	41/2	43/2	43/2	(0,0,0)	39097.8	(0.50)	[64008]
	21(2,20) – 22(1,21)	43/2	43/2	43/2	45/2	(0,0,0)	39142.46	(0.50)	[64008]
	21(2,20) – 22(1,21)	41/2	43/2	45/2	45/2	(0,0,0)	39192.94	(0.50)	[64008]
	21(2,20) – 22(1,21)	43/2	41/2	45/2	43/2	(0,0,0)	39235.98	(0.50)	[64008]
	21(2,20) – 22(1,21)	43/2	45/2	45/2	47/2	(0,0,0)	39247.28	(0.50)	[64008]
	10(0,10) – 9(1, 9)	19/2	19/2	19/2	17/2	(0,0,0)	40357.96	(0.50)	[64008]
	10(0,10) – 9(1, 9)	19/2	21/2	19/2	19/2	(0,0,0)	40467.44	(0.50)	[64008]
	10(0,10) – 9(1, 9)	21/2	23/2	19/2	21/2	(0,0,0)	40661.38	(0.50)	[64008]
	10(0,10) – 9(1, 9)	21/2	23/2	19/2	19/2	(0,0,0)	40661.38	(0.50)	[64008]
	10(0,10) – 9(1, 9)	21/2	19/2	19/2	17/2	(0,0,0)	40671.06	(0.50)	[64008]
	10(0,10) – 9(1, 9)	21/2	21/2	19/2	19/2	(0,0,0)	40703.20	(0.50)	[64008]
	10(0,10) – 9(1, 9)	19/2	21/2	17/2	19/2	(0,0,0)	40931.18	(0.50)	[64008]
	10(0,10) – 9(1, 9)	19/2	19/2	17/2	17/2	(0,0,0)	40964.38	(0.50)	[64008]
	10(0,10) – 9(1, 9)	19/2	17/2	17/2	15/2	(0,0,0)	40993.38	(0.50)	[64008]
	10(0,10) – 9(1, 9)	21/2	21/2	17/2	19/2	(0,0,0)	41167.52	(0.50)	[64008]
	10(0,10) – 9(1, 9)	21/2	19/2	17/2	17/2	(0,0,0)	41277.92	(0.50)	[64008]
	5(1, 5) – 6(0, 6)	9/2	11/2	11/2	11/2	(0,0,0)	69682.08	(0.05)	[74034]
	5(1, 5) – 6(0, 6)	11/2	9/2	9/2	9/2	(0,0,0)	69704.8	(0.05)	[74034]
	5(1, 5) – 6(0, 6)	9/2	11/2	11/2	13/2	(0,0,0)	69745.49	(0.05)	[74034]
	5(1, 5) – 6(0, 6)	9/2	9/2	11/2	11/2	(0,0,0)	69750.37	(0.05)	[74034]
	5(1, 5) – 6(0, 6)	9/2	7/2	11/2	9/2	(0,0,0)	69786.60	(0.05)	[74034]
	5(1, 5) – 6(0, 6)	9/2	11/2	13/2	13/2	(0,0,0)	70057.28	(0.05)	[74034]

TABLE 48.3. The microwave spectrum of NO_2—Continued

Isotopic species	$N'(K'_-,K'_+)$ – $N''(K''_-,K''_+)$	J'	F'	J''	F''	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{14}N^{16}O$	5(1, 5) – 6(0, 6)	9/2	9/2	13/2	11/2	(0,0,0)	70186.46	(0.05)	[74034]
	5(1, 5) – 6(0, 6)	11/2	9/2	11/2	11/2	(0,0,0)	70209.97	(0.05)	[74034]
	5(1, 5) – 6(0, 6)	11/2	11/2	11/2	11/2	(0,0,0)	70278.84	(0.05)	[74034]
	5(1, 5) – 6(0, 6)	11/2	11/2	11/2	13/2	(0,0,0)	70342.18	(0.05)	[74034]
	5(1, 5) – 6(0, 6)	11/2	13/2	11/2	13/2	(0,0,0)	70406.86	(0.05)	[74034]
	5(1, 5) – 6(0, 6)	11/2	13/2	13/2	15/2	(0,0,0)	70589.69	(0.05)	[74034]
	5(1, 5) – 6(0, 6)	11/2	9/2	13/2	11/2	(0,0,0)	70646.19	(0.05)	[74034]
	5(1, 5) – 6(0, 6)	11/2	11/2	13/2	13/2	(0,0,0)	70654.05	(0.05)	[74034]
	5(1, 5) – 6(0, 6)	11/2	11/2	13/2	11/2	(0,0,0)	70714.90	(0.05)	[74034]
	5(1, 5) – 6(0, 6)	11/2	13/2	13/2	13/2	(0,0,0)	70718.67	(0.05)	[74034]
	3(1, 3) – 4(0, 4)	5/2	7/2	7/2	9/2	(0,0,0)	123046.11	(0.05)	[66026]
	3(1, 3) – 4(0, 4)	5/2	5/2	7/2	7/2	(0,0,0)	123062.38	(0.05)	[66026]
	3(1, 3) – 4(0, 4)	5/2	3/2	7/2	5/2	(0,0,0)	123084.32	(0.05)	[66026]
	3(1, 3) – 4(0, 4)	7/2	7/2	7/2	9/2	(0,0,0)	123304.79	(0.10)	[66026]
	3(1, 3) – 4(0, 4)	5/2	7/2	9/2	9/2	(0,0,0)	124281.40	(0.10)	[66026]
	3(1, 3) – 4(0, 4)	7/2	9/2	9/2	11/2	(0,0,0)	124474.64	(0.05)	[66026]
	3(1, 3) – 4(0, 4)	7/2	5/2	9/2	7/2	(0,0,0)	124518.41	(0.05)	[66026]
	3(1, 3) – 4(0, 4)	7/2	7/2	9/2	9/2	(0,0,0)	124539.97	(0.05)	[66026]
	1(1, 1) – 2(0, 2)	1/2	3/2	3/2	3/2	(0,0,0)	173417.55	(0.10)	[66026]
	1(1, 1) – 2(0, 2)	1/2	1/2	3/2	1/2	(0,0,0)	173428.90	(0.10)	[66026]
	1(1, 1) – 2(0, 2)	1/2	1/2	3/2	3/2	(0,0,0)	173453.25	(0.10)	[66026]
	1(1, 1) – 2(0, 2)	1/2	3/2	3/2	5/2	(0,0,0)	173457.91	(0.10)	[66026]
	1(1, 1) – 2(0, 2)	1/2	3/2	5/2	5/2	(0,0,0)	173688.09	(0.25)	[66026]
	1(1, 1) – 2(0, 2)	3/2	3/2	3/2	3/2	(0,0,0)	177253.88	(0.20)	[66026]
	1(1, 1) – 2(0, 2)	3/2	3/2	3/2	5/2	(0,0,0)	177294.33	(0.15)	[66026]
	1(1, 1) – 2(0, 2)	3/2	5/2	3/2	5/2	(0,0,0)	177407.38	(0.10)	[66026]
	1(1, 1) – 2(0, 2)	3/2	5/2	5/2	7/2	(0,0,0)	177459.99	(0.05)	[66026]
	1(1, 1) – 2(0, 2)	3/2	1/2	5/2	3/2	(0,0,0)	177487.33	(0.10)	[66026]
	1(1, 1) – 2(0, 2)	3/2	3/2	5/2	5/2	(0,0,0)	177524.62	(0.05)	[66026]
	1(1, 1) – 2(0, 2)	3/2	3/2	5/2	3/2	(0,0,0)	177557.33	(0.15)	[66026]
	1(1, 1) – 2(0, 2)	3/2	5/2	5/2	5/2	(0,0,0)	177637.76	(0.25)	[66026]
$^{16}O^{15}N^{16}O$	21(2,20) – 22(1,21)	41/2	20	43/2	21	(0,0,0)	2746.51	(0.30)	[63018]
	21(2,20) – 22(1,21)	41/2	21	43/2	22	(0,0,0)	2767.35	(0.30)	[63018]
	21(2,20) – 22(1,21)	43/2	21	45/2	22	(0,0,0)	2861.82	(0.20)	[63018]
	21(2,20) – 22(1,21)	43/2	22	45/2	23	(0,0,0)	2902.11	(0.30)	[63018]
	7(1, 7) – 8(0, 8)	13/2	7	15/2	8	(0,0,0)	3660.75	(0.24)	[63018]
	7(1, 7) – 8(0, 8)	13/2	6	15/2	7	(0,0,0)	3759.69	(0.05)	[63018]
	7(1, 7) – 8(0, 8)	15/2	7	15/2	8	(0,0,0)	3900.57	(0.10)	[63018]
	7(1, 7) – 8(0, 8)	15/2	6	15/2	7	(0,0,0)	4082.16	(0.15)	[63018]
	7(1, 7) – 8(0, 8)	15/2	8	17/2	9	(0,0,0)	4243.94	(0.05)	[63018]
	7(1, 7) – 8(0, 8)	15/2	7	17/2	8	(0,0,0)	4321.59	(0.06)	[63018]
	10(0,10) – 9(1, 9)	21/2	11	19/2	10	(0,0,0)	52109.4	(0.5)	[64008]
	10(0,10) – 9(1, 9)	21/2	10	19/2	9	(0,0,0)	52149.8	(0.5)	[64008]
	10(0,10) – 9(1, 9)	19/2	10	17/2	9	(0,0,0)	52398.4	(0.5)	[64008]
	10(0,10) – 9(1, 9)	19/2	9	17/2	8	(0,0,0)	52419.2	(0.5)	[64008]
	5(1, 5) – 6(0, 6)	9/2	5	11/2	6	(0,0,0)	58583.23	(0.10)	[64008]
	5(1, 5) – 6(0, 6)	9/2	4	11/2	5	(0,0,0)	58650.08	(0.10)	[64008]
	5(1, 5) – 6(0, 6)	11/2	6	13/2	7	(0,0,0)	59411.47	(0.10)	[64008]
	5(1, 5) – 6(0, 6)	11/2	5	13/2	6	(0,0,0)	59457.01	(0.10)	[64008]
	12(0,12) – 11(1,11)	25/2	13	23/2	12	(0,0,0)	109559.23	(0.20)	[64008]
	12(0,12) – 11(1,11)	25/2	12	23/2	11	(0,0,0)	109576.98	(0.20)	[64008]
	12(0,12) – 11(1,11)	23/2	11	21/2	10	(0,0,0)	109743.01	(0.20)	[64008]
	12(0,12) – 11(1,11)	23/2	12	21/2	11	(0,0,0)	109743.83	(0.20)	[64008]
	3(1, 3) – 4(0, 4)	5/2	3	7/2	4	(0,0,0)	111969.09	(0.20)	[64008]
	3(1, 3) – 4(0, 4)	5/2	2	7/2	3	(0,0,0)	112040.39	(0.20)	[64008]
	3(1, 3) – 4(0, 4)	7/2	4	9/2	5	(0,0,0)	113362.39	(0.20)	[64008]
	3(1, 3) – 4(0, 4)	7/2	3	9/2	4	(0,0,0)	113409.41	(0.20)	[64008]
$^{16}O^{14}N^{18}O$	7(1, 7) – 8(0, 8)	13/2	13/2	15/2	15/2	(0,0,0)	23674.33	(0.20)	[64008]
	7(1, 7) – 8(0, 8)	13/2	15/2	15/2	17/2	(0,0,0)	23701.45	(0.20)	[64008]
	7(1, 7) – 8(0, 8)	13/2	11/2	15/2	13/2	(0,0,0)	23765.13	(0.20)	[64008]
	7(1, 7) – 8(0, 8)	13/2	15/2	17/2	17/2	(0,0,0)	23883.98	(0.20)	[64008]
	7(1, 7) – 8(0, 8)	15/2	15/2	15/2	17/2	(0,0,0)	23992.66	(0.20)	[64008]
	7(1, 7) – 8(0, 8)	15/2	13/2	15/2	15/2	(0,0,0)	24065.1	(0.20)	[64008]
	7(1, 7) – 8(0, 8)	13/2	13/2	17/2	15/2	(0,0,0)	24171.7	(0.20)	[64008]
	7(1, 7) – 8(0, 8)	15/2	17/2	17/2	19/2	(0,0,0)	24271.2	(0.20)	[64008]

TABLE 48.3. The microwave spectrum of NO_2—Continued

Isotopic species	$N'(K'_-,K'_+)$ – $N''(K''_-,K''_+)$	J'	F'	J''	F''	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{14}N^{18}O$	7(1, 7) – 8(0, 8)	15/2	15/2	17/2	17/2	(0,0,0)	24356.14	(0.20)	[64008]
	7(1, 7) – 8(0, 8)	15/2	13/2	17/2	15/2	(0,0,0)	24381.5	(0.20)	[64008]
	25(1,24) – 24(2,23)	51/2	49/2	49/2	47/2	(0,0,0)	25025.0	(0.20)	[64008]
	25(1,24) – 24(2,23)	51/2	53/2	49/2	51/2	(0,0,0)	25033.4	(0.20)	[64008]
	25(1,24) – 24(2,23)	51/2	51/2	49/2	49/2	(0,0,0)	25035.8	(0.20)	[64008]
	25(1,24) – 24(2,23)	49/2	51/2	47/2	49/2	(0,0,0)	25056.8	(0.20)	[64008]
	25(1,24) – 24(2,23)	49/2	49/2	47/2	47/2	(0,0,0)	25068.18	(0.20)	[64008]
	25(1,24) – 24(2,23)	49/2	47/2	47/2	45/2	(0,0,0)	25079.3	(0.20)	[64008]
	10(0,10) – 9(1, 9)	19/2	21/2	19/2	19/2	(0,0,0)	28446.98	(0.20)	[64008]
	10(0,10) – 9(1, 9)	21/2	23/2	19/2	21/2	(0,0,0)	28626.13	(0.20)	[64008]
	10(0,10) – 9(1, 9)	21/2	19/2	19/2	17/2	(0,0,0)	28638.28	(0.20)	[64008]
	10(0,10) – 9(1, 9)	21/2	21/2	19/2	19/2	(0,0,0)	28674.0	(0.20)	[64008]
	10(0,10) – 9(1, 9)	19/2	21/2	17/2	19/2	(0,0,0)	28886.61	(0.20)	[64008]
	10(0,10) – 9(1, 9)	19/2	19/2	17/2	17/2	(0,0,0)	28923.86	(0.20)	[64008]
	10(0,10) – 9(1, 9)	19/2	17/2	17/2	15/2	(0,0,0)	28954.85	(0.20)	[64008]
	10(0,10) – 9(1, 9)	19/2	19/2	19/2	17/2	(0,0,0)	29114.35	(0.20)	[64008]
	10(0,10) – 9(1, 9)	21/2	19/2	17/2	17/2	(0,0,0)	29218.7	(0.20)	[64008]
	22(2,21) – 23(1,22)	43/2		45/2		(0,0,0)	37021.45	(0.50)	[65019]
	22(2,21) – 23(1,22)	43/2		45/2		(0,0,0)	37024.46	(0.50)	[65019]
	22(2,21) – 23(1,22)	43/2		45/2		(0,0,0)	37055.26	(0.50)	[65019]
	22(2,21) – 23(1,22)	45/2		47/2		(0,0,0)	37116.43	(0.50)	[65019]
	22(2,21) – 23(1,22)	45/2		47/2		(0,0,0)	37147.47	(0.50)	[65019]
	22(2,21) – 23(1,22)	45/2		47/2		(0,0,0)	37151.20	(0.50)	[65019]
$^{16}O^{14}N^{17}O$	7(1, 7) – 8(0, 8)	9	2	10	5	(0,0,0)	19408.3	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	8	2	9	5	(0,0,0)	19433.0	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	10	1	11	3	(0,0,0)	19455.8	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	8	3	9	6	(0,0,0)	19458.2	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	9	1	10	4	(0,0,0)	19463.2	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	8	1	9	4	(0,0,0)	19481.8	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	7	3	8	6	(0,0,0)	19492.5	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	7	1	8	4	(0,0,0)	19504.5	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	8	2	9	4	(0,0,0)	19542.4	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	9	3	10	5	(0,0,0)	19549.0	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	8	3	9	5	(0,0,0)	19561.7	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	7	2	8	4	(0,0,0)	19563.8	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	5	3	6	5	(0,0,0)	19573.3	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	6	2	7	4	(0,0,0)	19586.0	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	7	3	8	5	(0,0,0)	19589.1	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	8	4	9	6	(0,0,0)	19596.3	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	5	2	6	3	(0,0,0)	19612.7	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	4	2	5	3	(0,0,0)	19615.0	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	6	3	7	5	(0,0,0)	19621.2	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	8	5	9	6	(0,0,0)	19649.0	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	5	3	6	4	(0,0,0)	19655.3	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	9	3	10	4	(0,0,0)	19666.2	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	8	3	9	4	(0,0,0)	19671.2	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	9	4	10	5	(0,0,0)	19672.0	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	7	3	8	4	(0,0,0)	19689.8	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	4	2	5	2	(0,0,0)	19693.0	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	8	4	9	5	(0,0,0)	19699.4	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	6	3	7	4	(0,0,0)	19711.7	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	6	4	7	6	(0,0,0)	19713.6	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	7	5	8	6	(0,0,0)	19715.2	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	5	3	6	3	(0,0,0)	19739.2	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	8	5	9	5	(0,0,0)	19752.7	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	7	4	8	5	(0,0,0)	19755.7	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	10	3	11	3	(0,0,0)	19772.7	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	9	1	10	3	(0,0,0)	19786.5	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	5	1	6	2	(0,0,0)	19788.6	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	4	3	5	3	(0,0,0)	19807.5	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	6	1	7	2	(0,0,0)	19808.3	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	7	5	8	5	(0,0,0)	19811.5	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	5	5	6	5	(0,0,0)	19818.9	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	7	1	8	2	(0,0,0)	19839.5	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	5	2	6	2	(0,0,0)	19842.9	(0.5)	[66025]

TABLE 48.3. The microwave spectrum of NO_2—Continued

Isotopic species	$N'(K'_-,K'_+)$ – $N''(K''_-,K''_+)$	J'	F'	J''	F''	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{14}N^{17}O$	7(1, 7) – 8(0, 8)	9	2	10	3	(0,0,0)	19848.7	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	9	5	10	4	(0,0,0)	19853.4	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	6	5	7	5	(0,0,0)	19859.4	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	8	1	9	2	(0,0,0)	19881.6	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	4	1	5	1	(0,0,0)	19885.5	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	6	4	7	4	(0,0,0)	19893.1	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	8	6	9	4	(0,0,0)	19913.0	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	8	3	9	3	(0,0,0)	19916.1	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	5	2	6	1	(0,0,0)	19918.4	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	5	4	6	3	(0,0,0)	19928.9	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	9	1	10	2	(0,0,0)	19937.9	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	8	2	9	2	(0,0,0)	19942.4	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	6	2	7	1	(0,0,0)	19954.9	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	7	6	8	4	(0,0,0)	19957.8	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	5	5	6	3	(0,0,0)	19985.6	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	6	6	7	4	(0,0,0)	19990.6	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	7	2	8	1	(0,0,0)	19997.3	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	6	4	7	3	(0,0,0)	20000.2	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	10	1	11	1	(0,0,0)	20014.4	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	7	3	8	2	(0,0,0)	20024.7	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	8	2	9	1	(0,0,0)	20048.8	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	9	1	10	1	(0,0,0)	20051.3	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	8	4	9	3	(0,0,0)	20054.0	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	6	5	7	3	(0,0,0)	20057.6	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	10	2	11	2	(0,0,0)	20069.9	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	6	3	7	1	(0,0,0)	20080.4	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	7	5	8	3	(0,0,0)	20086.0	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	6	6	7	3	(0,0,0)	20097.3	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	8	5	9	3	(0,0,0)	20107.3	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	9	2	10	1	(0,0,0)	20112.9	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	9	4	10	3	(0,0,0)	20112.9	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	7	3	8	1	(0,0,0)	20123.6	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	7	6	8	3	(0,0,0)	20131.5	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	9	3	10	2	(0,0,0)	20140.8	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	11	1	12	1	(0,0,0)	20153.6	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	8	6	9	3	(0,0,0)	20158.2	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	6	4	7	2	(0,0,0)	20173.4	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	9	5	10	3	(0,0,0)	20176.5	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	10	3	11	2	(0,0,0)	20181.9	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	7	4	8	2	(0,0,0)	20191.0	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	4	3	5	1	(0,0,0)	20205.8	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	8	4	9	2	(0,0,0)	20208.8	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	5	5	6	2	(0,0,0)	20215.6	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	10	2	11	1	(0,0,0)	20219.1	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	6	5	7	2	(0,0,0)	20230.4	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	5	4	6	1	(0,0,0)	20233.9	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	9	3	10	1	(0,0,0)	20253.8	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	6	4	7	1	(0,0,0)	20261.8	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	8	6	9	2	(0,0,0)	20312.8	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	8	4	9	1	(0,0,0)	20315.9	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	6	5	7	1	(0,0,0)	20318.9	(0.5)	[66025]
	10(0,10) – 9(1, 9)	11	3	10	4	(0,0,0)	34198.6	(0.5)	[66025]
	10(0,10) – 9(1, 9)	12	1	11	2	(0,0,0)	34201.6	(0.5)	[66025]
	10(0,10) – 9(1, 9)	11	2	10	3	(0,0,0)	34207.7	(0.5)	[66025]
	10(0,10) – 9(1, 9)	10	2	9	3	(0,0,0)	34225.0	(0.5)	[66025]
	10(0,10) – 9(1, 9)	11	1	10	2	(0,0,0)	34238.4	(0.5)	[66025]
	10(0,10) – 9(1, 9)	14	1	13	1	(0,0,0)	34248.9	(0.5)	[66025]
	10(0,10) – 9(1, 9)	12	1	11	1	(0,0,0)	34256.9	(0.5)	[66025]
	10(0,10) – 9(1, 9)	10	1	9	2	(0,0,0)	34269.6	(0.5)	[66025]
	10(0,10) – 9(1, 9)	13	1	12	1	(0,0,0)	34277.2	(0.5)	[66025]
	10(0,10) – 9(1, 9)	13	2	12	2	(0,0,0)	34292.1	(0.5)	[66025]
	10(0,10) – 9(1, 9)	9	1	8	2	(0,0,0)	34297.3	(0.5)	[66025]
	10(0,10) – 9(1, 9)	11	1	10	1	(0,0,0)	34298.3	(0.5)	[66025]
	10(0,10) – 9(1, 9)	9	3	8	4	(0,0,0)	34300.7	(0.5)	[66025]
	10(0,10) – 9(1, 9)	12	2	11	2	(0,0,0)	34316.2	(0.5)	[66025]

TABLE 48.3. The microwave spectrum of NO_2—Continued

Isotopic species	$N'(K'_-,K'_+)$ – $N''(K''_-,K''_+)$	J'	F'	J''	F''	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{14}N^{17}O$	10(0,10) – 9(1, 9)	8	1	7	2	(0,0,0)	34322.6	(0.5)	[66025]
	10(0,10) – 9(1, 9)	12	3	11	3	(0,0,0)	34327.7	(0.5)	[66025]
	10(0,10) – 9(1, 9)	10	1	9	1	(0,0,0)	34330.9	(0.5)	[66025]
	10(0,10) – 9(1, 9)	11	2	10	2	(0,0,0)	34348.9	(0.5)	[66025]
	10(0,10) – 9(1, 9)	11	3	10	3	(0,0,0)	34356.0	(0.5)	[66025]
	10(0,10) – 9(1, 9)	9	1	8	1	(0,0,0)	34356.0	(0.5)	[66025]
	10(0,10) – 9(1, 9)	12	2	11	1	(0,0,0)	34371.5	(0.5)	[66025]
	10(0,10) – 9(1, 9)	8	1	7	1	(0,0,0)	34372.7	(0.5)	[66025]
	10(0,10) – 9(1, 9)	10	2	9	2	(0,0,0)	34375.5	(0.5)	[66025]
	10(0,10) – 9(1, 9)	10	3	9	3	(0,0,0)	34377.9	(0.5)	[66025]
	10(0,10) – 9(1, 9)	7	1	6	1	(0,0,0)	34377.9	(0.5)	[66025]
	10(0,10) – 9(1, 9)	9	3	8	3	(0,0,0)	34393.4	(0.5)	[66025]
	10(0,10) – 9(1, 9)	9	2	8	2	(0,0,0)	34397.2	(0.5)	[66025]
	10(0,10) – 9(1, 9)	11	2	10	1	(0,0,0)	34408.8	(0.5)	[66025]
	10(0,10) – 9(1, 9)	8	2	7	2	(0,0,0)	34414.6	(0.5)	[66025]
	10(0,10) – 9(1, 9)	8	3	7	4	(0,0,0)	34423.3	(0.5)	[66025]
	10(0,10) – 9(1, 9)	9	4	8	5	(0,0,0)	34428.2	(0.5)	[66025]
	10(0,10) – 9(1, 9)	10	2	9	1	(0,0,0)	34436.6	(0.5)	[66025]
	10(0,10) – 9(1, 9)	10	4	9	5	(0,0,0)	34444.7	(0.5)	[66025]
	10(0,10) – 9(1, 9)	9	2	8	1	(0,0,0)	34455.8	(0.5)	[66025]
	10(0,10) – 9(1, 9)	7	2	6	3	(0,0,0)	34461.2	(0.5)	[66025]
	10(0,10) – 9(1, 9)	8	4	7	5	(0,0,0)	34465.2	(0.5)	[66025]
	10(0,10) – 9(1, 9)	11	4	10	5	(0,0,0)	34469.9	(0.5)	[66025]
	10(0,10) – 9(1, 9)	9	5	8	6	(0,0,0)	34480.6	(0.5)	[66025]
	10(0,10) – 9(1, 9)	9	4	8	4	(0,0,0)	34483.4	(0.5)	[66025]
	10(0,10) – 9(1, 9)	8	3	7	3	(0,0,0)	34509.0	(0.5)	[66025]
	10(0,10) – 9(1, 9)	8	4	7	4	(0,0,0)	34520.9	(0.5)	[66025]
	10(0,10) – 9(1, 9)	9	5	8	5	(0,0,0)	34530.5	(0.5)	[66025]
	10(0,10) – 9(1, 9)	11	4	10	4	(0,0,0)	34531.5	(0.5)	[66025]
	10(0,10) – 9(1, 9)	11	5	10	6	(0,0,0)	34541.2	(0.5)	[66025]
	10(0,10) – 9(1, 9)	7	2	6	2	(0,0,0)	34542.8	(0.5)	[66025]
	10(0,10) – 9(1, 9)	7	3	6	3	(0,0,0)	34547.5	(0.5)	[66025]
	10(0,10) – 9(1, 9)	10	5	9	5	(0,0,0)	34552.8	(0.5)	[66025]
	10(0,10) – 9(1, 9)	8	5	7	5	(0,0,0)	34554.8	(0.5)	[66025]
	10(0,10) – 9(1, 9)	12	4	11	4	(0,0,0)	34562.7	(0.5)	[66025]
	10(0,10) – 9(1, 9)	6	1	5	1	(0,0,0)	34566.3	(0.5)	[66025]
	10(0,10) – 9(1, 9)	9	6	8	6	(0,0,0)	34575.2	(0.5)	[66025]
	10(0,10) – 9(1, 9)	9	4	8	3	(0,0,0)	34576.2	(0.5)	[66025]
	10(0,10) – 9(1, 9)	11	5	10	5	(0,0,0)	34583.2	(0.5)	[66025]
	10(0,10) – 9(1, 9)	9	5	8	4	(0,0,0)	34585.5	(0.5)	[66025]
	10(0,10) – 9(1, 9)	13	3	12	3	(0,0,0)	34599.2	(0.5)	[66025]
	10(0,10) – 9(1, 9)	8	4	7	3	(0,0,0)	34606.9	(0.5)	[66025]
	10(0,10) – 9(1, 9)	10	6	9	6	(0,0,0)	34605.8	(0.5)	[66025]
$^{16}O^{14}N^{16}O$ $^2B_2$	9(0, 9) – 8(1, 8)	19/2	19/2	17/2	19/2	(0,0,0)	24360.9	(0.5)	[74019]
	9(0, 9) – 8(1, 8)	19/2	17/2	17/2	17/2	(0,0,0)	24368.1	(0.5)	[74019]
	9(0, 9) – 8(1, 8)	19/2	21/2	17/2	19/2	(0,0,0)	24399.0	(0.5)	[74019]
	9(0, 9) – 8(1, 8)	19/2	19/2	17/2	17/2	(0,0,0)	24402.0	(0.5)	[74019]
	9(0, 9) – 8(1, 8)	19/2	17/2	17/2	15/2	(0,0,0)	24403.5	(0.5)	[74019]
	6(1, 6) – 7(0, 7)	11/2	13/2	13/2	13/2	(0,0,0)	25291.4	(0.5)	[76018]
	6(1, 6) – 7(0, 7)	11/2	11/2	13/2	11/2	(0,0,0)	25294.4	(0.5)	[76018]
	6(1, 6) – 7(0, 7)	11/2	9/2	13/2	11/2	(0,0,0)	25327.2	(0.5)	[76018]
	6(1, 6) – 7(0, 7)	11/2	11/2	13/2	13/2	(0,0,0)	25328.4	(0.5)	[76018]
	6(1, 6) – 7(0, 7)	11/2	13/2	13/2	15/2	(0,0,0)	25330.8	(0.5)	[76018]
	6(1, 6) – 7(0, 7)	13/2	11/2	13/2	11/2	(0,0,0)	31508.7	(0.5)	[76018]
	6(1, 6) – 7(0, 7)	13/2	13/2	13/2	13/2	(0,0,0)	31553.0	(0.5)	[76018]
	6(1, 6) – 7(0, 7)	13/2	15/2	13/2	15/2	(0,0,0)	31604.6	(0.5)	[76018]
	9(0, 9) – 8(1, 8)	17/2	19/2	15/2	17/2	(0,0,0)	33085.3	(0.5)	[74019]
	9(0, 9) – 8(1, 8)	17/2	17/2	15/2	15/2	(0,0,0)	33090.0	(0.5)	[74019]
	9(0, 9) – 8(1, 8)	17/2	15/2	15/2	13/2	(0,0,0)	33093.7	(0.5)	[74019]
	9(0, 9) – 8(1, 8)	17/2	17/2	15/2	17/2	(0,0,0)	33125.0	(0.5)	[74019]
	9(0, 9) – 8(1, 8)	17/2	15/2	15/2	15/2	(0,0,0)	33125.0	(0.5)	[74019]
	9(0, 9) – 8(1, 8)	17/2	19/2	17/2	19/2	(0,0,0)	38119.6	(0.5)	[74019]
	9(0, 9) – 8(1, 8)	17/2	17/2	17/2	17/2	(0,0,0)	38200.4	(0.5)	[74019]
	9(0, 9) – 8(1, 8)	17/2	15/2	17/2	15/2	(0,0,0)	38270.8	(0.5)	[74019]
	6(1, 6) – 7(0, 7)	13/2	15/2	15/2	17/2	(0,0,0)	42371.6	(0.5)	[76018]

TABLE 48.3. The microwave spectrum of NO_2—Continued

Isotopic species	$N'(K'_-,K'_+)$ - $N''(K''_-,K''_+)$	J'	F'	J''	F''	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{14}N^{16}O$ $^2B_2$	6(1, 6) - 7(0, 7)	13/2	13/2	15/2	15/2	(0,0,0)	42400.2	(0.5)	[76018]
	6(1, 6) - 7(0, 7)	13/2	15/2	15/2	15/2	(0,0,0)	42412.4	(0.5)	[76018]
	6(1, 6) - 7(0, 7)	13/2	11/2	15/2	13/2	(0,0,0)	42425.8	(0.5)	[76018]
	6(1, 6) - 7(0, 7)	13/2	13/2	15/2	13/2	(0,0,0)	42436.0	(0.5)	[76018]

Table 49. Rotational and centrifugal distortion constants for N_2O[a].

Isotopic Species	Vib. State[b] v_1 v_2^{ℓ} v_3	B_v (MHz)	D_v (kHz)	H_v (Hz)	Reference
$^{14}N^{14}N^{16}O$	0 0^0 0	12 561.6348(21)	5.2808(61)	+0.0008(57)	[76028]
	1 0^0 0	12 458.1706	5.17		[75018]
	0 1^{1c}0	12 566.6411(21)	5.3539(61)	+0.0057(57)	[76028]
	0 1^{1d}0	12 590.3906(21)	5.4002(61)	+0.0197(57)	[76028]
	0 2^0 0	12 588.8913(21)	7.4403(61)	+0.0825(57)	[76028]
	0 2^{2c}0	12 595.0614(21)	3.6281(61)	-0.0702(57)	[76028]
	0 2^{2d}0	12 595.0692(21)	5.4482(61)	+0.0029(57)	[76028]
	0 3^{1c}0	12 578.8241(68)	6.340(19)	+0.039(18)	[76028]
	0 3^{1d}0	12 623.6200(68)	6.494(19)	-0.035(18)	[76028]
	0 3^3 0	12 611.2577(72)	4.742(20)	-0.102(18)	[76028]
	0 0^0 1	12 508.9923(31)	5.1726(86)	+0.0018(77)	[76028]
	0 1^{1c}1	12 515.270(15)	5.233(38)	-0.001(33)	[76028]
	0 1^{1d}1	12 542.493(15)	5.120(38)	-0.023(33)	[76028]
$^{14}N^{15}N^{16}O$	0 0^0 0	12 560.7310(21)	5.2682(61)	-0.0081(57)	[76028]
	0 1^{1c}0	12 564.5298(99)	5.319(27)	-0.021(24)	[76028]
	0 1^{1d}0	12 588.8168(68)	5.368(19)	-0.003(18)	[76028]
$^{15}N^{14}N^{16}O$	0 0^0 0	12 137.3103(22)	4.8896(57)	-0.0113(49)	[76028]
	0 1^{1c}0	12 142.711(10)	4.960(25)	-0.004(20)	[76028]
	0 1^{1d}0	12 164.996(10)	4.972(25)	-0.016(20)	[76028]
$^{15}N^{15}N^{16}O$	0 0^0 0	12 137.40(3)	5.2[c]		[49009]
$^{14}N^{14}N^{17}O$	0 0^0 0	12 191.719(10)	4.987(25)	-0.004(20)	[76028]
$^{14}N^{14}N^{18}O$	0 0^0 0	11 859.1097(22)	4.7274(57)	-0.0119(49)	[76028]
	0 1^{1c}0	11 864.545(10)	4.772(25)	-0.020(20)	[76028]
	0 1^{1d}0	11 885.913(15)	4.857(36)	+0.023(28)	[76028]

[a] For a detailed analysis of the ℓ-doubling and Fermi resonances in N_2O see Andreev et al. [76028] and the results in Tables 49.1 and 49.2.

[b] With the exception of the $(0,2^2,0)$ state, the c and d labels associated with the ℓ quantum number correlate with the L (lower) and U (upper) labels, respectively, in Table 49.4, while the reverse correlation holds for the $(0,2^2,0)$ c and d states.

[c] Assumed value.

Table 49.1. Molecular constants for $^{14}N_2{}^{16}O$ [76028][a].

Parameter	Value	Parameter	Value
B_0 (MHz)	12561.6369(9)	$q_{(010)}$ (MHz)	11.87212(27)
α_1^* (MHz)[c]	58.78678(86)	q_1 (MHz)	0.253(23)
α_2^* (MHz)[c]	-17.03655(35)	q_2 (MHz)	0.0379(56)
γ_{12} (MHz)	-0.41472(42)	q_J (Hz)	-15.68(38)
γ_{22} (MHz)	-0.17087(14)	q_{JJ} (Hz)	0[b]
$\gamma_{\ell\ell}$ (MHz)	0[b]	ρ (Hz)	-0.86(15)
D_0 (kHz)	5.2869(24)	$g_{\ell\ell}$ (GHz)	16.79(83)
β_1 (kHz)	-0.05153(92)	Δ_1 (THz)	2.9604
β_2 (kHz)	-0.08303(35)	Δ_2 (THz)	2.9360
H_0 (Hz)	0.0061(22)	$K^{122}_{(100)}$ (THz)	1.3221(87)
		λ_2 (THz)	-0.0123(24)
		λ_J (MHz)	-2.58(18)

[a] All experimental measurements from [76028], except for the $(0,3^3,0)$ state, were included in the analysis. The values of Δ_1 and Δ_2 were determined from infrared data.

[b] The condition $\gamma_{\ell\ell} = q_{JJ} = 0$ was employed.

[c] Here $\alpha_1^* = \alpha_1 - 2\gamma_{11} - 2\gamma_{12} - \gamma_{13}$ and $\alpha_2^* = \alpha_2 - \gamma_{12} - 2\gamma_{22} - \gamma_{23}$.

Table 49.2. Molecular constants for $^{14}N^{15}N^{16}O$, $^{15}N^{14}N^{16}O$ and $^{14}N_2{}^{18}O$ [76028].

Parameter	$^{14}N^{15}N^{16}O$ Value	$^{15}N^{14}N^{16}O$ Value	$^{14}N_2{}^{18}O$ Value
B_0 (MHz)	12560.7310(19)	12137.3104(20)	11859.1100(21)
α_2^{**} (MHz)[a]	-15.9332(14)	-16.5321(14)	-16.1024(17)
D_0 (kHz)	5.2680(57)	4.8898(54)	4.7280(55)
β_2 (kHz)	-0.0802(18)	-0.0748(16)	-0.0698(19)
H_0 (Hz)	-0.0083(53)	-0.0112(45)	-0.0114(47)
$q_{(010)}$ (MHz)	12.1398(13)	11.1457(13)	10.6723(15)
q_J (kHz)	-0.0142(17)	-0.0140(15)	-0.0145(17)

[a] This parameter is defined as $\alpha_2^{**} = \alpha_2 - \gamma_{12} - 2\gamma_{22} - \gamma_{23} - \gamma_{\ell\ell}$.

Table 49.3. Hyperfine and Zeeman constants and electric dipole moment for N_2O.

Parameters	$^{14}N^{14}N^{16}O$	Reference	$^{15}N^{14}N^{16}O$	Reference	$^{15}N^{15}N^{16}O$	Reference
eqQ (outer ^{14}N) (MHz)	-0.7767(10)	[75000]				
eqQ (inner ^{14}N) (MHz)	-0.2694(18)	[75000]	-0.27	[47008]		
M (outer) (kHz)	-2.35(20)	[75000]				
M (inner) (kHz)	-2.90(26)	[75000]				
$g_\perp$ (μ_N)					0.07606(10)	[69038]
$\chi_\perp - \chi_\parallel$ (erg/G^2)					$1.68(2)\times10^{-29}$	[69038]
μ (D)	0.160830(16)	[70029]	0.166(2)	[50006]		
α (Å^3)	3.222(46)	[70029]				

Additional references: [48005], [49008], [51008], [51009], [51013], [55009], [59011], [59007], [61010], [64006], [66027], [68009], [68015], [68016], [68035], [71027], and [74015].

TABLE 49.4. The microwave spectrum of N_2O

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{14}N^{14}N^{16}O$	1 – 1	2		1		$(0,1^1,0)$	47.280	(2E–4)	[76035]
	1 – 1	1		1		$(0,1^1,0)$	47.294	(2E–4)	[76035]
	1 – 1	2		3		$(0,1^1,0)$	47.315	(2E–4)	[76035]
	1 – 1	2		2		$(0,1^1,0)$	47.341	(2E–4)	[76035]
	1 – 1	1		2		$(0,1^1,0)$	47.355	(2E–4)	[76035]
	1 – 1	0		1		$(0,1^1,0)$	47.386	(2E–4)	[76035]
	1 – 1	2		1		$(0,1^1,0)$	47.402	(2E–4)	[76035]
	1 – 1	2		2		$(0,1^1,0)$	47.414	(2E–4)	[76035]
	1 – 1	1		1		$(0,1^1,0)$	47.416	(2E–4)	[76035]
	1 – 1	1		2		$(0,1^1,0)$	47.428	(2E–4)	[76035]
	1 – 1	2		1		$(0,1^1,0)$	47.448	(2E–4)	[76035]
	1 – 1	1		0		$(0,1^1,0)$	47.453	(2E–4)	[76035]
	1 – 1	2		3		$(0,1^1,0)$	47.483	(2E–4)	[76035]
	1 – 1	1		1		$(0,1^1,0)$	47.488	(2E–4)	[76035]
	1 – 1	3		3		$(0,1^1,0)$	47.500	(2E–4)	[76035]
	1 – 1	2		2		$(0,1^1,0)$	47.510	(2E–4)	[76035]
	1 – 1	3		2		$(0,1^1,0)$	47.526	(2E–4)	[76035]
	1 – 1	1		2		$(0,1^1,0)$	47.550	(2E–4)	[76035]
	1 – 1	2		1		$(0,1^1,0)$	47.571	(2E–4)	[76035]
	1 – 1	2		2		$(0,1^1,0)$	47.582	(2E–4)	[76035]
	1 – 1	3		2		$(0,1^1,0)$	47.599	(2E–4)	[76035]
	1 – 1	1		1		$(0,1^1,0)$	47.611	(2E–4)	[76035]
	1 – 1	1		0		$(0,1^1,0)$	47.648	(2E–4)	[76035]
	1 – 1	1		1		$(0,1^1,0)$	47.740	(2E–4)	[76035]
	1 – 1	1		2		$(0,1^1,0)$	47.801	(2E–4)	[76035]
	1 – 1	1		1		$(0,1^1,0)$	47.862	(2E–4)	[76035]
	1 – 1	1		2		$(0,1^1,0)$	47.873	(2E–4)	[76035]
	1 – 1	1		0		$(0,1^1,0)$	47.899	(2E–4)	[76035]
	2 – 2	2		2		$(0,1^1,0)$	142.215	(1E–3)	[76035]
	2 – 2	2		3		$(0,1^1,0)$	142.238	(2E–4)	[76035]
	2 – 2	2		1		$(0,1^1,0)$	142.267	(2E–4)	[76035]
	2 – 2	4		3		$(0,1^1,0)$	142.275	(2E–4)	[76035]
	2 – 2	3		2		$(0,1^1,0)$	142.299	(2E–4)	[76035]
	2 – 2	3		3		$(0,1^1,0)$	142.322	(2E–4)	[76035]
	2 – 2	3		2		$(0,1^1,0)$	142.362	(1E–3)	[76035]
	2 – 2	1		1		$(0,1^1,0)$	142.382	(2E–4)	[76035]
	2 – 2	3		3		$(0,1^1,0)$	142.385	(2E–4)	[76035]
	2 – 2	2		2		$(0,1^1,0)$	142.394	(2E–4)	[76035]
	2 – 2	2		3		$(\nu_1,\nu_2^{\ell},\nu_3)$	142.417	(2E–4)	[76035]
	2 – 2	2		3		$(0,1^1,0)$	142.440	(1E–3)	[76035]
	2 – 2	4		3		$(0,1^1,0)$	142.445	(2E–4)	[76035]
	2 – 2	2		2		$(0,1^1,0)$	142.472	(2E–4)	[76035]
	2 – 2	4		4		$(0,1^1,0)$	142.480	(2E–4)	[76035]
	2 – 2	3		3		$(0,1^1,0)$	142.492	(2E–4)	[76035]
	2 – 2	2		1		$(0,1^1,0)$	142.514	(2E–4)	[76035]
	2 – 2	3		2		$(0,1^1,0)$	142.524	(2E–4)	[76035]
	2 – 2	3		4		$(0,1^1,0)$	142.527	(1E–3)	[76035]
	2 – 2	2		2		$(0,1^1,0)$	142.536	(2E–4)	[76035]
	2 – 2	1		1		$(0,1^1,0)$	142.541	(2E–4)	[76035]
	2 – 2	3		3		$(0,1^1,0)$	142.554	(2E–4)	[76035]
	2 – 2	1		2		$(0,1^1,0)$	142.563	(2E–4)	[76035]
	2 – 2	1		0		$(0,1^1,0)$	142.572	(2E–4)	[76035]
	2 – 2	3		2		$(0,1^1,0)$	142.586	(1E–3)	[76035]
	2 – 2	3		4		$(0,1^1,0)$	142.589	(1E–3)	[76035]
	2 – 2	3		2		$(0,1^1,0)$	142.620	(1E–3)	[76035]
	2 – 2	1		1		$(0,1^1,0)$	142.661	(2E–4)	[76035]
	2 – 2	3		2		$(0,1^1,0)$	142.683	(1E–3)	[76035]
	2 – 2	2		1		$(0,1^1,0)$	142.693	(2E–4)	[76035]
	2 – 2	2		2		$(0,1^1,0)$	142.716	(2E–4)	[76035]
	3 – 3	3		3		$(0,1^1,0)$	284.562	(2E–4)	[76035]
	3 – 3	1		2		$(0,1^1,0)$	284.598	(2E–4)	[76035]
	3 – 3	3		4		$(0,1^1,0)$	284.613	(2E–4)	[76035]
	3 – 3	2		3		$(0,1^1,0)$	284.627	(2E–4)	[76035]
	3 – 3	3		2		$(0,1^1,0)$	284.651	(2E–4)	[76035]
	3 – 3	5		4		$(0,1^1,0)$	284.655	(2E–3)	[76035]

TABLE 49.4. The microwave spectrum of N_2O—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{14}N^{14}N^{16}O$	3 – 3	4		3		$(0,1^1,0)$	284.680	(2E–4)	[76035]
	3 – 3	4		4		$(0,1^1,0)$	284.731	(2E–4)	[76035]
	3 – 3	4		3		$(0,1^1,0)$	284.789	(2E–3)	[76035]
	3 – 3	2		2		$(0,1^1,0)$	284.836	(2E–4)	[76035]
	3 – 3	4		4		$(0,1^1,0)$	284.840	(1E–3)	[76035]
	3 – 3	3		3		$(0,1^1,0)$	284.855	(2E–4)	[76035]
	3 – 3	5		4		$(0,1^1,0)$	284.881	(1E–3)	[76035]
	3 – 3	3		2		$(0,1^1,0)$	284.903	(1E–3)	[76035]
	3 – 3	3		4		$(0,1^1,0)$	284.905	(1E–3)	[76035]
	3 – 3	1		2		$(0,1^1,0)$	284.915	(2E–4)	[76035]
	3 – 3	3		2		$(0,1^1,0)$	284.927	(2E–4)	[76035]
	3 – 3	3		3		$(0,1^1,0)$	284.936	(2E–4)	[76035]
	3 – 3	5		5		$(0,1^1,0)$	284.942	(2E–4)	[76035]
	3 – 3	4		4		$(0,1^1,0)$	284.958	(2E–3)	[76035]
	3 – 3	1		1		$(0,1^1,0)$	284.972	(2E–4)	[76035]
	3 – 3	3		3		$(0,1^1,0)$	284.979	(2E–4)	[76035]
	3 – 3	2		2		$(0,1^1,0)$	284.992	(2E–4)	[76035]
	3 – 3	4		3		$(0,1^1,0)$	285.013	(2E–4)	[76035]
	3 – 3	4		5		$(0,1^1,0)$	285.018	(2E–3)	[76035]
	3 – 3	2		3		$(0,1^1,0)$	285.044	(2E–4)	[76035]
	3 – 3	4		3		$(0,1^1,0)$	285.121	(1E–3)	[76035]
	3 – 3	4		5		$(0,1^1,0)$	285.127	(2E–4)	[76035]
	3 – 3	3		4		$(0,1^1,0)$	285.133	(2E–4)	[76035]
	3 – 3	2		2		$(0,1^1,0)$	285.153	(2E–4)	[76035]
	3 – 3	3		3		$(0,1^1,0)$	285.188	(2E–4)	[76035]
	3 – 3	4		3		$(0,1^1,0)$	285.206	(2E–3)	[76035]
	3 – 3	2		1		$(0,1^1,0)$	285.210	(2E–4)	[76035]
	3 – 3	3		2		$(0,1^1,0)$	285.220	(2E–4)	[76035]
	3 – 3	3		3		$(0,1^1,0)$	285.272	(2E–4)	[76035]
	1 – 0					$(0,0^0,1)$	25017.99	(0.06)	[64010]
	1 – 0	0	1	1	1	$(0,0^0,0)$	25122.980	(1E–3)	[75000]
	1 – 0	2	1	2	1	$(0,0^0,0)$	25123.037	(1E–3)	[75000]
	1 – 0	2	1	1	1	$(0,0^0,0)$	25123.037	(1E–3)	[75000]
	1 – 0	1	1	2	1	$(0,0^0,0)$	25123.060	(1E–3)	[75000]
	1 – 0	1	1	1	1	$(0,0^0,0)$	25123.060	(1E–3)	[75000]
	1 – 0	1	1	0	1	$(0,0^0,0)$	25123.060	(1E–3)	[75000]
	1 – 0	2	2	2	1	$(0,0^0,0)$	25123.246	(1E–3)	[75000]
	1 – 0	2	2	1	1	$(0,0^0,0)$	25123.246	(1E–3)	[75000]
	1 – 0	3	2	2	1	$(0,0^0,0)$	25123.303	(1E–3)	[75000]
	1 – 0	1	2	2	1	$(0,0^0,0)$	25123.340	(1E–3)	[75000]
	1 – 0	1	2	1	1	$(0,0^0,0)$	25123.340	(1E–3)	[75000]
	1 – 0	1	2	0	1	$(0,0^0,0)$	25123.340	(1E–3)	[75000]
	1 – 0	1	0	2	1	$(0,0^0,0)$	25123.642	(1E–3)	[75000]
	1 – 0	1	0	1	1	$(0,0^0,0)$	25123.642	(1E–3)	[75000]
	1 – 0	1	0	0	1	$(0,0^0,0)$	25123.642	(1E–3)	[75000]
	1 – 0					$(0,2^0,0)$	25177.65	(0.06)	[64010]
	2 – 1					$(1,0^0,0)$	49832.523	(0.03)	[75018]
	2 – 1		2		2	$(0,0^0,0)$	50245.63	(0.15)	[52017]
	2 – 1		1		0	$(0,0^0,0)$	50245.63	(0.15)	[52017]
	2 – 1		3		2	$(0,0^0,0)$	50246.03	(0.10)	[52017]
	2 – 1		2		1	$(0,0^0,0)$	50246.03	(0.10)	[52017]
	2 – 1		1		2	$(0,0^0,0)$	50246.03	(0.10)	[52017]
	2 – 1		1		1	$(0,0^0,0)$	50246.53	(0.15)	[52017]
	3 – 2					$(1,0^0,0)$	74748.471	(0.03)	[75018]
	3 – 2					$(0,0^0,1)$	75053.40	(0.10)	[71030]
	3 – 2					$(0,0^0,0)$	75369.224	(0.01)	[70029]
	3 – 2					$(0,1^{L1},0)$	75399.26	(0.10)	[71030]
	3 – 2					$(0,2^0,0)$	75532.47	(0.10)	[71030]
	3 – 2					$(0,1^{U1},0)$	75541.70	(0.10)	[71030]
	3 – 2					$(0,2^2,0)$	75569.94	(0.10)	[64010]
	4 – 3					$(1,0^0,0)$	99664.025	(0.06)	[75018]
	4 – 3					$(0,0^0,0)$	100491.74	(0.20)	[56005]
	4 – 3					$(0,1^{L1},0)$	100531.65	(0.20)	[56005]
	4 – 3					$(0,1^{U1},0)$	100721.58	(0.20)	[56005]
	5 – 4					$(1,0^0,0)$	124579.124	(0.06)	[75018]

TABLE 49.4. The microwave spectrum of N_2O—Continued

Isotopic species	$J' - J''$	F'	F'_1	F''	F''_1	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{14}N^{14}N^{16}O$	5 - 4					$(0,0^0,1)$	125087.400	(0.05)	[70030]
	5 - 4					$(0,0^0,0)$	125613.696	(0.03)	[70030]
	5 - 4					$(0,1^{L1},0)$	125663.687	(0.03)	[70030]
	5 - 4					$(0,2^0,0)$	125884.94	(0.10)	[70030]
	5 - 4					$(0,1^{U1},0)$	125901.113	(0.03)	[70030]
	5 - 4					$(0,2^{L2},0)$	125948.06	(0.10)	[70030]
	5 - 4					$(0,2^{U2},0)$	125948.74	(0.10)	[70030]
	6 - 5					$(0,0^0,1)$	150103.500	(0.06)	[70030]
	6 - 5					$(0,0^0,0)$	150735.046	(0.03)	[70030]
	6 - 5					$(0,1^{L1},0)$	150795.008	(0.03)	[70030]
	6 - 5					$(0,2^0,0)$	151060.28	(0.10)	[70030]
	6 - 5					$(0,1^{U1},0)$	151079.922	(0.03)	[70030]
	6 - 5					$(0,2^{L2},0)$	151136.06	(0.10)	[70030]
	6 - 5					$(0,2^{U2},0)$	151137.62	(0.10)	[70030]
	7 - 6					$(0,0^0,1)$	175119.012	(0.07)	[70030]
	7 - 6					$(0,0^0,0)$	175855.623	(0.04)	[70030]
	7 - 6					$(0,1^{L1},0)$	175925.593	(0.04)	[70030]
	7 - 6					$(0,2^0,0)$	176234.17	(0.10)	[70030]
	7 - 6					$(0,1^{U1},0)$	176257.962	(0.04)	[70030]
	7 - 6					$(0,2^{L2},0)$	176323.46	(0.10)	[70030]
	7 - 6					$(0,2^{U2},0)$	176325.83	(0.10)	[70030]
	8 - 7					$(0,0^0,0)$	200975.26	(0.10)	[56005]
	10 - 9					$(0,0^0,1)$	250159.637	(0.10)	[70030]
	10 - 9					$(0,0^0,0)$	251211.557	(0.08)	[70030]
	10 - 9					$(0,1^{L1},0)$	251311.342	(0.08)	[70030]
	10 - 9					$(0,2^0,0)$	251748.12	(0.12)	[70030]
	10 - 9					$(0,1^{U1},0)$	251786.078	(0.08)	[70030]
	10 - 9					$(0,2^{L2},0)$	251879.52	(0.12)	[70030]
	10 - 9					$(0,2^{U2},0)$	251886.75	(0.12)	[70030]
	12 - 11					$(0,0^0,0)$	301442.711	(0.05)	[74044]
	12 - 11					$(0,1^{L1},0)$	301562.280	(0.09)	[70030]
	12 - 11					$(0,2^0,0)$	302082.07	(0.15)	[70030]
	12 - 11					$(0,1^{U1},0)$	302132.009	(0.09)	[70030]
	12 - 11					$(0,2^{L2},0)$	302224.33	(0.15)	[70030]
	12 - 11					$(0,2^{U1},0)$	302256.25	(0.15)	[70030]
	13 - 12					$(0,0^0,0)$	326556.071	(0.05)	[74044]
	15 - 14					$(0,0^0,0)$	376777.753	(0.01)	[76028]
	15 - 14					$(0,1^{L1},0)$	376926.982	(0.01)	[76028]
	15 - 14					$(0,3^{L1},0)$	377279.303	(0.04)	[76028]
	15 - 14					$(0,2^0,0)$	377566.687	(0.01)	[76028]
	15 - 14					$(0,1^{U1},0)$	377638.917	(0.01)	[76028]
	15 - 14					$(0,2^{L2},0)$	377778.541	(0.01)	[76028]
	15 - 14					$(0,2^{U2},0)$	377802.535	(0.01)	[76028]
	15 - 14					$(0,3^3,0)$	378273.226	(0.04)	[76028]
	15 - 14					$(0,3^{U1},0)$	378620.731	(0.04)	[76028]
	16 - 15					$(0,0^0,1)$	400203.009	(0.01)	[76028]
	16 - 15					$(0,0^0,0)$	401885.802	(0.01)	[76028]
	16 - 15					$(0,1^{L1},0)$	402044.836	(0.01)	[76028]
	16 - 15					$(0,3^{L1},0)$	402418.747	(0.04)	[76028]
	16 - 15					$(0,2^0,0)$	402723.120	(0.01)	[76028]
	16 - 15					$(0,1^{U1},0)$	402804.126	(0.01)	[76028]
	16 - 15					$(0,2^{L2},0)$	402952.967	(0.01)	[76028]
	16 - 15					$(0,2^{U2},0)$	402982.088	(0.01)	[76028]
	16 - 15					$(0,3^{U1},0)$	403849.263	(0.04)	[76028]
	17 - 16					$(0,0^0,1)$	425204.112	(0.01)	[76028]
	17 - 16					$(0,1^{L1},1)$	425416.331	(0.04)	[76028]
	17 - 16					$(0,1^{U1},1)$	426343.955	(0.04)	[76028]
	17 - 16					$(0,0^0,0)$	426991.808	(0.01)	[76028]
	17 - 16					$(0,1^{L1},0)$	427160.632	(0.01)	[76028]
	17 - 16					$(0,3^{L1},0)$	427555.755	(0.04)	[76028]
	17 - 16					$(0,2^0,0)$	427876.776	(0.01)	[76028]
	17 - 16					$(0,1^{U1},0)$	427967.310	(0.01)	[76028]
	17 - 16					$(0,2^{L2},0)$	428125.318	(0.01)	[76028]
	17 - 16					$(0,2^{U2},0)$	428160.195	(0.01)	[76028]
	17 - 16					$(0,3^3,0)$	428688.725	(0.04)	[76028]

TABLE 49.4. The microwave spectrum of N_2O—Continued

Isotopic species	J' - J''	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{14}N^{14}N^{16}O$	17 - 16					$(0,3^{U1},0)$	429075.216	(0.04)	[76028]
	18 - 17					$(0,0^0,1)$	450203.085	(0.01)	[76028]
	18 - 17					$(0,1^{L1},1)$	450427.642	(0.04)	[76028]
	18 - 17					$(0,1^{U1},1)$	451410.056	(0.04)	[76028]
	18 - 17					$(0,0^0,0)$	452095.670	(0.01)	[76028]
	18 - 17					$(0,1^{L1},0)$	452274.249	(0.01)	[76028]
	18 - 17					$(0,3^{L1},0)$	452690.192	(0.04)	[76028]
	18 - 17					$(0,2^0,0)$	453027.454	(0.01)	[76028]
	18 - 17					$(0,1^{U1},0)$	453128.301	(0.01)	[76028]
	18 - 17					$(0,2^{L2},0)$	453295.428	(0.01)	[76028]
	18 - 17					$(0,2^{U2},0)$	453336.775	(0.01)	[76028]
	18 - 17					$(0,3^3,0)$	453893.533	(0.04)	[76028]
	18 - 17					$(0,3^{U1},0)$	454298.429	(0.04)	[76028]
	19 - 18					$(0,0^0,1)$	475199.801	(0.01)	[76028]
	19 - 18					$(0,1^{L1},1)$	475436.623	(0.04)	[76028]
	19 - 18					$(0,1^{U1},1)$	476473.886	(0.04)	[76028]
	19 - 18					$(0,0^0,0)$	477197.247	(0.01)	[76028]
	19 - 18					$(0,1^{L1},0)$	477385.556	(0.01)	[76028]
	19 - 18					$(0,3^{L1},0)$	477821.945	(0.04)	[76028]
	19 - 18					$(0,2^0,0)$	478174.970	(0.01)	[76028]
	19 - 18					$(0,1^{U1},0)$	478286.972	(0.01)	[76028]
	19 - 18					$(0,2^{L2},0)$	478463.193	(0.01)	[76028]
	19 - 18					$(0,2^{U2},0)$	478511.737	(0.01)	[76028]
	19 - 18					$(0,3^3,0)$	479096.157	(0.04)	[76028]
	19 - 18					$(0,3^{U1},0)$	479518.847	(0.04)	[76028]
	20 - 19					$(0,0^0,1)$	500194.206	(0.01)	[76028]
	20 - 19					$(0,1^{L1},1)$	500443.339	(0.04)	[76028]
	20 - 19					$(0,1^{U1},1)$	501535.464	(0.04)	[76028]
	20 - 19					$(0,0^0,0)$	502296.423	(0.01)	[76028]
	20 - 19					$(0,1^{L1},0)$	502494.433	(0.01)	[76028]
	20 - 19					$(0,3^{L1},0)$	502950.827	(0.04)	[76028]
	20 - 19					$(0,2^0,0)$	503319.159	(0.01)	[76028]
	20 - 19					$(0,1^{U1},0)$	503443.198	(0.01)	[76028]
	20 - 19					$(0,2^{L2},0)$	503628.487	(0.01)	[76028]
	20 - 19					$(0,2^{U2},0)$	503685.005	(0.01)	[76028]
	20 - 19					$(0,3^3,0)$	504296.581	(0.04)	[76028]
	20 - 19					$(0,3^{U1},0)$	504736.326	(0.04)	[76028]
	21 - 20					$(0,0^0,1)$	525186.106	(0.01)	[76028]
	21 - 20					$(0,1^{L1},1)$	525447.475	(0.04)	[76028]
	21 - 20					$(0,1^{U1},1)$	526594.468	(0.04)	[76028]
	21 - 20					$(0,0^0,0)$	527393.051	(0.01)	[76028]
	21 - 20					$(0,1^{L1},0)$	527600.741	(0.01)	[76028]
	21 - 20					$(0,3^{L1},0)$	528076.706	(0.04)	[76028]
	21 - 20					$(0,2^0,0)$	528459.840	(0.01)	[76028]
	21 - 20					$(0,1^{U1},0)$	528596.839	(0.01)	[76028]
	21 - 20					$(0,2^{L2},0)$	528791.162	(0.01)	[76028]
	21 - 20					$(0,2^{U2},0)$	528856.462	(0.01)	[76028]
	21 - 20					$(0,3^3,0)$	529494.653	(0.04)	[76028]
	21 - 20					$(0,3^{U1},0)$	529950.638	(0.04)	[76028]
	22 - 21					$(0,0^0,1)$	550175.406	(0.01)	[76028]
	22 - 21					$(0,1^{L1},1)$	550448.950	(0.04)	[76028]
	22 - 21					$(0,1^{U1},1)$	551650.897	(0.04)	[76028]
	22 - 21					$(0,0^0,0)$	552487.036	(0.01)	[76028]
	22 - 21					$(0,1^{L1},0)$	552704.352	(0.01)	[76028]
	22 - 21					$(0,3^{L1},0)$	553199.419	(0.04)	[76028]
	22 - 21					$(0,2^0,0)$	553596.860	(0.01)	[76028]
	22 - 21					$(0,1^{U1},0)$	553747.764	(0.01)	[76028]
	22 - 21					$(0,2^{L2},0)$	553951.086	(0.01)	[76028]
	22 - 21					$(0,2^{U2},0)$	554025.998	(0.01)	[76028]
	22 - 21					$(0,3^3,0)$	554690.231	(0.04)	[76028]
	22 - 21					$(0,3^{U1},0)$	555161.627	(0.04)	[76028]
$^{14}N^{15}N^{16}O$	1 - 0					$(0,0^0,0)$	25121.55	(0.05)	[49009]
	15 - 14					$(0,0^0,0)$	376750.762	(0.01)	[76028]
	15 - 14					$(0,1^{U1},0)$	377592.022	(0.04)	[76028]
	16 - 15					$(0,0^0,0)$	401857.048	(0.01)	[76028]

TABLE 49.4. The microwave spectrum of N_2O—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{14}N^{15}N^{16}O$	16 - 15					$(0,1^{L1},0)$	401977.590	(0.04)	[76028]
	16 - 15					$(0,1^{U1},0)$	402754.200	(0.04)	[76028]
	17 - 16					$(0,0^0,0)$	426961.257	(0.01)	[76028]
	17 - 16					$(0,1^{U1},0)$	427914.282	(0.04)	[76028]
	18 - 17					$(0,0^0,0)$	452063.322	(0.01)	[76028]
	18 - 17					$(0,1^{L1},0)$	452198.710	(0.04)	[76028]
	18 - 17					$(0,1^{U1},0)$	453072.147	(0.04)	[76028]
	19 - 18					$(0,0^0,0)$	477163.120	(0.01)	[76028]
	19 - 18					$(0,1^{L1},0)$	477305.799	(0.04)	[76028]
	19 - 18					$(0,1^{U1},0)$	478227.737	(0.04)	[76028]
	20 - 19					$(0,0^0,0)$	502260.498	(0.01)	[76028]
	20 - 19					$(0,1^{L1},0)$	502410.529	(0.04)	[76028]
	20 - 19					$(0,1^{U1},0)$	503380.850	(0.04)	[76028]
	21 - 20					$(0,0^0,0)$	527355.356	(0.01)	[76028]
	21 - 20					$(0,1^{L1},0)$	527512.660	(0.04)	[76028]
	21 - 20					$(0,1^{U1},0)$	528531.346	(0.04)	[76028]
	22 - 21					$(0,0^0,0)$	552447.533	(0.01)	[76028]
	22 - 21					$(0,1^{L1},0)$	552612.059	(0.04)	[76028]
	22 - 21					$(0,1^{U1},0)$	553679.232	(0.04)	[76028]
$^{15}N^{14}N^{16}O$	1 - 0		1		1	$(0,0^0,0)$	24274.53	(0.05)	[47008]
	1 - 0		2		1	$(0,0^0,0)$	24274.61	(0.05)	[47008]
	1 - 0		0		1	$(0,0^0,0)$	24274.73	(0.05)	[47008]
	16 - 15					$(0,0^0,0)$	388313.736	(0.01)	[76028]
	17 - 16					$(0,0^0,0)$	412572.385	(0.01)	[76028]
	17 - 16					$(0,1^{L1},0)$	412754.664	(0.04)	[76028]
	17 - 16					$(0,1^{U1},0)$	413512.003	(0.04)	[76028]
	18 - 17					$(0,0^0,0)$	436828.978	(0.01)	[76028]
	18 - 17					$(0,1^{L1},0)$	437021.775	(0.04)	[76028]
	18 - 17					$(0,1^{U1},0)$	437823.654	(0.04)	[76028]
	19 - 18					$(0,0^0,0)$	461083.472	(0.01)	[76028]
	19 - 18					$(0,1^{L1},0)$	461286.927	(0.04)	[76028]
	19 - 18					$(0,1^{U1},0)$	462133.172	(0.04)	[76028]
	20 - 19					$(0,0^0,0)$	485335.729	(0.01)	[76028]
	20 - 19					$(0,1^{L1},0)$	485549.636	(0.04)	[76028]
	20 - 19					$(0,1^{U1},0)$	486440.411	(0.04)	[76028]
	21 - 20					$(0,0^0,0)$	509585.619	(0.01)	[76028]
	21 - 20					$(0,1^{L1},0)$	509809.983	(0.04)	[76028]
	21 - 20					$(0,1^{U1},0)$	510745.225	(0.04)	[76028]
	22 - 21					$(0,0^0,0)$	533833.046	(0.01)	[76028]
	22 - 21					$(0,1^{L1},0)$	534067.894	(0.04)	[76028]
	22 - 21					$(0,1^{U1},0)$	535047.522	(0.04)	[76028]
	23 - 22					$(0,0^0,0)$	558077.877	(0.01)	[76028]
	23 - 22					$(0,1^{L1},0)$	558323.158	(0.04)	[76028]
	23 - 22					$(0,1^{U1},0)$	559347.184	(0.04)	[76028]
$^{15}N^{15}N^{16}O$	1 - 0					$(0,0^0,0)$	24274.78	(0.05)	[49009]
$^{14}N^{14}N^{18}O$	16 - 15					$(0,0^0,0)$	379413.968	(0.01)	[76028]
	17 - 16					$(0,0^0,0)$	403116.747	(0.01)	[76028]
	17 - 16					$(0,1^{L1},0)$	403300.584	(0.04)	[76028]
	18 - 17					$(0,0^0,0)$	426817.545	(0.01)	[76028]
	18 - 17					$(0,1^{U1},0)$	427779.831	(0.04)	[76028]
	19 - 18					$(0,0^0,0)$	450516.295	(0.01)	[76028]
	19 - 18					$(0,1^{L1},0)$	450721.500	(0.04)	[76028]
	19 - 18					$(0,1^{U1},0)$	451531.806	(0.04)	[76028]
	20 - 19					$(0,0^0,0)$	474212.870	(0.01)	[76028]
	20 - 19					$(0,1^{L1},0)$	474428.692	(0.04)	[76028]
	20 - 19					$(0,1^{U1},0)$	475281.483	(0.04)	[76028]
	21 - 20					$(0,0^0,0)$	497907.195	(0.01)	[76028]
	21 - 20					$(0,1^{L1},0)$	498133.635	(0.04)	[76028]
	21 - 20					$(0,1^{U1},0)$	499029.049	(0.04)	[76028]
	22 - 21					$(0,0^0,0)$	521599.106	(0.01)	[76028]
	22 - 21					$(0,1^{L1},0)$	521836.114	(0.04)	[76028]
	22 - 21					$(0,1^{U1},0)$	522774.011	(0.04)	[76028]
	23 - 22					$(0,0^0,0)$	545288.526	(0.01)	[76028]
	23 - 22					$(0,1^{L1},0)$	545536.046	(0.04)	[76028]
	23 - 22					$(0,1^{U1},0)$	546516.516	(0.04)	[76028]

TABLE 49.4. The microwave spectrum of N_2O—Continued

Isotopic species	$J' - J''$	F'	F'_1	F''	F''_1	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{14}N^{14}N^{17}O$	17 - 16					$(0,0^0,0)$	414420.396	(0.04)	[76028]
	18 - 17					$(0,0^0,0)$	438785.508	(0.04)	[76028]
	19 - 18					$(0,0^0,0)$	463148.448	(0.04)	[76028]
	20 - 19					$(0,0^0,0)$	487509.107	(0.04)	[76028]
	21 - 20					$(0,0^0,0)$	511867.356	(0.04)	[76028]
	22 - 21					$(0,0^0,0)$	536223.104	(0.04)	[76028]
	23 - 22					$(0,0^0,0)$	560576.228	(0.04)	[76028]

Table 50. Rotational and centrifugal distortion constants for $^{32}S_2{}^{16}O$.

Watson's Determinable Parameters	$^{32}S_2{}^{16}O$ (0,0,0)[a,d] (MHz)	$^{32}S_2{}^{16}O$ (0,1,0)[a] (MHz)	Derived Parameters (assuming planarity conditions)	$^{32}S_2{}^{16}O$ (0,0,0)[d] (MHz)	$^{32}S_2{}^{16}O$ (0,1,0) (MHz)
A"	41 915.4395(100)	42 479.687(24)	A'	41 915.436(10)	42 479.683(24)
B"	5 059.04706(131)	5 059.73551(471)	B'	5 059.0714(13)	5 059.7598(43)
C"	4 507.15763(131)	4 500.8588(42)	C'	4 507.1896(12)	4 500.8870(36)
τ_1	0.105983(308)	0.097785(3959)	τ'_{bbcc}	-0.006688(13)	-0.00717(15)
τ_2	0.00494026(3709)	0.003748(464)	τ'_{ccaa}	0.04865(11)	0.0486(12)
τ_3[b]	0.601(1)	0.66(2)	τ'_{aabb}	0.06402(23)	0.0564(31)
τ_{aaaa}	-4.67933(269)	-5.0330(170)	$\tau_{aabb}(1)$	0.13013(16)	0.1349(17)
τ_{bbbb}	-0.0103185(152)	-0.010957(175)	$\tau_{aabb}(2)$	0.12906(50)	0.1171(52)
τ_{cccc}	-0.0047746(166)	-0.005489(187)	$\tau_{aabb}(3)$	0.12906(50)	0.1171(52)
H_J	$-0.7367(4840)\times10^{-8}$		$\tau_{abab}(1)$	-0.03306(11)	-0.0393(13)
H_{JK}	$0.2400(1321)\times10^{-6}$		$\tau_{abab}(2)$	-0.03209(39)	-0.0232(39)
H_{KJ}	$-0.6155(1234)\times10^{-5}$		$\tau_{abab}(3)$	-0.03199(43)	-0.0214(44)
H_K	$0.1349(258)\times10^{-3}$				
h_J[c]	$0.418(157)\times10^{-8}$		$\Delta\tau$	$-0.199(83)\times10^{-4}$	$-0.33(10)\times10^{-3}$
h_{JK}	$-0.546(292)\times10^{-6}$				
h_K	$0.3578(1459)\times10^{-4}$				
Std. dev.	0.074	0.069			
No. lines fit	113	22			
μ_a (D)	0.875(10)[e]				
μ_b (D)	1.18(2)[e]				

[a] The uncertainties quoted are one standard deviation as estimated by the least squares fit. The number of significant figures quoted are necessary to reproduce the calculated transition frequencies within their standard deviations.

[b] Strictly speaking, τ_3 is not a determinable parameter, but is calculated from τ_1, τ_2, τ_{aaaa} and τ_{bbbb} using the planarity conditions.

[c] Watson uses $2h_J$ for this parameter.

[d] Data from [73041] and [74006] shown in Table 50.2 was refit to obtain these values.

[e] Reference [59003].

Table 50.1. Rotational constants for $^{34}S^{32}S^{16}O$ and $^{32}S^{34}S^{16}O$ [74006].

Rotational Constant	$^{34}S^{32}S^{16}O$ Value (MHz)	$^{32}S^{34}S^{16}O$ Value (MHz)
A"	41 737.142(60)	40 637.232(75)
B"	4 901.545(10)	5 034.435(10)
C"	4 379.740(10)	4 472.449(10)

TABLE 50.2. The microwave spectrum of S_2O

Isotopic species	$J'(K'_-,K'_+)$ – $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{32}S^{32}S^{16}O$	12(2,10) – 13(1,13)	(0,0,0)	19028.615	(0.10)	[74006]
	2(0, 2) – 1(0, 1)	(0,0,0)	19126.4	(0.50)	[59003]
	27(3,24) – 26(4,23)	(0,0,0)	19675.430	(0.10)	[74006]
	2(1, 1) – 1(1, 0)	(0,0,0)	19684.3	(0.50)	[59003]
	15(3,13) – 16(2,14)	(0,0,0)	20058.095	(0.10)	[74006]
	35(4,31) – 34(5,30)	(0,0,0)	20068.505	(0.10)	[74006]
	24(4,20) – 25(3,23)	(0,0,0)	20631.530	(0.10)	[74006]
	30(3,28) – 29(4,25)	(0,0,0)	21532.783	(0.10)	[74006]
	26(2,25) – 25(3,22)	(0,0,0)	21869.23	(0.10)	[73041]
	17(3,14) – 18(2,17)	(0,0,0)	22155.03	(0.10)	[73041]
	11(2, 9) – 12(1,12)	(0,0,0)	23137.86	(0.10)	[73041]
	12(1,11) – 11(2,10)	(0,0,0)	23963.56	(0.10)	[73041]
	6(0, 6) – 5(1, 5)	(0,0,0)	24015.760	(0.10)	[74006]
	27(2,26) – 26(3,23)	(0,0,0)	24364.33	(0.10)	[73041]
	7(2, 6) – 8(1, 7)	(0,0,0)	25137.230	(0.10)	[74006]
	37(4,34) – 36(5,31)	(0,0,0)	25415.880	(0.10)	[74006]
	31(2,30) – 30(3,27)	(0,0,0)	25672.801	(0.10)	[74006]
	28(2,27) – 27(3,24)	(0,0,0)	26025.07	(0.10)	[73041]
	18(2,16) – 18(2,17)	(0,1,0)	26038.352	(0.10)	[74006]
	38(6,32) – 39(5,35)	(0,0,0)	26597.898	(0.10)	[74006]
	30(2,29) – 29(3,26)	(0,0,0)	26703.728	(0.10)	[74006]
	29(2,28) – 28(3,25)	(0,0,0)	26814.38	(0.10)	[73041]
	30(5,26) – 31(4,27)	(0,0,0)	26969.803	(0.10)	[74006]
	23(2,21) – 24(1,24)	(0,0,0)	27169.25	(0.10)	[73041]
	3(1, 3) – 2(1, 2)	(0,0,0)	27867.0	(0.50)	[59003]
	10(2, 8) – 11(1,11)	(0,0,0)	27916.31	(0.10)	[73041]
	3(0, 3) – 2(0, 2)	(0,0,0)	28673.990	(0.10)	[74006]
	3(2, 2) – 2(2, 1)	(0,0,0)	28699.3	(0.50)	[59003]
	3(2, 1) – 2(2, 0)	(0,0,0)	28723.949	(0.10)	[74006]
	31(3,29) – 30(4,26)	(0,0,0)	29010.736	(0.10)	[74006]
	28(3,25) – 27(4,24)	(0,1,0)	29116.733	(0.10)	[74006]
	3(1, 2) – 2(1, 1)	(0,0,0)	29522.8	(0.50)	[59003]
	22(4,19) – 23(3,20)	(0,0,0)	29626.54	(0.10)	[73041]
	23(4,19) – 24(3,22)	(0,0,0)	29735.40	(0.10)	[73041]
	16(3,13) – 17(2,16)	(0,0,0)	29859.90	(0.10)	[73041]
	19(2,17) – 19(2,18)	(0,0,0)	30982.100	(0.10)	[74006]
	45(7,38) – 46(6,41)	(0,0,0)	31686.950	(0.10)	[74006]
	20(2,18) – 19(3,17)	(0,0,0)	31944.58	(0.10)	[73041]
	14(3,12) – 15(2,13)	(0,0,0)	32150.12	(0.10)	[73041]
	30(5,25) – 31(4,28)	(0,0,0)	32422.827	(0.10)	[74006]
	36(4,32) – 35(5,31)	(0,0,0)	32650.964	(0.10)	[74006]
	24(2,22) – 25(1,25)	(0,0,0)	32924.710	(0.10)	[74006]
	28(3,25) – 27(4,24)	(0,0,0)	32998.37	(0.10)	[73041]
	9(2, 7) – 10(1,10)	(0,0,0)	33312.766	(0.10)	[74006]
	44(5,39) – 43(6,38)	(0,0,0)	33400.775	(0.10)	[74006]
	37(6,32) – 38(5,33)	(0,0,0)	34495.794	(0.10)	[74006]
	7(0, 7) – 6(1, 6)	(0,0,0)	34942.247	(0.10)	[74006]
	13(1,12) – 12(2,11)	(0,1,0)	35301.584	(0.10)	[74006]
	32(3,30) – 31(4,27)	(0,0,0)	36060.422	(0.10)	[74006]
	11(1,10) – 11(1,11)	(0,0,0)	36284.840	(0.10)	[74006]
	13(1,12) – 12(2,11)	(0,0,0)	36769.650	(0.10)	[74006]
	37(6,31) – 38(5,34)	(0,0,0)	36789.380	(0.10)	[74006]
	6(2, 5) – 7(1, 6)	(0,0,0)	36827.258	(0.10)	[74006]
	4(1, 4) – 3(1, 3)	(0,1,0)	37112.3	(0.50)	[59003]
	4(1, 4) – 3(1, 3)	(0,0,0)	37149.040	(0.10)	[74006]
	1(1, 0) – 1(0, 1)	(0,0,0)	37407.2	(0.50)	[59003]
	15(3,12) – 16(2,15)	(0,0,0)	37886.598	(0.10)	[74006]
	2(1, 1) – 2(0, 2)	(0,0,0)	37965.395	(0.10)	[74006]
	29(5,25) – 30(4,26)	(0,0,0)	38062.145	(0.10)	[74006]
	4(0, 4) – 3(0, 3)	(0,1,0)	38180.0	(0.50)	[59003]
	4(0, 4) – 3(0, 3)	(0,0,0)	38203.0	(0.50)	[59003]
	4(2, 3) – 3(2, 2)	(0,0,0)	38260.9	(0.50)	[59003]
	4(3, 1) – 3(3, 0)	(0,0,0)	38279.1	(0.50)	[59003]
	4(3, 2) – 3(3, 1)	(0,0,0)	38279.1	(0.50)	[59003]
	4(2, 2) – 3(2, 1)	(0,0,0)	38322.3	(0.50)	[59003]

TABLE 50.2. The microwave spectrum of S_2O—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{32}S^{32}S^{16}O$	6(2, 5) - 7(1, 6)	(0,1,0)	38469.950	(0.10)	[74006]
	2(1, 1) - 2(0, 2)	(0,1,0)	38542.744	(0.10)	[74006]
	3(1, 2) - 3(0, 3)	(0,0,0)	38814.0	(0.50)	[59003]
	22(4,18) - 23(3,21)	(0,0,0)	38984.32	(0.10)	[73041]
	8(2, 6) - 9(1, 9)	(0,0,0)	39275.365	(0.10)	[74006]
	4(1, 3) - 3(1, 2)	(0,1,0)	39347.226	(0.10)	[74006]
	4(1, 3) - 3(1, 2)	(0,0,0)	39356.2	(0.50)	[59003]
	3(1, 2) - 3(0, 3)	(0,1,0)	39402.196	(0.10)	[74006]
	25(2,23) - 26(1,26)	(0,0,0)	39441.778	(0.10)	[74006]
	4(1, 3) - 4(0, 4)	(0,0,0)	39966.8	(0.50)	[59003]
	4(1, 3) - 4(0, 4)	(0,1,0)	40569.593	(0.10)	[74006]
	5(1, 4) - 5(0, 5)	(0,0,0)	41442.2	(0.50)	[59003]
	44(7,37) - 45(6,40)	(0,0,0)	42006.400	(0.10)	[74006]
	5(1, 4) - 5(0, 5)	(0,1,0)	42063.360	(0.10)	[74006]
	8(0, 8) - 7(1, 7)	(0,1,0)	45480.308	(0.10)	[74006]
	7(1, 6) - 7(0, 7)	(0,1,0)	46122.824	(0.10)	[74006]
	14(3,11) - 15(2,14)	(0,0,0)	46193.200	(0.10)	[74006]
	5(1, 5) - 4(1, 4)	(0,1,0)	46378.808	(0.10)	[74006]
	1(1, 1) - 0(0, 0)	(0,0,0)	46421.6	(0.50)	[59003]
	5(1, 5) - 4(1, 4)	(0,0,0)	46424.740	(0.10)	[74006]
	13(3,11) - 14(2,12)	(0,1,0)	46713.212	(0.10)	[74006]
	1(1, 1) - 0(0, 0)	(0,1,0)	46979.456	(0.10)	[74006]
	7(2, 5) - 8(1, 8)	(0,1,0)	47633.514	(0.10)	[74006]
	5(0, 5) - 4(0, 4)	(0,0,0)	47707.620	(0.10)	[74006]
	5(2, 4) - 4(2, 3)	(0,0,0)	47818.040	(0.10)	[74006]
	5(4, 1) - 4(4, 0)	(0,0,0)	47849.270	(0.10)	[74006]
	5(3, 3) - 4(3, 2)	(0,0,0)	47854.040	(0.10)	[74006]
	5(2, 3) - 4(2, 2)	(0,0,0)	47940.840	(0.10)	[74006]
	14(1,13) - 13(2,12)	(0,1,0)	48330.480	(0.10)	[74006]
	14(3,11) - 15(2,14)	(0,1,0)	49147.280	(0.10)	[74006]
	5(1, 4) - 4(1, 3)	(0,1,0)	49171.940	(0.10)	[74006]
	14(1,13) - 13(2,12)	(0,0,0)	49759.490	(0.10)	[74006]
	13(1,12) - 13(1,13)	(0,0,0)	49859.480	(0.10)	[74006]
	9(1, 8) - 9(0, 9)	(0,0,0)	51060.220	(0.10)	[74006]
	43(7,37) - 44(6,38)	(0,0,0)	51587.100	(0.10)	[74006]
	9(1, 8) - 9(0, 9)	(0,1,0)	51799.685	(0.10)	[74006]
	35(3,33) - 34(4,30)	(0,0,0)	54095.650	(0.10)	[74006]
	47(5,43) - 46(6,40)	(0,0,0)	54205.480	(0.10)	[74006]
	10(1, 9) - 10(0,10)	(0,0,0)	54540.680	(0.10)	[74006]
	10(1, 9) - 10(0,10)	(0,1,0)	55322.560	(0.10)	[74006]
	2(1, 2) - 1(0, 1)	(0,0,0)	55435.980	(0.10)	[74006]
	6(1, 6) - 5(1, 5)	(0,0,0)	55692.960	(0.10)	[74006]
	35(6,30) - 36(5,31)	(0,0,0)	55760.460	(0.10)	[74006]
	27(5,22) - 28(4,25)	(0,0,0)	62148.170	(0.10)	[74006]
	10(6, 5) - 9(6, 4)	(0,0,0)	95717.67	(0.10)	[73041]
	10(6, 4) - 9(6, 3)	(0,0,0)	95717.67	(0.10)	[73041]
	10(7, 4) - 9(7, 3)	(0,0,0)	95717.67	(0.10)	[73041]
	10(7, 3) - 9(7, 2)	(0,0,0)	95717.67	(0.10)	[73041]
	10(8, 2) - 9(8, 1)	(0,0,0)	95722.17	(0.10)	[73041]
	10(8, 3) - 9(8, 2)	(0,0,0)	95722.17	(0.10)	[73041]
	10(5, 6) - 9(5, 5)	(0,0,0)	95724.00	(0.10)	[73041]
	10(5, 5) - 9(5, 4)	(0,0,0)	95724.00	(0.10)	[73041]
	10(4, 7) - 9(4, 6)	(0,0,0)	95743.95	(0.10)	[73041]
	10(4, 6) - 9(4, 5)	(0,0,0)	95743.95	(0.10)	[73041]
	10(3, 8) - 9(3, 7)	(0,0,0)	95782.68	(0.10)	[73041]
	10(3, 7) - 9(3, 6)	(0,0,0)	95816.46	(0.10)	[73041]
	20(2,18) - 20(1,19)	(0,0,0)	96404.01	(0.10)	[73041]
	12(2,10) - 12(1,11)	(0,0,0)	96484.74	(0.10)	[73041]
	10(2, 8) - 9(2, 7)	(0,0,0)	96486.87	(0.10)	[73041]
	7(1, 7) - 6(0, 6)	(0,0,0)	96629.70	(0.10)	[73041]
	11(2, 9) - 11(1,10)	(0,0,0)	97938.33	(0.10)	[73041]
	21(2,19) - 21(1,20)	(0,0,0)	98528.76	(0.10)	[73041]
	10(2, 8) - 10(1, 9)	(0,0,0)	99527.22	(0.10)	[73041]
	22(2,20) - 22(1,21)	(0,0,0)	101246.22	(0.10)	[73041]
	11(1,11) - 10(1,10)	(0,0,0)	101883.26	(0.10)	[73041]

TABLE 50.2. The microwave spectrum of S_2O—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{32}S^{32}S^{16}O$	13(0,13) - 12(1,12)	(0,0,0)	102091.14	(0.10)	[73041]
	8(2, 6) - 8(1, 7)	(0,0,0)	102871.77	(0.10)	[73041]
	11(0,11) - 10(0,10)	(0,0,0)	103922.97	(0.10)	[73041]
	11(2,10) - 10(2, 9)	(0,0,0)	105011.71	(0.10)	[73041]
	11(7, 4) - 10(7, 3)	(0,0,0)	105292.83	(0.10)	[73041]
	11(7, 5) - 10(7, 4)	(0,0,0)	105292.83	(0.10)	[73041]
	11(6, 5) - 10(6, 4)	(0,0,0)	105294.36	(0.10)	[73041]
	11(6, 6) - 10(6, 5)	(0,0,0)	105294.36	(0.10)	[73041]
	11(8, 4) - 10(8, 3)	(0,0,0)	105296.46	(0.10)	[73041]
	11(8, 3) - 10(8, 2)	(0,0,0)	105296.46	(0.10)	[73041]
	11(5, 7) - 10(5, 6)	(0,0,0)	105304.53	(0.10)	[73041]
	11(5, 6) - 10(5, 5)	(0,0,0)	105304.53	(0.10)	[73041]
	11(3, 9) - 10(3, 8)	(0,0,0)	105380.13	(0.10)	[73041]
	11(3, 8) - 10(3, 7)	(0,0,0)	105434.94	(0.10)	[73041]
	11(2, 9) - 10(2, 8)	(0,0,0)	106306.77	(0.10)	[73041]
	11(1,10) - 10(1, 9)	(0,0,0)	107895.51	(0.10)	[73041]
	15(0,15) - 14(0,14)	(0,0,0)	140456.20	(0.10)	[73041]
	13(1,13) - 12(0,12)	(0,0,0)	140462.40	(0.10)	[73041]
$^{34}S^{32}S^{16}O$	3(1, 2) - 3(0, 3)	(0,0,0)	38685.010	(0.10)	[74006]
	4(1, 3) - 4(0, 4)	(0,0,0)	39772.750	(0.10)	[74006]
	5(1, 4) - 5(0, 5)	(0,0,0)	41162.713	(0.10)	[74006]
	7(1, 6) - 7(0, 7)	(0,0,0)	44933.084	(0.10)	[74006]
	1(1, 1) - 0(0, 0)	(0,0,0)	46115.814	(0.10)	[74006]
	5(0, 5) - 4(0, 4)	(0,0,0)	46295.792	(0.10)	[74006]
	5(2, 4) - 4(2, 3)	(0,0,0)	46394.804	(0.10)	[74006]
	5(2, 3) - 4(2, 2)	(0,0,0)	46504.760	(0.10)	[74006]
	10(1, 9) - 10(0,10)	(0,0,0)	53449.268	(0.10)	[74006]
	2(1, 2) - 1(0, 1)	(0,0,0)	54875.550	(0.10)	[74006]
$^{32}S^{34}S^{16}O$	1(1, 1) - 0(0, 0)	(0,0,0)	45108.466	(0.10)	[74006]
	5(1, 5) - 4(1, 4)	(0,0,0)	46101.040	(0.10)	[74006]
	8(1, 7) - 8(0, 8)	(0,0,0)	47043.918	(0.10)	[74006]
	5(0, 5) - 4(0, 4)	(0,0,0)	47402.150	(0.10)	[74006]
	5(2, 4) - 4(2, 3)	(0,0,0)	47520.422	(0.10)	[74006]
	5(3, 3) - 4(3, 2)	(0,0,0)	47558.774	(0.10)	[74006]
	5(3, 2) - 4(3, 1)	(0,0,0)	47559.782	(0.10)	[74006]
	5(2, 3) - 4(2, 2)	(0,0,0)	47652.016	(0.10)	[74006]
	2(1, 2) - 1(0, 1)	(0,0,0)	54053.680	(0.10)	[74006]

Table 51. Rotational and centrifugal distortion constants for the ground vibrational state of $^{32}S^{16}O_2$ and $^{33}S^{16}O_2$ [76000]

Watson's Determinable Parameters	$^{32}S^{16}O_2$ Value[a] (MHz)	$^{33}S^{16}O_2$ Value[a] (MHz)
A''	60 778.5553(56)	59 856.4540(681)
B''	10 317.91220(106)	10 318.1328(121)
C''	8 799.651056(927)	8 780.08934(116)
τ_1	0.3883076(1118)	0.381875±0.0092
τ_2	0.03157071(1652)	0.0316319±0.0014
τ_3[b]	0.72784(44)	0.670±0.032
τ_{aaaa}	-9.917148(221)	-9.62800±0.014
τ_{bbbb}	-0.04004591(753)	-0.0396980±0.00056
τ_{cccc}	-0.01282924(624)	-0.012705±0.00035
H_J	$0.13729(1361)\times10^{-7}$	$(-0.63683\pm0.36)\times10^{-6}$
H_{JK}	$0.1129(291)\times10^{-6}$	$(-0.17436\pm0.089)\times10^{-4}$
H_{KJ}	$-0.184810(797)\times10^{-4}$	$(0.50098\pm0.34)\times10^{-4}$
H_K	$0.354211(587)\times10^{-3}$	$(-0.1257\pm0.25)\times10^{-3}$
h_J[c]	$0.10146(241)\times10^{-7}$	$(-0.1553\pm0.078)\times10^{-6}$
h_{JK}	$0.49316(4775)\times10^{-6}$	$(-0.5277\pm0.46)\times10^{-5}$
h_K	0.12411(1467)	$(0.1324\pm0.11)\times10^{-3}$
Std. dev.	0.086	0.111
No. lines fit	198	40
Derived Parameters (assuming planarity conditions)		
A'	60 778.5452(56)	59 856.444(68)
B'	10 317.9625(10)	10 318.1809(117)
C'	8 799.8050(9)	8 780.2420(121)
τ'_{bbcc}	-0.0201513(60)	-0.01964(48)
τ'_{ccaa}	0.100672(34)	0.0962(23)
τ'_{aabb}	0.307787(94)	0.3053(65)
$\tau_{aabb}(1)$	0.42737(5)	0.4221(36)
$\tau_{aabb}(2)$	0.41948(9)	0.4059(34)
$\tau_{aabb}(3)$	0.41948(9)	0.4059(34)
$\tau_{abab}(1)$	-0.05980(5)	-0.0584(15)
$\tau_{abab}(2)$	-0.05289(5)	-0.0442(41)
$\tau_{abab}(3)$	-0.05189(7)	-0.0422(45)
$\Delta\tau$	$-0.246(3)\times10^{-3}$	$-0.516(104)\times10^{-3}$

[a] The uncertainties quoted are one standard deviation as estimated by the least squares fit. The number of significant figures quoted are necessary to reproduce the calculated transition frequencies within their standard deviations.

[b] Strictly speaking, τ_3 is not a determinable parameter, but is calculated from τ_1, τ_2, τ_{aaaa} and τ_{bbbb} using the planarity conditions.

[c] Watson uses $2h_J$ for this parameter.

Table 51.1. Rotational and centrifugal distortion constants for the (1,0,0) and (0,0,1) vibrational states of $^{32}S^{16}O_2$ [76000].

Watson's Determinable Parameters	$^{32}S^{16}O_2$ ν_1=1 Value[a] (MHz)	$^{32}S^{16}O_2$ ν_3=1 Value[a] (MHz)
A"	60 810.908(87)	60 158.405(86)
B"	10 268.097(15)	10 283.0482(192)
C"	8 757.3121(17)	8 766.86835(1655)
τ_1	0.354762±0.0136	0.481166±0.023
τ_2	0.027035±0.0020	0.0447019±0.0034
τ_3[b]	0.821±0.048	0.450±0.080
τ_{aaaa}	-10.0546±0.024	-9.87982±0.034
τ_{bbbb}	-0.0410525±0.00084	-0.0362180±0.0014
τ_{cccc}	-0.013630±0.00055	-0.011006±0.0008
H_J	$(0.66187\pm0.59)\times10^{-6}$	$(-0.220903\pm0.079)\times10^{-5}$
H_{JK}	$(0.12798\pm0.17)\times10^{-4}$	$(-0.766512\pm0.23)\times10^{-4}$
H_{KJ}	$(-0.51919\pm0.76)\times10^{-4}$	$(0.24558\pm0.081)\times10^{-3}$
H_K	$(0.6008\pm0.52)\times10^{-3}$	$(-0.10760\pm0.052)\times10^{-2}$
h_J[c]	$(0.4347\pm1.66)\times10^{-7}$	$(-0.76972\pm0.23)\times10^{-6}$
h_{JK}	$(0.1132\pm0.064)\times10^{-4}$	$(-0.4544\pm0.73)\times10^{-5}$
h_K	$(-0.1522\pm0.13)\times10^{-3}$	$(-0.6118\pm1.31)\times10^{-4}$
Std. dev.	0.190	0.151
No. lines fit	41	33
Derived Parameters (assuming planarity conditions)		
A'	60 810.898(87)	60 158.397(86)
B'	10 268.146(15)	10 283.107(17)
C'	8 757.451(17)	8 767.058(17)
τ'_{bbcc}	-0.02104(72)	-0.0167(12)
τ'_{ccaa}	0.0972(34)	0.1180(60)
τ'_{aabb}	0.2786(97)	0.380(16)
$\tau_{aabb}(1)$	0.4245(52)	0.4533(92)
$\tau_{aabb}(2)$	0.4153(83)	0.4091(89)
$\tau_{aabb}(3)$	0.4153(83)	0.4091(89)
$\tau_{abab}(1)$	-0.0730(25)	-0.0368(35)
$\tau_{abab}(2)$	-0.0649(86)	0.002(13)
$\tau_{abab}(3)$	-0.0637(96)	0.007(14)
$\Delta\tau$	$-0.287(242)\times10^{-3}$	$-0.139(36)\times10^{-2}$

[a] The uncertainites quoted are one standard deviation as estimated by the least squares fit. The number of significant figures quoted are necessary to reproduce the calculated transition frequencies within their standard deviations.

[b] Strictly speaking, τ_3 is not a determinable parameter, but is calculated from τ_1, τ_2, τ_{aaaa} and τ_{bbbb} using the planarity conditions.

[c] Watson uses $2h_J$ for this parameter.

Table 51.2. Rotational and centrifugal distortion constants for the (0,1,0) and (0,2,0) vibrational states of $^{32}S^{16}O_2$ [76000].[a]

Watson's Determinable Parameters	$^{32}S^{16}O_2$ ν_2=1 Value (MHz)	$^{32}S^{16}O_2$ ν_2=2 Value (MHz)
A''	61 954.7930(177)	63 185.5876(656)
B''	10 320.2147(32)	10 322.1482(114)
C''	8 783.80517(276)	8 767.77679(1004)
τ_1	0.4094489(5437)	0.441451±0.0070
τ_2	0.03361685(7973)	0.0372037±0.0010
τ_3[b]	0.6996(21)	0.6355±0.024
τ_{aaaa}	-11.02698(118)	-12.2839±0.014
τ_{bbbb}	-0.04013276(3566)	-0.0396164±0.00040
τ_{cccc}	-0.0127477(275)	-0.012326±0.00026
H_J	$(0.2793\pm0.78)\times10^{-8}$	$(-0.31551\pm0.16)\times10^{-6}$
H_{JK}	$(-0.3777\pm1.64)\times10^{-7}$	$(-0.78331\pm0.42)\times10^{-5}$
H_{KJ}	$(-0.21090\pm0.011)\times10^{-4}$	$(0.1111\pm0.19)\times10^{-4}$
H_K	$(0.43841\pm0.010)\times10^{-3}$	$(0.26342\pm0.14)\times10^{-3}$
h_J[c]	$(0.11290\pm0.0080)\times10^{-7}$	$(-0.4662\pm0.29)\times10^{-7}$
h_{JK}	$(0.1301\pm0.20)\times10^{-6}$	$(-0.3455\pm0.19)\times10^{-5}$
h_K	$(0.1509\pm0.048)\times10^{-4}$	$(0.10331\pm0.038)\times10^{-3}$
Std. dev.	0.114	0.143
No. lines fit	90	52
Derived Parameters (assuming planarity conditions)		
A'	61 954.783(18)	63 185.578(66)
B'	10 320.2697(32)	10 322.210(11)
C'	8 783.9647(27)	8 767.945(10)
τ'_{bbcc}	-0.019572(29)	-0.01839(36)
τ'_{ccaa}	0.11004(17)	0.1231(17)
τ'_{aabb}	0.31898(45)	0.3368(49)
$\tau_{aabb}(1)$	0.46821(24)	0.5171(27)
$\tau_{aabb}(2)$	0.44620(31)	0.4752(18)
$\tau_{aabb}(3)$	0.44620(31)	0.4752(18)
$\tau_{abab}(1)$	-0.07462(22)	-0.0920(12)
$\tau_{abab}(2)$	-0.05529(18)	-0.0533(24)
$\tau_{abab}(3)$	-0.05245(22)	-0.0478(26)
$\Delta\tau$	$-0.689(12)\times10^{-3}$	$-0.1312(54)\times10^{-2}$

[a] The uncertainties quoted are one standard deviation as estimated by the least squares fit. The number of significant figures quoted are necessary to reproduce the calculated transition frequencies within their standard deviations.

[b] Strictly speaking, τ_3 is not a determinable parameter, but is calculated from τ_1, τ_2, τ_{aaaa} and τ_{bbbb} using the planarity conditions.

[c] Watson uses $2h_J$ for this parameter.

Table 51.3. Rotational and centrifugal distortion constants for the ground and (0,1,0) vibrational states of $^{34}S^{16}O_2$ [76000].[a]

Watson's Determinable Parameters	$^{34}S^{16}O_2$ (0,0,0) Value (MHz)	$^{34}S^{16}O_2$ (0,1,0) Value (MHz)
A"	58 991.1970(150)	60 129.228(339)
B"	10 318.3582(28)	10 320.298(63)
C"	8 761.25810(246)	8 745.0711(513)
τ_1	0.367168(717)	0.37964±0.029
τ_2	0.0303047(1098)	0.031482±0.0043
τ_3[b]	0.6542(24)	0.64±0.09
τ_{aaaa}	-9.338295(1597)	-10.2580±0.043
τ_{bbbb}	-0.0400718(447)	-0.040042±0.0017
τ_{cccc}	-0.012533(35)	-0.012357±0.0012
H_J	$(0.2242\pm0.099)\times10^{-7}$	
H_{JK}	$(0.3456\pm0.63)\times10^{-6}$	
H_{KJ}	$(-0.21318\pm0.037)\times10^{-4}$	
H_K	$(0.36197\pm0.026)\times10^{-3}$	
h_J[c]	$(0.672\pm0.82)\times10^{-8}$	
h_{JK}	$(0.6369\pm0.59)\times10^{-6}$	
h_K	$(0.7388\pm1.74)\times10^{-5}$	
Std. Dev.	0.083	0.401
No. lines fit	59	24
Derived Parameters (assuming planarity conditions)		
A'	58 991.187(15)	60 129.218(338)
B'	10 318.4033(27)	10 320.347(61)
C'	8 761.4064(24)	8 745.221(49)
τ'_{bbcc}	-0.019739(40)	-0.0191(15)
τ'_{ccaa}	0.09027(31)	0.0992(83)
τ'_{aabb}	0.29664(49)	0.300(19)
$\tau_{aabb}(1)$	0.41404(44)	0.451(13)
$\tau_{aabb}(2)$	0.40618(80)	0.431(9)
$\tau_{aabb}(3)$	0.40618(80)	0.431(9)
$\tau_{abab}(1)$	-0.05871(25)	-0.0755(33)
$\tau_{abab}(2)$	-0.05184(78)	-0.0588(66)
$\tau_{abab}(3)$	-0.05083(88)	-0.0563(71)
$\Delta\tau$	$-0.256(29)\times10^{-3}$	$-0.62(14)\times10^{-3}$

[a] The uncertainties quoted are one standard deviation as estimated by the least squares fit. The number of significant figures quoted are necessary to reproduce the calculated transition frequencies within their standard deviations.

[b] Strictly speaking, τ_3 is not a determinable parameter, but is calculated from τ_1, τ_2, τ_{aaaa} and τ_{bbbb} using the planarity conditions.

[c] Watson uses $2h_J$ for this parameter.

Table 51.4. Rotational and quartic distortion constants for all isotopic species and vibrational states analyzed for SO_2 by the Kivelson and Wilson method.[a]

Isotopic Species	Vib. State	A'	B'	C'	τ'_{aaaa}	τ'_{bbbb}	τ'_{aabb}	τ'_{abab}	Reference
$^{32}S^{16}O_2$	(0,0,0)	60 778.514	10 317.965	8 799.804	- 9.87411	-0.040090	0.42171	-0.05617	[68036]
	(1,0,0)	60 811.038	10 268.174	8 757.465	-10.02397	-0.041791	0.41672	-0.07140	[68036]
	(0,1,0)	61 954.687	10 320.256	8 783.941	-10.96607	-0.040361	0.45757	-0.06649	[68036]
	(0,0,1)	60 158.431	10 283.159	8 767.041	- 9.71437	-0.040616	0.41771	-0.04510	[68036]
	(0,2,0)	63 185.787	10 322.313	8 767.940	-11.92063	-0.048489	0.44319	-0.09991	[68036]
	(0,3,0)	64 474.75	10 323.98	8 751.89					[69039]
	(1,1,0)	61 993.90	10 270.61	8 742.11					[69039]
	(0,1,1)	61 315.42	10 285.17	8 750.50					[69039]
	(1,0,1)	60 183.04	10 233.31	8 723.59					[69039]
	(2,0,0)	60 842.29	10 218.40	8 715.38					[69039]
	(0,0,2)	59 544.76	10 247.91	8 734.14					[69039]
$^{34}S^{16}O_2$	(0,0,0)	58 991.174	10 318.399	8 761.394	- 9.31885	-0.040074	0.40944	-0.05585	[65015]
	(0,1,0)	60 130.514	10 320.598	8 745.3716	-10.06005	-0.049991	0.36370	-0.08613	[63016]
$^{33}S^{16}O_2$	(0,0,0)	59 856.387	10 318.283	8 780.124	- 9.54037	-0.040133	0.41053	-0.05566	[68017]
	(0,1,0)	61 013.738	10 320.489	8 764.2976	-10.32546	-0.049430	0.36925	-0.08474	[64015]
$^{32}S^{16}O^{18}O$	(0,0,0)	59 101.191	9 724.523	8 331.647	- 9.34427	-0.035482	0.38333	-0.05035	[65016]
	(0,1,0)	60 212.028	9 726.741	8 317.2379	-10.21285	-0.037730	0.39444	-0.06710	[64012]
$^{32}S^{18}O_2$	(0,0,0)	57 384.526	9 170.351	7 889.6007	- 8.73736	-0.032574	0.33891	-0.04538	[63010]
	(0,1,0)	58 432.942	9 172.691	7 876.7265	- 9.63121	-0.034810	0.35594	-0.06241	[64012]
$^{34}S^{16}O^{18}O$	(0,0,0)	57 314.690	9 724.228	8 294.697	- 8.75329	-0.035421	0.37185	-0.05107	[65016]
	(0,1,0)	58 390.506	9 726.328	8 280.1595	- 9.60174	-0.038290	0.38053	-0.06821	[64015]
$^{34}S^{18}O_2$	(0,0,0)	55 597.855	9 170.815	7 854.9773	- 8.24354	-0.031857	0.33922	-0.04580	[63017]
	(0,1,0)	56 611.880	9 172.937	7 841.8818	- 9.01647	-0.033977	0.34620	-0.05832	[64015]
$^{33}S^{16}O^{18}O$	(0,0,0)	58 179.596	9 724.495	8 312.748	- 8.98394	-0.036655	0.36724	-0.05199	[68017]
$^{33}S^{18}O_2$	(0,0,0)	56 463.093	9 170.713	7 871.928	- 8.51291	-0.031434	0.34678	-0.04355	[68017]
$^{32}S^{16}O^{17}O$	(0,0,0)	59 883.544	10 008.076	8 555.1956	- 9.53188	-0.037835	0.39729	-0.05552	[65017]
	(0,1,0)	61 024.922	10 010.312	8 540.0787	-10.46194	-0.041371	0.40171	-0.07346	[65017]
$^{32}S^{17}O_2$	(0,0,0)	58 977.398	9 709.1769	8 317.7300	- 9.23091	-0.036151	0.37450	-0.05103	[68037]
	(0,1,0)	60 085.210	9 711.4564	8 303.4243	-10.22963	-0.036417	0.40693	-0.06079	[68037]
$^{34}S^{16}O^{17}O$	(0,0,0)	58 096.578	10 008.3346	8 517.6794	- 9.85911	-0.039230	0.37508	-0.05612	[65017]
	(0,1,0)	59200.674	10 010.1790	8 502.2035	- 9.94347	-0.037375	0.42598	-0.06948	[65017]
$^{34}S^{17}O_2$	(0,0,0)	57 190.236	9 709.6284	8 281.2770	- 8.59731	-0.039159	0.34067	-0.05660	[68037]
$^{33}S^{16}O^{17}O$	(0,0,0)	58 961.521	10 008.284	8 535.969	- 9.23227	-0.038835	0.38387	-0.05465	[68017]
	(0,1,0)	60 085.026	10 010.5588	8 520.9077	-10.19203	-0.043129	0.36780	-0.05501	[68037]
$^{33}S^{17}O_2$	(0,0,0)	58 055.949	9 709.489	8 299.264	- 8.95079	-0.036378	0.36448	-0.04853	[68017]
$^{32}S^{17}O^{18}O$	(0,0,0)	58 184.900	9 435.2693	8 100.7437	- 9.07095	-0.030668	0.38563	-0.04298	[65017]
	(0,1,0)	59 263.039	9 437.7055	8 087.1002	- 9.87586	-0.035927	0.37394	-0.05895	[68037]
$^{33}S^{17}O^{18}O$	(0,0,0)	57 263.881	9 435.627	8 082.606	- 8.72074	-0.033828	0.35598	-0.04705	[68017]
$^{34}S^{17}O^{18}O$	(0,0,0)	56 398.745	9 435.6558	8 065.1794	- 8.44291	-0.034950	0.34410	-0.05096	[65017]
$^{36}S^{16}O_2$	(0,0,0)	57 399.507	10 318.7849	8 725.4710	- 8.75476	-0.041953	0.38162	-0.05924	[64014]
	(0,1,0)	58 507.	10 320.8	8 709.3					[64014]

[a] No uncertainties are given in the refernces cited. See the previous SO_2 tables for the constants and uncertainties determined in the present work.

Table 51.5. Hyperfine coupling constants, Zeeman constants and electric dipole moment for SO_2.

Parameter	Isotopic Species	Value	Reference
Hyperfine constants			
χ_{aa} (^{33}S) (MHz)	$^{33}S^{16}O_2$	- 1.91(13)	[76000]
χ_{bb} (^{33}S) (MHz)	$^{33}S^{16}O_2$	25.86(8)	[76000]
χ_{cc} (^{33}S) (MHz)	$^{33}S^{16}O_2$	-23.95(8)	[76000]
χ_{aa} (^{17}O) (MHz)	a	- 1.0(1)	[65017]
χ_{bb} (^{17}O) (MHz)	a	5.8(2)	[65017]
χ_{cc} (^{17}O) (MHz)	a	- 4.8(1)	[65017]
Zeeman constants			
g_{aa} (μ_N)	$^{32}S^{16}O_2$	- 0.6037(5)	[69027]
g_{bb} (μ_N)	$^{32}S^{16}O_2$	- 0.1161(2)	[69027]
g_{cc} (μ_N)	$^{32}S^{16}O_2$	- 0.0882(4)	[69027]
χ_{aa} (erg/G^2·mole)	$^{32}S^{16}O_2$	-16.07(18)	[69027]
χ_{bb} (erg/G^2·mole)	$^{32}S^{16}O_2$	-17.18(12)	[69027]
χ_{cc} (erg/G^2·mole)	$^{32}S^{16}O_2$	-21.35(30)	[69027]
Electric dipole moment			
μ (D)	$^{32}S^{16}O_2$	1.634(1)	[69042]

[a] Identical values were obtained from $^{32}S^{16}O^{17}O$, $^{34}S^{16}O^{17}O$, $^{32}S^{17}O^{18}O$ and $^{34}S^{17}O^{18}O$.

Table 51.6. Additional references for SO_2 divided into general categories.

Microwave Spectrum	Stark and Zeeman Effect	Line Width and Pressure Broadening	Other
[47009] [66029]	[48009]	[63012] [72042]	[61010]
[51015] [67001]	[51008]	[63013] [73051]	[62003]
[54010] [67017]	[51009]	[63014]	[76026]
[57008] [69040]	[59005]	[69032]	
[59012] [70031]	[65013]	[69041]	
[62017] [72031]	[69043]	[70032]	
[64017] [73050]		[70033]	
[66028] [76027]		[70034]	

TABLE 51.7. The microwave spectrum of SO_2

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{16}O$	39(7,33) - 38(8,30)	(0,0,0)	521.431	(*0.01)	[76000]
	18(3,15) - 17(4,14)	(0,1,0)	851.336	(*0.03)	[76000]
	15(2,14) - 14(3,11)	(0,1,0)	1069.337	(*0.03)	[76000]
	19(3,17) - 18(4,14)	(1,0,0)	1832.116	(*0.10)	[76000]
	45(9,37) - 46(8,38)	(0,2,0)	1906.511	(*0.10)	[76000]
	7(1, 6) - 6(2, 5)	(0,0,1)	1935.561	(*0.07)	[76000]
	34(6,28) - 33(7,27)	(1,0,0)	2496.283	(*0.11)	[76000]
	44(9,35) - 45(8,38)	(0,1,0)	2613.415	(*0.04)	[76000]
	23(4,19) - 22(5,18)	(0,0,1)	2794.648	(*0.10)	[76000]
	27(2,26) - 26(3,23)	(0,0,0)	2838.925	(*0.03)	[76000]
	43(9,35) - 44(8,36)	(0,0,0)	3045.788	(*0.02)	[76000]
	29(5,25) - 28(6,22)	(1,0,0)	3228.873	(*0.09)	[76000]
	19(3,17) - 18(4,14)	(0,0,0)	4027.080	(*0.01)	[76000]
	13(3,10) - 14(2,13)	(0,0,1)	4155.011	(*0.09)	[76000]
	38(4,34) - 39(3,37)	(0,0,0)	4195.716	(*0.03)	[76000]
	26(3,23) - 27(2,26)	(0,1,0)	4275.675	(*0.05)	[76000]
	18(4,14) - 19(3,17)	(0,1,0)	4332.963	(*0.03)	[76000]
	38(8,30) - 39(7,33)	(1,0,0)	4350.057	(*0.17)	[76000]
	11(3, 9) - 12(2,10)	(0,0,0)	4546.018	(0.02)	[73051]
	11(3, 9) - 12(2,10)	(0,0,0)	4546.071	(*0.01)	[76000]
	25(4,22) - 24(5,19)	(0,2,0)	4822.815	(*0.06)	[76000]
	40(7,33) - 39(8,32)	(0,1,0)	5086.187	(*0.04)	[76000]
	60(11,49) - 59(12,48)	(0,0,0)	5189.596	(*0.04)	[76000]
	14(3,11) - 15(2,14)	(0,2,0)	5285.493	(*0.06)	[76000]
	56(10,46) - 55(11,45)	(0,1,0)	5636.682	(*0.05)	[76000]
	15(2,14) - 14(3,11)	(1,0,0)	5682.599	(*0.09)	[76000]
	41(7,35) - 40(8,32)	(0,2,0)	6089.706	(*0.08)	[76000]
	11(3, 9) - 12(2,10)	(1,0,0)	6254.875	(*0.09)	[76000]
	28(6,22) - 29(5,25)	(0,1,0)	6326.651	(*0.02)	[76000]
	34(7,27) - 35(6,30)	(0,2,0)	6750.990	(*0.06)	[76000]
	29(5,25) - 28(6,22)	(0,0,0)	6837.402	(*0.01)	[76000]
	34(6,28) - 33(7,27)	(0,0,0)	6848.427	(*0.01)	[76000]
	18(3,15) - 17(4,14)	(1,0,0)	6888.714	(*0.10)	[76000]
	15(2,14) - 14(3,11)	(0,0,0)	7169.45	(0.10)	[70055]
	15(2,14) - 14(3,11)	(0,0,0)	7169.597	(*0.01)	[76000]
	48(10,38) - 49(9,41)	(0,0,0)	7503.519	(*0.02)	[76000]
	39(7,32) - 38(8,31)	(0,0,1)	7800.663	(*0.39)	[76000]
	11(2, 9) - 12(1,12)	(0,0,1)	8087.07	(0.10)	[64016]
	17(4,14) - 18(3,15)	(0,2,0)	8120.1	(0.2)	[68036]
	12(2,10) - 13(1,13)	(0,0,0)	8420.3	(0.2)	[68036]
	43(9,35) - 44(8,36)	(1,0,0)	8521.615	(*0.23)	[76000]
	3(0, 3) - 2(1, 2)	(0,0,1)	8622.74	(0.10)	[64016]
	49(10,40) - 50(9,41)	(0,1,0)	8793.8	(0.2)	[68036]
	33(7,27) - 34(6,28)	(0,1,0)	8797.40	(0.10)	[68036]
	30(5,25) - 29(6,24)	(0,2,0)	8885.6	(0.2)	[68036]
	27(6,22) - 28(5,23)	(0,0,0)	8911.0	(0.2)	[68036]
	27(6,22) - 28(5,23)	(0,0,0)	8911.144	(*0.01)	[76000]
	27(6,21) - 28(5,24)	(0,0,1)	9080.7	(0.2)	[68036]
	12(2,10) - 13(1,13)	(1,0,0)	9172.5	(0.2)	[68036]
	55(10,46) - 54(11,43)	(0,0,0)	9240.7	(0.1)	[68036]
	32(7,26) - 33(6,27)	(0,0,1)	9264.176	(*0.16)	[76000]
	18(3,15) - 17(4,14)	(0,0,0)	9403.2	(0.2)	[68036]
	34(6,29) - 33(7,26)	(0,0,1)	9482.026	(*0.21)	[76000]
	35(6,30) - 34(7,27)	(0,1,0)	9509.70	(0.10)	[68036]
	13(2,11) - 14(1,14)	(0,0,1)	9653.603	(*0.25)	[76000]
	52(9,43) - 51(10,42)	(0,2,0)	10025.972	(*0.14)	[76000]
	11(3, 9) - 12(2,10)	(0,1,0)	10527.60	(0.10)	[68036]
	17(4,13) - 18(3,16)	(0,0,1)	10915.0	(0.2)	[68036]
	24(4,21) - 23(5,18)	(0,0,1)	11024.921	(*0.09)	[76000]
	50(10,40) - 51(9,43)	(0,2,0)	11409.629	(*0.14)	[76000]
	26(3,23) - 27(2,26)	(0,2,0)	11434.180	(*0.14)	[76000]
	24(4,20) - 23(5,19)	(0,1,0)	11456.95	(0.10)	[68036]
	53(11,43) - 54(10,44)	(0,0,0)	11472.3	(0.1)	[68036]
	10(2, 8) - 11(1,11)	(0,0,0)	11788.841	(0.02)	[73051]
	16(4,13) - 17(3,14)	(0,0,1)	11884.180	(*0.08)	[76000]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ – $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{16}O$	45(8,38) – 44(9,35)	(1,0,0)	11973.676	(*0.29)	[76000]
	51(9,43) – 50(10,40)	(0,1,0)	11994.3	(0.2)	[68036]
	22(5,17) – 23(4,20)	(0,0,0)	12132.4	(0.2)	[68036]
	2(0, 2) – 1(1, 1)	(0,0,0)	12256.583	(0.02)	[73051]
	1(1, 1) – 2(0, 2)	(1,0,0)	12522.89	(0.10)	[64016]
	27(6,22) – 28(5,23)	(1,0,0)	12563.0	(0.2)	[68036]
	10(2, 8) – 11(1,11)	(1,0,0)	12597.69	(0.10)	[64016]
	38(4,34) – 39(3,37)	(0,1,0)	12756.20	(0.10)	[68036]
	1(1, 1) – 2(0, 2)	(2,0,0)	12787.19	(0.10)	[69039]
	18(4,14) – 19(3,17)	(0,2,0)	13072.5	(0.2)	[65015]
	12(2,10) – 13(1,13)	(0,1,0)	13084.10	(0.10)	[68036]
	1(1, 1) – 2(0, 2)	(0,1,0)	13457.50	(0.10)	[68036]
	50(9,41) – 49(10,40)	(0,0,0)	13599.5	(0.1)	[62014]
	39(8,32) – 40(7,33)	(0,2,0)	13685.8	(0.2)	[68036]
	1(1, 1) – 2(0, 2)	(1,1,0)	13729.07	(0.20)	[69039]
	37(8,29) – 38(7,32)	(0,0,1)	14169.218	(*0.30)	[76000]
	25(2,24) – 24(3,21)	(0,2,0)	14506.8	(0.2)	[68036]
	14(2,12) – 15(1,15)	(0,0,0)	14587.697	(0.02)	[73051]
	1(1, 1) – 2(0, 2)	(0,2,0)	14714.15	(0.20)	[68036]
	8(1, 7) – 7(2, 6)	(0,3,0)	14880.46	(0.20)	[69039]
	22(5,17) – 23(4,20)	(1,0,0)	14974.3	(0.2)	[68036]
	14(2,12) – 15(1,15)	(1,0,0)	15230.5	(0.2)	[68036]
	54(11,43) – 55(10,46)	(0,1,0)	15309.2	(0.2)	[68036]
	58(12,46) – 59(11,49)	(0,0,0)	15470.4	(0.1)	[68036]
	9(2, 7) – 10(1,10)	(0,0,1)	15847.9	(0.2)	[68036]
	1(1, 1) – 2(0, 2)	(0,3,0)	16030.59	(0.20)	[69039]
	25(4,22) – 24(5,19)	(0,1,0)	16048.54	(0.10)	[64019]
	49(4,46) – 48(5,43)	(0,1,0)	16069.0	(0.2)	[68036]
	10(2, 8) – 11(1,11)	(0,1,0)	16126.89	(0.10)	[64019]
	17(2,16) – 16(3,13)	(0,2,0)	16372.7	(0.2)	[68036]
	32(7,25) – 33(6,28)	(0,0,0)	16681.03	(0.10)	[64019]
	11(3, 9) – 12(2,10)	(0,2,0)	16807.3	(0.2)	[68036]
	38(8,30) – 39(7,33)	(0,1,0)	17341.9	(0.3)	[62014]
	45(8,38) – 44(9,35)	(0,0,0)	17539.94	(0.10)	[64019]
	71(13,59) – 70(14,56)	(0,0,0)	17719.15	(0.10)	[68036]
	12(2,10) – 13(1,13)	(0,2,0)	17880.1	(0.2)	[68036]
	40(7,33) – 39(8,32)	(1,0,0)	17994.7	(0.2)	[68036]
	29(5,24) – 28(6,23)	(0,0,1)	18145.0	(0.2)	[68036]
	8(1, 7) – 7(2, 6)	(0,2,0)	18568.3	(0.2)	[64016]
	47(8,40) – 46(9,37)	(0,2,0)	18592.15	(0.20)	[68036]
	36(6,30) – 35(7,29)	(0,2,0)	18976.5	(0.2)	[68036]
	24(4,20) – 23(5,19)	(1,0,0)	19226.75	(0.10)	[68036]
	46(8,38) – 45(9,37)	(0,1,0)	19229.6	(0.3)	[62014]
	63(13,51) – 64(12,52)	(0,0,0)	19306.2	(0.2)	[68036]
	37(8,30) – 38(7,31)	(0,0,0)	19637.10	(0.10)	[64019]
	14(2,12) – 15(1,15)	(0,1,0)	19681.13	(0.10)	[64019]
	62(11,51) – 61(12,50)	(0,1,0)	20031.0	(0.2)	[68036]
	28(6,22) – 29(5,25)	(0,2,0)	20103.1	(0.2)	[65015]
	12(3, 9) – 13(2,12)	(0,0,0)	20335.396	(0.02)	[73051]
	21(3,19) – 20(4,16)	(0,2,0)	20383.75	(0.20)	[68036]
	16(2,15) – 15(3,12)	(0,0,1)	20383.86	(0.10)	[64016]
	10(2, 8) – 11(1,11)	(0,2,0)	20611.6	(0.2)	[68036]
	35(6,30) – 34(7,27)	(1,0,0)	20689.8	(0.2)	[65015]
	15(2,13) – 16(1,16)	(0,0,1)	20777.282	(*0.32)	[76000]
	31(5,27) – 30(6,24)	(0,2,0)	20785.7	(0.2)	[65015]
	32(7,25) – 33(6,28)	(1,0,0)	20835.1	(0.2)	[65015]
	8(1, 7) – 7(2, 6)	(1,1,0)	20953.36	(0.20)	[69039]
	25(2,24) – 24(3,21)	(0,1,0)	21264.29	(0.10)	[64019]
	59(12,48) – 60(11,49)	(0,1,0)	21479.5	(0.2)	[68036]
	66(12,54) – 65(13,53)	(0,0,0)	21761.4	(0.2)	[68036]
	12(3, 9) – 13(2,12)	(1,0,0)	21768.64	(0.10)	[64016]
	8(2, 6) – 9(1, 9)	(0,0,2)	21843.68	(0.20)	[69039]
	8(1, 7) – 7(2, 6)	(0,1,0)	22065.73	(0.10)	[64019]
	27(6,22) – 28(5,23)	(0,1,0)	22220.36	(0.10)	[64019]
	24(4,20) – 23(5,19)	(0,0,0)	22482.548	(0.02)	[73051]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{16}O$	17(2,16) - 16(3,13)	(0,1,0)	22733.99	(0.10)	[64019]
	22(5,17) - 23(4,20)	(0,1,0)	22904.86	(0.10)	[64019]
	30(5,25) - 29(6,24)	(0,1,0)	22928.52	(0.10)	[64019]
	40(7,33) - 39(8,32)	(0,0,0)	23034.821	(0.02)	[73051]
	68(14,54) - 69(13,57)	(0,0,0)	23041.1	(0.2)	[68036]
	43(9,35) - 44(8,36)	(0,1,0)	23206.35	(0.30)	[62014]
	13(2,11) - 12(3,10)	(0,0,1)	23402.2	(0.2)	[68036]
	5(2, 4) - 6(1, 5)	(0,0,0)	23414.253	(0.02)	[73051]
	20(3,18) - 19(4,15)	(0,0,1)	23629.6	(0.2)	[68036]
	44(9,35) - 45(8,38)	(0,2,0)	23681.2	(0.2)	[68036]
	25(4,22) - 24(5,19)	(1,0,0)	23788.	(1.)	[65015]
	21(5,17) - 22(4,18)	(0,0,0)	24039.641	(0.02)	[73051]
	8(2, 6) - 9(1, 9)	(0,0,0)	24083.455	(0.02)	[73051]
	5(2, 4) - 6(1, 5)	(1,0,0)	24275.46	(0.10)	[64016]
	8(1, 7) - 7(2, 6)	(1,0,0)	24301.59	(0.10)	[64016]
	42(9,33) - 43(8,36)	(0,0,0)	24319.556	(0.02)	[73051]
	37(8,30) - 38(7,31)	(1,0,0)	24431.8	(0.2)	[68036]
	41(7,35) - 40(8,32)	(0,1,0)	24796.9	(0.3)	[62014]
	8(2, 6) - 9(1, 9)	(1,0,0)	24888.0	(0.2)	[68036]
	14(2,12) - 15(1,15)	(0,2,0)	24889.75	(0.20)	[68036]
	49(4,46) - 48(5,43)	(0,0,0)	24915.60	(0.10)	[68036]
	35(6,30) - 34(7,27)	(0,0,0)	25049.43	(0.02)	[73051]
	5(2, 4) - 6(1, 5)	(2,0,0)	25132.06	(0.20)	[69039]
	33(7,27) - 34(6,28)	(0,2,0)	25167.2	(0.2)	[68036]
	10(2, 8) - 11(1,11)	(0,3,0)	25254.4	(0.2)	[68036]
	8(1, 7) - 7(2, 6)	(0,0,0)	25392.776	(0.02)	[51016]
	4(0, 4) - 3(1, 3)	(0,3,0)	25597.70	(0.20)	[69039]
	8(2, 6) - 9(1, 9)	(2,0,0)	25683.50	(0.20)	[69039]
	61(11,51) - 60(12,48)	(0,0,0)	25883.6	(0.2)	[65015]
	26(6,21) - 27(5,22)	(0,0,1)	25999.8	(0.2)	[68036]
	12(3, 9) - 13(2,12)	(0,1,0)	26411.75	(0.10)	[64016]
	57(10,48) - 56(11,45)	(0,1,0)	26489.4	(0.2)	[68036]
	73(15,59) - 74(14,60)	(0,0,0)	26644.5	(0.2)	[68036]
	25(4,22) - 24(5,19)	(0,0,0)	26776.574	(0.02)	[73051]
	5(2, 4) - 6(1, 5)	(0,1,0)	26850.3	(0.2)	[62016]
	4(0, 4) - 3(1, 3)	(0,2,0)	26898.5	(0.2)	[68036]
	21(5,17) - 22(4,18)	(1,0,0)	26977.8	(0.2)	[65015]
	10(3, 8) - 11(2, 9)	(0,0,1)	26984.8	(0.2)	[68036]
	17(2,16) - 16(3,13)	(1,0,0)	27386.15	(0.10)	[68036]
	64(13,51) - 65(12,54)	(0,1,0)	27546.3	(0.2)	[68036]
	40(7,34) - 39(8,31)	(0,0,1)	27638.748	(*0.59)	[76000]
	4(0, 4) - 3(1, 3)	(1,1,0)	27669.12	(0.20)	[69039]
	8(1, 7) - 7(2, 6)	(0,0,2)	27700.88	(0.20)	[69039]
	5(2, 4) - 6(1, 5)	(1,1,0)	27730.40	(0.20)	[69039]
	12(3, 9) - 13(2,12)	(1,1,0)	27865.5	(0.5)	[68036]
	25(2,24) - 24(3,21)	(0,0,0)	27932.2	(0.2)	[68036]
	25(2,24) - 24(3,21)	(0,0,0)	27932.454	(*0.03)	[76000]
	21(5,16) - 22(4,19)	(0,0,1)	28121.3	(0.2)	[68036]
	4(0, 4) - 3(1, 3)	(0,1,0)	28138.3	(0.2)	[62016]
	8(2, 6) - 9(1, 9)	(0,1,0)	28173.4	(0.2)	[62016]
	47(10,38) - 48(9,39)	(0,0,0)	28179.20	(0.05)	[62016]
	4(0, 4) - 3(1, 3)	(2,0,0)	28395.22	(0.20)	[69039]
	4(0, 4) - 3(1, 3)	(1,0,0)	28857.310	(*0.05)	[76000]
	17(2,16) - 16(3,13)	(0,0,0)	28858.037	(0.02)	[73051]
	8(2, 6) - 9(1, 9)	(1,1,0)	28983.2	(0.5)	[69039]
	21(3,19) - 20(4,16)	(0,1,0)	29052.63	(0.10)	[64019]
	4(0, 4) - 3(1, 3)	(0,0,0)	29321.333	(0.02)	[73051]
	19(3,16) - 18(4,15)	(0,1,1)	29658.4	(0.5)	[68036]
	42(9,33) - 43(8,36)	(1,0,0)	29668.0	(0.2)	[68036]
	48(10,38) - 49(9,41)	(0,1,0)	29861.2	(0.2)	[68036]
	42(7,35) - 41(8,34)	(0,2,0)	29871.8	(0.2)	[68036]
	4(0, 4) - 3(1, 3)	(0,0,2)	29922.82	(0.20)	[69039]
	16(2,14) - 17(1,17)	(0,0,0)	30205.52	(0.10)	[64019]
	56(10,46) - 55(11,45)	(0,0,0)	30218.84	(0.10)	[65015]
	23(2,22) - 22(3,19)	(0,2,0)	30268.7	(0.2)	[68036]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{16}O$	5(2, 4) - 6(1, 5)	(0,2,0)	30455.1	(0.2)	[68036]
	19(2,18) - 18(3,15)	(0,2,0)	30486.1	(0.2)	[68036]
	16(2,14) - 17(1,17)	(1,0,0)	30700.5	(0.2)	[68036]
	53(9,45) - 52(10,42)	(0,2,0)	30869.3	(0.2)	[68036]
	37(3,35) - 36(4,32)	(0,1,0)	30948.20	(0.10)	[68036]
	28(3,25) - 29(2,28)	(0,0,0)	31089.903	(*0.03)	[76000]
	28(3,25) - 29(2,28)	(0,0,0)	31089.92	(0.10)	[64019]
	30(5,26) - 29(6,23)	(0,0,1)	31678.1	(0.2)	[68036]
	16(4,12) - 17(3,15)	(0,0,0)	31922.21	(0.03)	[63011]
	31(7,24) - 32(6,27)	(0,0,1)	31943.6	(0.2)	[68036]
	7(2, 5) - 8(1, 8)	(0,0,1)	31993.92	(0.10)	[64016]
	49(10,40) - 50(9,41)	(0,2,0)	32188.0	(0.2)	[68036]
	52(11,41) - 53(10,44)	(0,0,0)	32195.45	(0.10)	[64019]
	32(7,25) - 33(6,28)	(0,1,0)	32214.62	(0.10)	[64019]
	30(5,25) - 29(6,24)	(1,0,0)	32381.8	(0.2)	[68036]
	8(2, 6) - 9(1, 9)	(0,2,0)	32420.05	(0.20)	[68036]
	12(3, 9) - 13(2,12)	(0,2,0)	32753.0	(0.5)	[65015]
	7(2, 5) - 8(1, 8)	(1,0,1)	32786.60	(0.20)	[69039]
	50(5,45) - 51(4,48)	(0,0,0)	32829.93	(0.10)	[65015]
	50(5,45) - 51(4,48)	(0,0,0)	32830.067	(*0.07)	[76000]
	52(9,43) - 51(10,42)	(0,1,0)	33483.3	(0.2)	[68036]
	11(3, 8) - 12(2,11)	(0,0,1)	33730.90	(0.10)	[64016]
	46(8,38) - 45(9,37)	(1,0,0)	33733.4	(0.2)	[68036]
	16(4,12) - 17(3,15)	(1,0,0)	33996.1	(0.2)	[68036]
	26(6,20) - 27(5,23)	(0,0,0)	34097.72	(0.03)	[63011]
	22(5,17) - 23(4,20)	(0,2,0)	34176.75	(0.20)	[68036]
	35(6,29) - 34(7,28)	(0,0,1)	34253.4	(0.2)	[68036]
	36(8,29) - 37(7,30)	(0,0,1)	34345.8	(0.2)	[68036]
	51(9,43) - 50(10,40)	(0,0,0)	34393.55	(0.10)	[64019]
	31(5,27) - 30(6,24)	(0,1,0)	34530.22	(0.10)	[64019]
	21(5,17) - 22(4,18)	(0,1,0)	34971.60	(0.10)	[64019]
	21(3,19) - 20(4,16)	(1,0,0)	35084.3	(0.2)	[68036]
	37(6,32) - 36(7,29)	(0,2,0)	35233.3	(0.2)	[68036]
	36(6,30) - 35(7,29)	(0,1,0)	35448.00	(0.10)	[64019]
	21(2,20) - 20(3,17)	(0,2,0)	35477.486	(*0.08)	[76000]
	14(2,12) - 13(3,11)	(0,2,0)	35788.9	(0.2)	[68036]
	16(2,14) - 17(1,17)	(0,1,0)	35855.86	(0.10)	[64019]
	7(2, 5) - 8(1, 8)	(0,1,1)	35941.26	(0.20)	[69039]
	57(12,46) - 58(11,47)	(0,0,0)	36003.54	(0.10)	[64019]
	53(11,43) - 54(10,44)	(0,1,0)	36003.6	(0.2)	[68036]
	38(8,30) - 39(7,33)	(0,2,0)	36022.8	(0.2)	[68036]
	31(7,25) - 32(6,26)	(0,0,0)	36065.23	(0.03)	[63011]
	27(6,22) - 28(5,23)	(0,2,0)	36150.5	(0.2)	[68036]
	30(5,25) - 29(6,24)	(0,0,0)	36338.05	(0.03)	[63011]
	23(2,22) - 22(3,19)	(0,1,0)	36791.07	(0.10)	[64019]
	19(2,18) - 18(3,15)	(0,1,0)	36857.00	(0.10)	[64019]
	21(3,19) - 20(4,16)	(0,0,0)	37351.80	(0.10)	[64019]
	26(6,20) - 27(5,23)	(1,0,0)	37515.6	(0.2)	[68036]
	37(8,30) - 38(7,31)	(0,1,0)	37525.20	(0.10)	[64019]
	41(7,35) - 40(8,32)	(1,0,0)	37593.4	(0.2)	[68036]
	21(5,17) - 22(4,18)	(1,1,0)	37961.0	(0.5)	[68036]
	41(9,32) - 42(8,35)	(0,0,1)	38015.3	(0.2)	[68036]
	19(3,16) - 18(4,15)	(0,0,1)	38101.4	(0.2)	[68036]
	18(2,17) - 17(3,14)	(0,0,1)	38186.9	(0.2)	[68036]
	72(13,59) - 71(14,58)	(0,0,0)	38209.5	(0.2)	[68036]
	15(4,12) - 16(3,13)	(0,0,0)	38518.225	(0.02)	[73051]
	28(3,25) - 29(2,28)	(0,1,0)	38843.50	(0.10)	[68036]
	37(3,35) - 36(4,32)	(0,0,0)	38909.683	(*0.03)	[76000]
	37(3,35) - 36(4,32)	(0,0,0)	38909.70	(0.10)	[64019]
	46(8,38) - 45(9,37)	(0,0,0)	39446.99	(0.10)	[64019]
	47(8,40) - 46(9,37)	(0,1,0)	39698.7	(0.2)	[68036]
	62(13,49) - 63(12,52)	(0,0,0)	39730.0	(0.2)	[68036]
	14(2,12) - 13(3,11)	(1,1,0)	39965.3	(0.5)	[68036]
	31(7,25) - 32(6,26)	(1,0,0)	40163.0	(0.2)	[68036]
	16(4,12) - 17(3,15)	(0,1,0)	40313.08	(0.10)	[64019]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{16}O$	15(4,12) - 16(3,13)	(1,0,0)	40720.8	(0.2)	[68036]
	63(11,53) - 62(12,50)	(0,1,0)	40867.4	(0.2)	[68036]
	17(2,15) - 18(1,18)	(0,0,1)	41050.7	(0.2)	[68036]
	36(8,28) - 37(7,31)	(0,0,0)	41177.50	(0.10)	[68036]
	48(8,40) - 47(9,39)	(0,2,0)	41249.4	(0.2)	[68036]
	6(2, 4) - 7(1, 7)	(0,0,2)	41495.15	(0.20)	[69039]
	16(2,14) - 17(1,17)	(0,2,0)	41603.6	(0.2)	[68036]
	19(2,18) - 18(3,15)	(1,0,0)	41642.4	(0.2)	[68036]
	21(2,20) - 20(3,17)	(0,1,0)	41887.49	(0.10)	[64019]
	14(2,12) - 13(3,11)	(0,1,0)	42005.35	(0.10)	[64019]
	58(12,46) - 59(11,49)	(0,1,0)	42111.9	(0.2)	[68036]
	20(5,16) - 21(4,17)	(0,0,1)	42231.3	(0.2)	[68036]
	23(2,22) - 22(3,19)	(1,0,0)	42243.044	(*0.71)	[76000]
	67(12,56) - 66(13,53)	(0,0,0)	42397.7	(0.2)	[68036]
	16(4,12) - 17(3,15)	(1,1,0)	42423.0	(0.5)	[68036]
	27(4,24) - 26(5,21)	(0,2,0)	42498.8	(0.2)	[68036]
	50(5,45) - 51(4,48)	(0,1,0)	42615.9	(0.2)	[68036]
	41(7,35) - 40(8,32)	(0,0,0)	42680.09	(0.10)	[64019]
	19(2,18) - 18(3,15)	(0,0,0)	43016.28	(0.10)	[64019]
	23(2,22) - 22(3,19)	(0,0,0)	43178.14	(0.10)	[64019]
	67(14,54) - 68(13,55)	(0,0,0)	43321.7	(0.2)	[68036]
	31(5,27) - 30(6,24)	(1,0,0)	43878.4	(0.2)	[68036]
	20(3,17) - 19(4,16)	(0,2,0)	44023.5	(0.2)	[68036]
	6(2, 4) - 7(1, 7)	(0,0,0)	44052.860	(0.02)	[73051]
	43(9,35) - 44(8,36)	(0,2,0)	44278.2	(0.2)	[68036]
	42(9,33) - 43(8,36)	(0,1,0)	44438.05	(0.10)	[68036]
	6(2, 4) - 7(1, 7)	(1,0,0)	44794.5	(0.2)	[68036]
	41(9,33) - 42(8,34)	(0,0,0)	44875.86	(0.03)	[64011]
	4(2, 3) - 5(1, 4)	(0,0,1)	45468.4	(0.2)	[68036]
	6(2, 4) - 7(1, 7)	(2,0,0)	45528.88	(0.20)	[69039]
	36(8,28) - 37(7,31)	(1,0,0)	45834.0	(0.2)	[68036]
	14(2,12) - 13(3,11)	(1,0,0)	45911.1	(0.2)	[68036]
	4(2, 3) - 5(1, 4)	(1,0,1)	46194.30	(0.20)	[69039]
	21(5,17) - 22(4,18)	(0,2,0)	46418.9	(0.2)	[68036]
	36(6,30) - 35(7,29)	(1,0,0)	46547.236	(*0.30)	[76000]
	28(3,25) - 29(2,28)	(0,2,0)	46599.5	(0.2)	[68036]
	62(11,51) - 61(12,50)	(0,0,0)	46752.9	(0.2)	[68036]
	72(15,57) - 73(14,60)	(0,0,0)	46786.9	(0.2)	[68036]
	21(2,20) - 20(3,17)	(1,0,0)	46929.5	(0.2)	[68036]
	15(4,12) - 16(3,13)	(0,1,0)	47017.60	(0.06)	[64011]
	26(6,20) - 27(5,23)	(0,1,0)	47269.31	(0.06)	[64011]
	22(2,21) - 21(3,18)	(0,0,1)	47331.623	(*0.94)	[76000]
	15(4,11) - 16(3,14)	(0,0,1)	47575.6	(0.2)	[68036]
	20(2,19) - 19(3,16)	(0,0,1)	47594.544	(*0.31)	[76000]
	31(5,27) - 30(6,24)	(0,0,0)	47660.60	(0.05)	[68036]
	58(10,48) - 57(11,47)	(0,1,0)	47745.8	(0.2)	[68036]
	14(2,12) - 13(3,11)	(0,0,0)	47913.420	(0.02)	[73051]
	59(5,55) - 58(6,52)	(0,1,0)	47916.069	(*0.93)	[76000]
	6(2, 4) - 7(1, 7)	(0,1,0)	47950.79	(0.06)	[64011]
	63(13,51) - 64(12,52)	(0,1,0)	48005.5	(0.2)	[68036]
	21(2,20) - 20(3,17)	(0,0,0)	48120.44	(0.03)	[64011]
	32(7,25) - 33(6,28)	(0,2,0)	48464.05	(0.20)	[68036]
	9(1, 8) - 8(2, 7)	(0,1,1)	48531.97	(0.20)	[69039]
	43(7,37) - 42(8,34)	(0,2,0)	48635.75	(0.20)	[68036]
	6(2, 4) - 7(1, 7)	(1,1,0)	48703.36	(0.20)	[69039]
	42(7,35) - 41(8,34)	(0,1,0)	48732.7	(0.2)	[68036]
	4(2, 3) - 5(1, 4)	(0,1,1)	48893.15	(0.20)	[69039]
	46(10,36) - 47(9,39)	(0,0,0)	48958.18	(0.03)	[64011]
	16(4,12) - 17(3,15)	(0,2,0)	49088.2	(0.2)	[68036]
	26(4,23) - 25(5,20)	(0,0,1)	49108.0	(0.2)	[68036]
	25(6,19) - 26(5,22)	(0,0,1)	49814.1	(0.2)	[68036]
	26(4,22) - 25(5,21)	(0,2,0)	49833.5	(0.2)	[68036]
	5(0, 5) - 4(1, 4)	(0,1,1)	49951.69	(0.20)	[69039]
	23(3,21) - 22(4,18)	(0,2,0)	49971.0	(0.2)	[68036]
	41(9,33) - 42(8,34)	(1,0,0)	50125.995	(*0.35)	[76000]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ – $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{16}O$	47(10,38) – 48(9,39)	(0,1,0)	50523.7	(0.2)	[68036]
	5(0, 5) – 4(1, 4)	(1,0,1)	50538.70	(0.20)	[69039]
	9(1, 8) – 8(2, 7)	(1,0,1)	50561.22	(0.20)	[69039]
	41(7,34) – 40(8,33)	(0,0,1)	50893.349	(*0.96)	[76000]
	25(4,21) – 24(5,20)	(0,0,1)	51052.3	(0.2)	[68036]
	57(10,48) – 56(11,45)	(0,0,0)	51086.1	(0.1)	[68036]
	5(0, 5) – 4(1, 4)	(0,0,1)	51097.25	(0.10)	[68036]
	36(6,30) – 35(7,29)	(0,0,0)	51185.22	(0.06)	[64011]
	36(6,31) – 35(7,28)	(0,0,1)	51205.385	(*0.65)	[76000]
	1(1, 0) – 1(0, 1)	(0,0,1)	51389.15	(0.10)	[68036]
	1(1, 0) – 1(0, 1)	(1,0,1)	51457.16	(0.20)	[69039]
	37(6,32) – 36(7,29)	(0,1,0)	51485.10	(0.10)	[68036]
	30(7,24) – 31(6,25)	(0,0,1)	51531.103	(*0.22)	[76000]
	31(7,25) – 32(6,26)	(0,1,0)	51645.00	(0.10)	[68036]
	20(5,15) – 21(4,18)	(0,0,0)	51736.59	(0.03)	[64011]
	9(1, 8) – 8(2, 7)	(0,0,1)	51738.145	(*0.09)	[76000]
	6(2, 4) – 7(1, 7)	(0,2,0)	52010.9	(0.2)	[68036]
	10(3, 7) – 11(2,10)	(0,0,0)	52051.71	(0.03)	[64011]
	25(6,20) – 26(5,21)	(0,0,0)	52188.48	(0.06)	[64011]
	2(1, 1) – 2(0, 2)	(0,0,2)	52356.93	(0.20)	[69039]
	1(1, 0) – 1(0, 1)	(0,1,1)	52562.63	(0.20)	[69039]
	51(11,41) – 52(10,42)	(0,0,0)	52744.0	(0.1)	[68036]
	9(3, 7) – 10(2, 8)	(0,0,0)	53015.296	(*0.01)	[76000]
	9(3, 7) – 10(2, 8)	(0,0,0)	53015.4	(0.2)	[68036]
	20(3,17) – 19(4,16)	(0,1,0)	53048.80	(0.10)	[68036]
	48(10,38) – 49(9,41)	(0,2,0)	53216.327	(*0.22)	[76000]
	10(3, 7) – 11(2,10)	(1,0,0)	53378.9	(0.2)	[68036]
	2(1, 1) – 2(0, 2)	(0,0,0)	53528.80	(0.05)	[70055]
	2(1, 1) – 2(0, 2)	(1,0,0)	53595.8	(0.2)	[68036]
	27(4,24) – 26(5,21)	(0,1,0)	53633.80	(0.10)	[68036]
	2(1, 1) – 2(0, 2)	(2,0,0)	53661.16	(0.20)	[69039]
	40(4,36) – 41(3,39)	(0,0,0)	54138.8	(0.3)	[68036]
	40(4,36) – 41(3,39)	(0,0,0)	54139.127	(*0.04)	[76000]
	53(9,45) – 52(10,42)	(0,1,0)	54322.300	(*0.08)	[76000]
	20(5,15) – 21(4,18)	(1,0,0)	54406.496	(*0.14)	[76000]
	9(3, 7) – 10(2, 8)	(1,0,0)	54448.594	(*0.12)	[76000]
	18(2,16) – 19(1,19)	(0,0,0)	54633.4	(0.2)	[68036]
	2(1, 1) – 2(0, 2)	(0,1,0)	54738.80	(0.10)	[68036]
	2(1, 1) – 2(0, 2)	(1,1,0)	54811.92	(0.20)	[69039]
	22(3,20) – 21(4,17)	(0,0,1)	54859.6	(0.2)	[68036]
	18(2,16) – 19(1,19)	(1,0,0)	54958.364	(*0.86)	[76000]
	5(2, 3) – 6(1, 6)	(0,0,1)	55066.475	(*0.13)	[76000]
	3(1, 2) – 3(0, 3)	(0,0,1)	55329.3	(0.2)	[63015]
	3(1, 2) – 3(0, 3)	(1,0,1)	55379.81	(0.20)	[69039]
	35(8,27) – 36(7,30)	(0,0,1)	55512.229	(*0.43)	[76000]
	25(6,20) – 26(5,21)	(1,0,0)	55576.215	(*0.19)	[76000]
	5(2, 3) – 6(1, 6)	(1,0,1)	55756.48	(0.20)	[69039]
	15(4,12) – 16(3,13)	(0,2,0)	55922.2	(0.2)	[68036]
	52(9,43) – 51(10,42)	(0,0,0)	55932.0	(0.1)	[68036]
	2(1, 1) – 2(0, 2)	(0,2,0)	56003.6	(0.2)	[68036]
	37(8,30) – 38(7,31)	(0,2,0)	56229.3	(0.2)	[68036]
	56(12,44) – 57(11,47)	(0,0,0)	56481.05	(0.05)	[70055]
	3(1, 2) – 3(0, 3)	(0,1,1)	56549.34	(0.20)	[69039]
	32(5,27) – 31(6,26)	(0,2,0)	56569.6	(0.2)	[68036]
	59(5,55) – 58(6,52)	(0,0,0)	56572.00	(0.05)	[70055]
	52(11,41) – 53(10,44)	(0,1,0)	56699.5	(0.2)	[68036]
	2(1, 1) – 2(0, 2)	(0,3,0)	57326.93	(0.20)	[69039]
	14(4,11) – 15(3,12)	(0,0,1)	57902.252	(*0.17)	[76000]
	30(7,23) – 31(6,26)	(0,0,0)	58042.41	(0.2)	[65015]
	30(7,23) – 31(6,26)	(0,0,0)	58042.664	(*0.01)	[76000]
	10(3, 7) – 11(2,10)	(0,1,0)	58101.04	(0.10)	[65015]
	40(9,32) – 41(8,33)	(0,0,1)	58450.850	(*0.72)	[76000]
	23(3,21) – 22(4,18)	(0,1,0)	58524.32	(0.10)	[65015]
	20(3,17) – 19(4,16)	(1,0,0)	58769.217	(*0.20)	[76000]
	5(2, 3) – 6(1, 6)	(0,1,1)	58839.53	(0.20)	[69039]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{16}O$	36(8,28) - 37(7,31)	(0,1,0)	59013.40	(0.10)	[68036]
	9(3, 7) - 10(2, 8)	(0,1,0)	59019.93	(0.10)	[64019]
	4(1, 3) - 4(0, 4)	(0,0,0)	59224.84	(0.10)	[65015]
	4(1, 3) - 4(0, 4)	(1,0,0)	59260.96	(0.10)	[63015]
	4(1, 3) - 4(0, 4)	(2,0,0)	59295.57	(0.20)	[69039]
	47(8,40) - 46(9,37)	(0,0,0)	59883.50	(0.05)	[70055]
	61(13,49) - 62(12,50)	(0,0,0)	60072.58	(0.05)	[70055]
	4(1, 3) - 4(0, 4)	(0,1,0)	60498.73	(0.08)	[63011]
	4(1, 3) - 4(0, 4)	(1,1,0)	60540.09	(0.20)	[69039]
	18(2,16) - 19(1,19)	(0,1,0)	60983.936	(*0.08)	[76000]
	26(6,20) - 27(5,23)	(0,2,0)	61050.033	(*0.09)	[76000]
	27(4,24) - 26(5,21)	(1,0,0)	61182.337	(*0.15)	[76000]
	33(5,29) - 32(6,26)	(0,2,0)	61197.187	(*0.11)	[76000]
	49(8,42) - 48(9,39)	(0,2,0)	61358.367	(*0.26)	[76000]
	42(7,35) - 41(8,34)	(1,0,0)	61452.283	(*0.61)	[76000]
	35(8,28) - 36(7,29)	(0,0,0)	61489.85	(0.05)	[70055]
	26(4,22) - 25(5,21)	(0,1,0)	61526.04	(0.10)	[64019]
	20(3,17) - 19(4,16)	(0,0,0)	61636.16	(0.05)	[70055]
	4(1, 3) - 4(0, 4)	(0,2,0)	61826.6	(0.2)	[68036]
	30(7,23) - 31(6,26)	(1,0,0)	61988.164	(*0.27)	[76000]
	37(6,32) - 36(7,29)	(1,0,0)	62455.923	(*0.38)	[76000]
	48(8,40) - 47(9,39)	(0,1,0)	62464.558	(*0.08)	[76000]
	20(5,15) - 21(4,18)	(0,1,0)	62524.798	(*0.03)	[76000]
	57(12,46) - 58(11,47)	(0,1,0)	62622.020	(*0.13)	[76000]
	5(1, 4) - 5(0, 5)	(0,0,1)	62944.88	(0.10)	[63015]
	5(1, 4) - 5(0, 5)	(1,0,1)	62959.11	(0.20)	[69039]
	4(1, 3) - 4(0, 4)	(0,3,0)	63211.76	(0.20)	[69039]
	40(4,36) - 41(3,39)	(0,1,0)	63578.142	(*0.16)	[76000]
	5(1, 4) - 5(0, 5)	(0,1,1)	64248.60	(0.20)	[69039]
	27(4,24) - 26(5,21)	(0,0,0)	64277.10	(0.04)	[63011]
	10(3, 7) - 11(2,10)	(0,2,0)	64421.890	(*0.07)	[76000]
	23(3,21) - 22(4,18)	(1,0,0)	64453.886	(*0.14)	[76000]
	31(5,26) - 30(6,25)	(0,0,1)	64671.435	(*0.38)	[76000]
	38(6,32) - 37(7,31)	(0,2,0)	64982.973	(*0.15)	[76000]
	41(9,33) - 42(8,34)	(0,1,0)	64988.183	(*0.05)	[76000]
	9(3, 7) - 10(2, 8)	(0,2,0)	65313.416	(*0.09)	[76000]
	25(6,20) - 26(5,21)	(0,1,0)	65426.89	(0.10)	[64019]
	42(9,33) - 43(8,36)	(0,2,0)	65463.990	(*0.20)	[76000]
	40(9,31) - 41(8,34)	(0,0,0)	65714.09	(0.04)	[63011]
	35(3,33) - 34(4,30)	(0,1,0)	65811.662	(*0.09)	[76000]
	35(8,28) - 36(7,29)	(1,0,0)	66054.980	(*0.42)	[76000]
	23(3,21) - 22(4,18)	(0,0,0)	66724.87	(0.04)	[63011]
	42(7,35) - 41(8,34)	(0,0,0)	66761.15	(0.05)	[70055]
	9(3, 6) - 10(2, 9)	(0,0,1)	66846.480	(*0.17)	[76000]
	37(6,32) - 36(7,29)	(0,0,0)	67011.29	(0.04)	[63011]
	4(2, 2) - 5(1, 5)	(0,0,2)	67295.4	(0.5)	[69039]
	43(7,37) - 42(8,34)	(0,1,0)	67356.765	(*0.08)	[76000]
	18(2,16) - 19(1,19)	(0,2,0)	67415.212	(*0.26)	[76000]
	19(5,14) - 20(4,17)	(0,0,1)	67719.999	(*0.20)	[76000]
	6(1, 5) - 6(0, 6)	(0,0,2)	67790.28	(0.20)	[69039]
	19(5,15) - 20(4,16)	(0,0,0)	67848.65	(0.05)	[70055]
	31(7,25) - 32(6,26)	(0,2,0)	67941.138	(*0.12)	[76000]
	47(4,44) - 46(5,41)	(0,1,0)	68275.956	(*0.17)	[76000]
	1(1, 1) - 0(0, 0)	(0,0,2)	68276.3	(0.5)	[69039]
	24(6,19) - 25(5,20)	(0,0,1)	68442.831	(*0.26)	[76000]
	59(10,50) - 58(11,47)	(0,1,0)	68728.171	(*0.15)	[76000]
	6(1, 5) - 6(0, 6)	(2,0,0)	68929.72	(0.20)	[69039]
	6(1, 5) - 6(0, 6)	(1,0,0)	68951.16	(0.10)	[69039]
	6(1, 5) - 6(0, 6)	(0,0,0)	68972.17	(0.05)	[70055]
	26(4,22) - 25(5,21)	(1,0,0)	69038.487	(*0.27)	[76000]
	6(0, 6) - 5(1, 5)	(0,3,0)	69192.59	(0.20)	[69039]
	14(4,10) - 15(3,13)	(0,0,0)	69464.09	(0.05)	[70055]
	14(4,10) - 15(3,13)	(0,0,0)	69464.143	(*0.01)	[76000]
	45(10,36) - 46(9,37)	(0,0,0)	69480.43	(0.05)	[70055]
	1(1, 1) - 0(0, 0)	(1,0,0)	69566.06	(0.10)	[69039]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ – $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{16}O$	1(1, 1) – 0(0, 0)	(0,0,0)	69575.91	(0.02)	[73051]
	19(2,17) – 20(1,20)	(0,0,1)	69595.838	(*1.37)	[76000]
	3(2, 2) – 4(1, 3)	(0,0,0)	69653.57	(0.05)	[70055]
	10(1, 9) – 9(2, 8)	(0,2,0)	69879.627	(*0.08)	[76000]
	4(2, 2) – 5(1, 5)	(0,0,0)	70134.368	(0.02)	[73051]
	3(2, 2) – 4(1, 3)	(1,0,0)	70293.43	(0.10)	[69039]
	6(1, 5) – 6(0, 6)	(0,1,0)	70347.95	(0.10)	[63011]
	6(0, 6) – 5(1, 5)	(0,2,0)	70440.170	(*0.08)	[76000]
	19(5,15) – 20(4,16)	(1,0,0)	70515.410	(*0.30)	[76000]
	1(1, 1) – 0(0, 0)	(0,1,0)	70735.92	(0.10)	[63015]
	4(2, 2) – 5(1, 5)	(1,0,0)	70765.92	(0.10)	[69039]
	32(5,27) – 31(6,26)	(0,1,0)	70770.64	(0.10)	[64019]
	40(9,31) – 41(8,34)	(1,0,0)	70848.359	(*0.79)	[76000]
	46(10,36) – 47(9,39)	(0,1,0)	71274.502	(*0.08)	[76000]
	14(4,10) – 15(3,13)	(1,0,0)	71384.609	(*0.18)	[76000]
	6(0, 6) – 5(1, 5)	(0,1,0)	71627.84	(0.08)	[63011]
	6(1, 5) – 6(0, 6)	(0,2,0)	71774.9	(0.2)	[65015]
	1(1, 1) – 0(0, 0)	(0,2,0)	71950.511	(*0.07)	[76000]
	32(5,28) – 31(6,25)	(0,0,1)	72090.423	(*0.82)	[76000]
	6(0, 6) – 5(1, 5)	(1,0,0)	72094.411	(*0.11)	[76000]
	58(10,48) – 57(11,47)	(0,0,0)	72383.71	(0.05)	[70055]
	30(3,27) – 31(2,30)	(0,0,0)	72437.26	(0.04)	[63011]
	30(3,27) – 31(2,30)	(0,0,0)	72437.263	(*0.03)	[76000]
	26(4,22) – 25(5,21)	(0,0,0)	72668.03	(0.05)	[70055]
	6(0, 6) – 5(1, 5)	(0,0,0)	72758.24	(0.05)	[70055]
	29(7,22) – 30(6,25)	(0,0,1)	72967.863	(*0.50)	[76000]
	3(2, 2) – 4(1, 3)	(0,1,0)	73161.979	(*0.02)	[76000]
	10(1, 9) – 9(2, 8)	(0,1,0)	73231.58	(0.10)	[63011]
	50(11,39) – 51(10,42)	(0,0,0)	73255.22	(0.05)	[70055]
	8(3, 6) – 9(2, 7)	(0,0,1)	73412.025	(*0.23)	[76000]
	35(3,33) – 34(4,30)	(0,0,0)	73430.42	(0.05)	[70055]
	35(3,33) – 34(4,30)	(0,0,0)	73430.453	(*0.03)	[76000]
	30(7,23) – 31(6,26)	(0,1,0)	73558.128	(*0.04)	[76000]
	20(5,15) – 21(4,18)	(0,2,0)	73811.644	(*0.11)	[76000]
	47(10,38) – 48(9,39)	(0,2,0)	73862.171	(*0.42)	[76000]
	4(2, 2) – 5(1, 5)	(0,1,0)	73883.939	(*0.02)	[76000]
	25(3,23) – 24(4,20)	(0,2,0)	74101.876	(*0.12)	[76000]
	44(7,37) – 43(8,36)	(0,2,0)	74753.883	(*0.26)	[76000]
	24(6,18) – 25(5,21)	(0,0,0)	74866.51	(0.05)	[70055]
	33(5,29) – 32(6,26)	(0,1,0)	74868.565	(*0.06)	[76000]
	7(1, 6) – 7(0, 7)	(0,0,1)	75060.599	(*0.17)	[76000]
	10(1, 9) – 9(2, 8)	(1,0,0)	75085.674	(*0.14)	[76000]
	45(10,36) – 46(9,37)	(1,0,0)	75181.050	(*1.53)	[76000]
	34(8,27) – 35(7,28)	(0,0,1)	75748.693	(*0.91)	[76000]
	54(9,45) – 53(10,44)	(0,1,0)	76403.664	(*0.14)	[76000]
	10(1, 9) – 9(2, 8)	(0,0,0)	76412.162	(0.02)	[73051]
	47(4,44) – 46(5,41)	(0,0,0)	76540.02	(0.05)	[70055]
	53(9,45) – 52(10,42)	(0,0,0)	76762.28	(0.05)	[70055]
	3(2, 2) – 4(1, 3)	(0,2,0)	76837.304	(*0.09)	[76000]
	55(12,44) – 56(11,45)	(0,0,0)	76860.55	(0.05)	[70055]
	51(11,41) – 52(10,42)	(0,1,0)	77227.939	(*0.13)	[76000]
	39(6,34) – 38(7,31)	(0,2,0)	77262.947	(*0.23)	[76000]
	15(2,13) – 14(3,12)	(0,0,1)	77655.028	(*0.21)	[76000]
	36(8,28) – 37(7,31)	(0,2,0)	77661.401	(*0.20)	[76000]
	4(2, 2) – 5(1, 5)	(0,2,0)	77798.064	(*0.08)	[76000]
	14(4,10) – 15(3,13)	(0,1,0)	77863.427	(*0.03)	[76000]
	29(4,26) – 28(5,23)	(0,2,0)	77904.364	(*0.13)	[76000]
	29(7,23) – 30(6,24)	(0,0,0)	77926.72	(0.05)	[70055]
	24(6,18) – 25(5,21)	(1,0,0)	78085.940	(*0.41)	[76000]
	19(5,15) – 20(4,16)	(0,1,0)	78711.356	(*0.03)	[76000]
	39(9,30) – 40(8,33)	(0,0,1)	79067.013	(*1.58)	[76000]
	25(6,20) – 26(5,21)	(0,2,0)	79277.574	(*0.17)	[76000]
	35(8,28) – 36(7,29)	(0,1,0)	79329.242	(*0.05)	[76000]
	37(6,31) – 36(7,30)	(0,0,1)	79475.646	(*1.27)	[76000]
	43(7,37) – 42(8,34)	(1,0,0)	79948.864	(*1.22)	[76000]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{16}O$	32(5,27) - 31(6,26)	(1,0,0)	80004.911	(*0.56)	[76000]
	30(3,27) - 31(2,30)	(0,1,0)	81040.557	(*0.14)	[76000]
	24(3,22) - 23(4,19)	(0,0,1)	81285.238	(*0.58)	[76000]
	38(6,32) - 37(7,31)	(0,1,0)	81598.508	(*0.08)	[76000]
	29(7,23) - 30(6,24)	(1,0,0)	81790.965	(*0.57)	[76000]
	52(11,41) - 53(10,44)	(0,2,0)	82277.396	(*0.94)	[76000]
	34(8,26) - 35(7,29)	(0,0,0)	82409.534	(*0.01)	[76000]
	25(3,23) - 24(4,20)	(0,1,0)	82488.380	(*0.05)	[76000]
	49(8,42) - 48(9,39)	(0,1,0)	82497.782	(*0.13)	[76000]
	48(8,40) - 47(9,39)	(0,0,0)	82752.788	(*0.02)	[76000]
	13(4,10) - 14(3,11)	(0,0,0)	82952.019	(*0.01)	[76000]
	56(12,44) - 57(11,47)	(0,1,0)	83074.685	(*0.22)	[76000]
	3(2, 1) - 4(1, 4)	(0,0,1)	83503.670	(*0.20)	[76000]
	8(1, 7) - 8(0, 8)	(1,0,0)	83576.340	(*0.17)	[76000]
	8(1, 7) - 8(0, 8)	(0,0,0)	83688.071	(*0.01)	[76000]
	33(5,29) - 32(6,26)	(1,0,0)	84000.695	(*0.62)	[76000]
	32(5,27) - 31(6,26)	(0,0,0)	84320.922	(*0.02)	[76000]
	13(4,10) - 14(3,11)	(1,0,0)	84885.242	(*0.34)	[76000]
	18(5,14) - 19(4,15)	(0,0,1)	84931.632	(*0.40)	[76000]
	8(1, 7) - 8(0, 8)	(0,1,0)	85208.061	(*0.02)	[76000]
	43(7,37) - 42(8,34)	(0,0,0)	85246.955	(*0.02)	[76000]
	28(4,25) - 27(5,22)	(0,0,1)	85265.114	(*0.79)	[76000]
	50(8,42) - 49(9,41)	(0,2,0)	85382.521	(*0.52)	[76000]
	13(4, 9) - 14(3,12)	(0,0,1)	85447.225	(*0.35)	[76000]
	40(9,31) - 41(8,34)	(0,1,0)	85796.088	(*0.08)	[76000]
	41(9,33) - 42(8,34)	(0,2,0)	86005.082	(*0.37)	[76000]
	39(9,31) - 40(8,32)	(0,0,0)	86153.727	(*0.02)	[76000]
	2(1, 2) - 1(0, 1)	(0,0,1)	86457.459	(*0.13)	[76000]
	8(3, 5) - 9(2, 8)	(0,0,0)	86639.138	(*0.01)	[76000]
	14(4,10) - 15(3,13)	(0,2,0)	86648.812	(*0.13)	[76000]
	8(1, 7) - 8(0, 8)	(0,2,0)	86774.654	(*0.10)	[76000]
	20(2,18) - 21(1,21)	(0,0,0)	86828.917	(*0.04)	[76000]
	34(8,26) - 35(7,29)	(1,0,0)	86854.130	(*0.89)	[76000]
	8(3, 5) - 9(2, 8)	(1,0,0)	87825.868	(*0.20)	[76000]
	33(5,29) - 32(6,26)	(0,0,0)	87926.348	(*0.02)	[76000]
	24(6,18) - 25(5,21)	(0,1,0)	88028.914	(*0.04)	[76000]
	25(3,23) - 24(4,20)	(1,0,0)	88364.350	(*0.49)	[76000]
	29(4,26) - 28(5,23)	(0,1,0)	88888.846	(*0.06)	[76000]
	30(3,27) - 31(2,30)	(0,2,0)	89610.792	(*0.65)	[76000]
	30(7,23) - 31(6,26)	(0,2,0)	89784.389	(*0.25)	[76000]
	44(10,34) - 45(9,37)	(0,0,0)	90005.081	(*0.02)	[76000]
	19(5,15) - 20(4,16)	(0,2,0)	90079.556	(*0.21)	[76000]
	2(2, 1) - 3(1, 2)	(0,0,1)	90185.829	(*0.19)	[76000]
	23(6,17) - 24(5,20)	(0,0,1)	90301.216	(*0.54)	[76000]
	60(10,50) - 59(11,49)	(0,1,0)	90390.193	(*0.27)	[76000]
	33(3,31) - 32(4,28)	(0,1,0)	90496.938	(*0.10)	[76000]
	25(3,23) - 24(4,20)	(0,0,0)	90548.220	(*0.02)	[76000]
	27(3,25) - 26(4,22)	(0,2,0)	91005.593	(*0.30)	[76000]
	39(9,31) - 40(8,32)	(1,0,0)	91187.078	(*1.44)	[76000]
	13(4,10) - 14(3,11)	(0,1,0)	91400.926	(*0.03)	[76000]
	45(7,39) - 44(8,36)	(0,2,0)	91513.219	(*0.51)	[76000]
	18(5,13) - 19(4,16)	(0,0,0)	91550.521	(*0.01)	[76000]
	45(10,36) - 46(9,37)	(0,1,0)	91779.852	(*0.13)	[76000]
	16(2,14) - 15(3,13)	(0,2,0)	92177.821	(*0.12)	[76000]
	38(6,32) - 37(7,31)	(1,0,0)	92497.497	(*1.17)	[76000]
	9(1, 8) - 9(0, 9)	(0,0,1)	92619.941	(*0.30)	[76000]
	8(3, 5) - 9(2, 8)	(0,1,0)	92660.350	(*0.03)	[76000]
	21(3,18) - 20(4,17)	(0,0,1)	92676.776	(*0.35)	[76000]
	28(7,22) - 29(6,23)	(0,0,1)	92866.157	(*0.85)	[76000]
	59(10,50) - 58(11,47)	(0,0,0)	93373.061	(*0.03)	[76000]
	29(7,23) - 30(6,24)	(0,1,0)	93456.384	(*0.05)	[76000]
	39(6,34) - 38(7,31)	(0,1,0)	93474.308	(*0.11)	[76000]
	49(11,39) - 50(10,40)	(0,0,0)	93641.776	(*0.02)	[76000]
	44(7,37) - 43(8,36)	(0,1,0)	93736.357	(*0.13)	[76000]
	20(2,18) - 21(1,21)	(0,1,0)	94032.814	(*0.12)	[76000]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{16}O$	18(5,13) - 19(4,16)	(1,0,0)	94034.561	(*0.52)	[76000]
	23(6,18) - 24(5,19)	(0,0,0)	94064.767	(*0.01)	[76000]
	52(5,47) - 53(4,50)	(0,0,0)	94478.694	(*0.14)	[76000]
	46(10,36) - 47(9,39)	(0,2,0)	94581.665	(*0.71)	[76000]
	7(0, 7) - 6(1, 6)	(0,0,1)	94905.666	(*0.16)	[76000]
	29(4,26) - 28(5,23)	(1,0,0)	96252.088	(*0.70)	[76000]
	33(8,25) - 34(7,28)	(0,0,1)	96393.557	(*1.53)	[76000]
	31(3,29) - 30(4,26)	(0,2,0)	96491.728	(*1.63)	[76000]
	55(9,47) - 54(10,44)	(0,1,0)	97144.063	(*0.22)	[76000]
	54(12,42) - 55(11,45)	(0,0,0)	97177.284	(*0.03)	[76000]
	23(6,18) - 24(5,19)	(1,0,0)	97215.741	(*0.75)	[76000]
	38(6,32) - 37(7,31)	(0,0,0)	97466.399	(*0.02)	[76000]
	7(3, 5) - 8(2, 6)	(0,0,0)	97702.389	(*0.01)	[76000]
	50(11,39) - 51(10,42)	(0,1,0)	97714.805	(*0.21)	[76000]
	35(8,28) - 36(7,29)	(0,2,0)	97978.035	(*0.36)	[76000]
	33(3,31) - 32(4,28)	(0,0,0)	97994.156	(*0.03)	[76000]
	16(2,14) - 15(3,13)	(0,1,0)	98264.674	(*0.04)	[76000]
	7(3, 5) - 8(2, 6)	(1,0,0)	98887.146	(*0.28)	[76000]
	54(9,45) - 53(10,44)	(0,0,0)	98917.685	(*0.02)	[76000]
	29(3,27) - 28(4,24)	(0,2,0)	98937.806	(*0.77)	[76000]
	8(3, 5) - 9(2, 8)	(0,2,0)	98955.514	(*0.14)	[76000]
	28(7,21) - 29(6,24)	(0,0,0)	98976.323	(*0.01)	[76000]
	27(3,25) - 26(4,22)	(0,1,0)	99177.414	(*0.07)	[76000]
	29(4,26) - 28(5,23)	(0,0,0)	99392.605	(*0.02)	[76000]
	34(8,26) - 35(7,29)	(0,1,0)	100214.875	(*0.07)	[76000]
	13(4,10) - 14(3,11)	(0,2,0)	100245.233	(*0.21)	[76000]
	35(5,31) - 34(6,28)	(0,2,0)	100511.131	(*0.36)	[76000]
	59(13,47) - 60(12,48)	(0,0,0)	100563.034	(*0.07)	[76000]
	2(2, 0) - 3(1, 3)	(0,0,0)	100878.09	(0.08)	[70055]
	12(4, 9) - 13(3,10)	(0,0,1)	100881.184	(*0.56)	[76000]
	22(3,19) - 21(4,18)	(0,2,0)	100968.889	(*0.18)	[76000]
	20(2,18) - 21(1,21)	(0,2,0)	101304.598	(*0.47)	[76000]
	2(2, 0) - 3(1, 3)	(1,0,0)	101366.437	(*0.15)	[76000]
	16(2,14) - 15(3,13)	(1,0,0)	101732.812	(*0.34)	[76000]
	24(6,18) - 25(5,21)	(0,2,0)	101796.723	(*0.29)	[76000]
	7(3, 4) - 8(2, 7)	(0,0,1)	102299.509	(*0.41)	[76000]
	18(5,13) - 19(4,16)	(0,1,0)	102335.148	(*0.04)	[76000]
	33(8,26) - 34(7,27)	(0,0,0)	102690.05	(0.08)	[70055]
	49(8,42) - 48(9,39)	(0,0,0)	102707.24	(0.08)	[70055]
	28(7,21) - 29(6,24)	(1,0,0)	102714.307	(*1.07)	[76000]
	51(11,41) - 52(10,42)	(0,2,0)	102781.975	(*1.34)	[76000]
	55(12,44) - 56(11,45)	(0,1,0)	103431.050	(*0.34)	[76000]
	11(1,10) - 10(2, 9)	(0,0,1)	103493.669	(*0.25)	[76000]
	27(4,23) - 26(5,22)	(0,0,1)	103500.638	(*0.64)	[76000]
	7(3, 5) - 8(2, 6)	(0,1,0)	103699.713	(*0.03)	[76000]
	3(1, 3) - 2(0, 2)	(1,0,0)	103853.468	(*0.18)	[76000]
	10(1, 9) - 10(0,10)	(1,0,0)	103998.060	(*0.28)	[76000]
	3(1, 3) - 2(0, 2)	(0,0,0)	104029.42	(0.08)	[70055]
	16(2,14) - 15(3,13)	(0,0,0)	104033.56	(0.08)	[70055]
	31(3,29) - 30(4,26)	(0,1,0)	104210.693	(*0.10)	[76000]
	39(6,34) - 38(7,31)	(1,0,0)	104224.395	(*1.86)	[76000]
	10(1, 9) - 10(0,10)	(0,0,0)	104239.28	(0.08)	[70055]
	28(4,24) - 27(5,23)	(0,2,0)	104319.909	(*0.18)	[76000]
	2(2, 0) - 3(1, 3)	(0,1,0)	104518.053	(*0.03)	[76000]
	51(8,44) - 50(9,41)	(0,2,0)	104587.568	(*1.09)	[76000]
	27(3,25) - 26(4,22)	(1,0,0)	105072.098	(*1.55)	[76000]
	3(1, 3) - 2(0, 2)	(0,1,0)	105117.151	(*0.03)	[76000]
	52(5,47) - 53(4,50)	(0,1,0)	105567.099	(*0.37)	[76000]
	10(1, 9) - 10(0,10)	(0,1,0)	105956.722	(*0.03)	[76000]
	39(9,31) - 40(8,32)	(0,1,0)	106223.129	(*0.11)	[76000]
	3(1, 3) - 2(0, 2)	(0,2,0)	106258.639	(*0.12)	[76000]
	38(9,29) - 39(8,32)	(0,0,0)	106674.82	(0.08)	[70055]
	50(8,42) - 49(9,41)	(0,1,0)	106700.769	(*0.21)	[76000]
	40(9,31) - 41(8,34)	(0,2,0)	106779.355	(*0.61)	[76000]
	29(3,27) - 28(4,24)	(0,1,0)	106870.669	(*0.09)	[76000]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{16}O$	33(8,26) - 34(7,27)	(1,0,0)	107037.128	(*1.54)	[76000]
	27(3,25) - 26(4,22)	(0,0,0)	107060.19	(0.08)	[70055]
	23(6,18) - 24(5,19)	(0,1,0)	107251.176	(*0.04)	[76000]
	17(5,12) - 18(4,15)	(0,0,1)	107372.348	(*0.72)	[76000]
	10(1, 9) - 10(0,10)	(0,2,0)	107713.820	(*0.15)	[76000]
	34(5,29) - 33(6,28)	(0,2,0)	107814.243	(*0.24)	[76000]
	57(5,53) - 56(6,50)	(0,1,0)	107836.436	(*0.98)	[76000]
	12(4, 8) - 13(3,11)	(0,0,0)	107843.46	(0.08)	[70055]
	2(2, 0) - 3(1, 3)	(0,2,0)	108322.917	(*0.12)	[76000]
	42(4,38) - 43(3,41)	(0,0,0)	108915.46	(0.08)	[70055]
	39(6,34) - 38(7,31)	(0,0,0)	108955.91	(0.08)	[70055]
	12(4, 8) - 13(3,11)	(1,0,0)	109591.725	(*0.51)	[76000]
	22(6,17) - 23(5,18)	(0,0,1)	109679.006	(*0.92)	[76000]
	29(7,23) - 30(6,24)	(0,2,0)	109695.541	(*0.40)	[76000]
	17(5,13) - 18(4,14)	(0,0,0)	109757.60	(0.08)	[70055]
	31(4,28) - 30(5,25)	(0,2,0)	109807.388	(*0.41)	[76000]
	7(3, 5) - 8(2, 6)	(0,2,0)	109978.529	(*0.18)	[76000]
	22(3,19) - 21(4,18)	(0,1,0)	110003.708	(*0.05)	[76000]
	45(7,39) - 44(8,36)	(0,1,0)	110227.805	(*0.18)	[76000]
	43(10,34) - 44(9,35)	(0,0,0)	110363.80	(0.08)	[70055]
	31(3,29) - 30(4,26)	(0,0,0)	111755.03	(0.08)	[70055]
	44(7,37) - 43(8,36)	(0,0,0)	111875.54	(0.08)	[70055]
	45(4,42) - 44(5,39)	(0,1,0)	112010.469	(*0.22)	[76000]
	17(5,13) - 18(4,14)	(1,0,0)	112186.000	(*0.83)	[76000]
	44(10,34) - 45(9,37)	(0,1,0)	112280.761	(*0.19)	[76000]
	40(6,34) - 39(7,33)	(0,2,0)	113521.720	(*0.43)	[76000]
	27(7,20) - 28(6,23)	(0,0,1)	113554.811	(*1.39)	[76000]
	18(5,13) - 19(4,16)	(0,2,0)	113616.457	(*0.31)	[76000]
	48(11,37) - 49(10,40)	(0,0,0)	113970.87	(0.08)	[70055]
	35(5,31) - 34(6,28)	(0,1,0)	114050.785	(*0.11)	[76000]
	33(5,28) - 32(6,27)	(0,0,1)	114445.255	(*1.78)	[76000]
	28(7,21) - 29(6,24)	(0,1,0)	114467.055	(*0.06)	[76000]
	29(3,27) - 28(4,24)	(0,0,0)	114565.35	(0.08)	[70055]
	8(0, 8) - 7(1, 7)	(0,2,0)	114831.687	(*0.13)	[76000]
	45(10,36) - 46(9,37)	(0,2,0)	115066.810	(*1.06)	[76000]
	60(10,50) - 59(11,49)	(0,0,0)	115090.63	(0.08)	[70055]
	22(6,16) - 23(5,19)	(0,0,0)	115317.58	(0.08)	[70055]
	22(3,19) - 21(4,18)	(1,0,0)	115331.073	(*0.65)	[76000]
	57(5,53) - 56(6,50)	(0,0,0)	115904.836	(*0.07)	[76000]
	8(0, 8) - 7(1, 7)	(0,1,0)	115933.887	(*0.03)	[76000]
	8(0, 8) - 7(1, 7)	(1,0,0)	116125.602	(*0.21)	[76000]
	28(4,24) - 27(5,23)	(0,1,0)	116163.327	(*0.07)	[76000]
	12(4, 8) - 13(3,11)	(0,1,0)	116235.806	(*0.04)	[76000]
	11(1,10) - 11(0,11)	(0,0,1)	116295.807	(*0.52)	[76000]
	6(3, 4) - 7(2, 5)	(0,0,1)	116360.903	(*0.53)	[76000]
	8(0, 8) - 7(1, 7)	(0,0,0)	116980.44	(0.08)	[70055]
	53(12,42) - 54(11,43)	(0,0,0)	117412.57	(0.08)	[70055]
	49(11,39) - 50(10,40)	(0,1,0)	118080.628	(*0.31)	[76000]
	22(6,16) - 23(5,19)	(1,0,0)	118336.376	(*1.22)	[76000]
	22(3,19) - 21(4,18)	(0,0,0)	118577.42	(0.08)	[70055]
	34(8,26) - 35(7,29)	(0,2,0)	118826.104	(*0.60)	[76000]
	41(6,36) - 40(7,33)	(0,2,0)	118972.537	(*0.80)	[76000]
	27(7,21) - 28(6,22)	(0,0,0)	118994.21	(0.08)	[70055]
	4(1, 4) - 3(0, 3)	(0,0,1)	119334.696	(*0.24)	[76000]
	32(3,29) - 33(2,32)	(0,0,0)	119483.08	(0.08)	[70055]
	42(4,38) - 43(3,41)	(0,1,0)	119523.363	(*0.30)	[76000]
	55(9,47) - 54(10,44)	(0,0,0)	119621.790	(*0.02)	[76000]
	45(4,42) - 44(5,39)	(0,0,0)	120023.40	(0.08)	[70055]
	56(9,47) - 55(10,46)	(0,1,0)	120095.464	(*0.35)	[76000]
	33(8,26) - 34(7,27)	(0,1,0)	120487.829	(*0.10)	[76000]
	31(4,28) - 30(5,25)	(0,1,0)	120564.283	(*0.10)	[76000]
	17(5,13) - 18(4,14)	(0,1,0)	120569.461	(*0.04)	[76000]
	58(13,45) - 59(12,48)	(0,0,0)	120713.137	(*0.07)	[76000]
	23(6,18) - 24(5,19)	(0,2,0)	121043.326	(*0.45)	[76000]
	46(7,39) - 45(8,38)	(0,2,0)	121395.560	(*0.74)	[76000]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{16}O$	34(5,29) - 33(6,28)	(0,1,0)	122226.512	(*0.11)	[76000]
	27(7,21) - 28(6,22)	(1,0,0)	122639.824	(*1.72)	[76000]
	12(1,11) - 11(2,10)	(0,2,0)	122946.544	(*0.16)	[76000]
	6(3, 3) - 7(2, 6)	(0,0,0)	123057.69	(0.08)	[70055]
	32(8,24) - 33(7,27)	(0,0,0)	123194.70	(0.08)	[70055]
	50(11,39) - 51(10,42)	(0,2,0)	123241.151	(*1.86)	[76000]
	28(4,24) - 27(5,23)	(1,0,0)	123367.864	(*0.96)	[76000]
	54(12,42) - 55(11,45)	(0,1,0)	123724.050	(*0.48)	[76000]
	11(4, 7) - 12(3,10)	(0,0,1)	123889.979	(*0.84)	[76000]
	6(3, 3) - 7(2, 6)	(1,0,0)	124081.848	(*0.39)	[76000]
	11(4, 8) - 12(3, 9)	(0,0,0)	124864.74	(0.08)	[70055]
	12(4, 8) - 13(3,11)	(0,2,0)	125013.834	(*0.29)	[76000]
	22(2,20) - 23(1,23)	(0,0,0)	125427.13	(0.08)	[70055]
	51(8,44) - 50(9,41)	(0,1,0)	125748.951	(*0.28)	[76000]
	16(5,12) - 17(4,13)	(0,0,1)	126034.830	(*1.12)	[76000]
	12(1,11) - 11(2,10)	(0,1,0)	126111.620	(*0.04)	[76000]
	11(4, 8) - 12(3, 9)	(1,0,0)	126563.253	(*0.74)	[76000]
	38(9,29) - 39(8,32)	(0,1,0)	126720.236	(*0.16)	[76000]
	37(9,29) - 38(8,30)	(0,0,0)	126962.46	(0.08)	[70055]
	35(5,31) - 34(6,28)	(0,0,0)	126980.70	(0.08)	[70055]
	11(2, 9) - 11(1,10)	(0,0,1)	127016.032	(*0.94)	[76000]
	50(8,42) - 49(9,41)	(0,0,0)	127081.96	(0.08)	[70055]
	39(9,31) - 40(8,32)	(0,2,0)	127190.681	(*0.92)	[76000]
	28(4,24) - 27(5,23)	(0,0,0)	127428.23	(0.08)	[70055]
	12(1,11) - 11(2,10)	(1,0,0)	127547.729	(*0.31)	[76000]
	45(7,39) - 44(8,36)	(0,0,0)	128103.81	(0.08)	[70055]
	22(6,16) - 23(5,19)	(0,1,0)	128460.976	(*0.05)	[76000]
	12(2,10) - 12(1,11)	(0,0,0)	128605.13	(0.08)	[70055]
	13(2,11) - 13(1,12)	(0,0,1)	128620.710	(*1.33)	[76000]
	12(2,10) - 12(1,11)	(1,0,0)	128773.970	(*0.86)	[76000]
	6(3, 3) - 7(2, 6)	(0,1,0)	129050.545	(*0.04)	[76000]
	12(1,11) - 11(2,10)	(0,0,0)	129105.83	(0.08)	[70055]
	32(3,29) - 33(2,32)	(0,1,0)	129157.351	(*0.24)	[76000]
	59(13,47) - 60(12,48)	(0,1,0)	129162.246	(*0.71)	[76000]
	10(2, 8) - 10(1, 9)	(0,0,0)	129514.81	(0.08)	[70055]
	10(2, 8) - 10(1, 9)	(1,0,0)	129763.115	(*0.58)	[76000]
	9(2, 7) - 9(1, 8)	(0,0,1)	129806.895	(*0.71)	[76000]
	40(6,34) - 39(7,33)	(0,1,0)	130341.053	(*0.18)	[76000]
	21(6,15) - 22(5,18)	(0,0,1)	130433.478	(*1.47)	[76000]
	12(1,11) - 12(0,12)	(1,0,0)	130613.204	(*0.46)	[76000]
	28(7,21) - 29(6,24)	(0,2,0)	130663.442	(*0.62)	[76000]
	42(10,32) - 43(9,35)	(0,0,0)	130680.01	(0.08)	[70055]
	52(8,44) - 51(9,43)	(0,2,0)	130762.993	(*1.46)	[76000]
	31(4,28) - 30(5,25)	(0,0,0)	130859.40	(0.08)	[70055]
	12(1,11) - 12(0,12)	(0,0,0)	131014.86	(0.08)	[70055]
	34(5,29) - 33(6,28)	(1,0,0)	131218.192	(*1.74)	[76000]
	16(5,11) - 17(4,14)	(0,0,0)	131274.93	(0.08)	[70055]
	12(2,10) - 12(1,11)	(0,1,0)	131530.51	(0.10)	[64011]
	17(5,13) - 18(4,14)	(0,2,0)	131879.994	(*0.45)	[76000]
	10(2, 8) - 10(1, 9)	(0,1,0)	132594.39	(0.10)	[64011]
	43(10,34) - 44(9,35)	(0,1,0)	132621.129	(*0.27)	[76000]
	14(2,12) - 14(1,13)	(0,0,0)	132744.86	(0.08)	[70055]
	14(2,12) - 14(1,13)	(1,0,0)	132783.793	(*1.40)	[76000]
	12(1,11) - 12(0,12)	(0,1,0)	133003.55	(0.10)	[64011]
	11(4, 8) - 12(3, 9)	(0,1,0)	133271.68	(0.10)	[64011]
	16(5,11) - 17(4,14)	(1,0,0)	133567.285	(*1.21)	[76000]
	22(2,20) - 23(1,23)	(0,1,0)	133645.623	(*0.17)	[76000]
	8(2, 6) - 8(1, 7)	(0,0,0)	134004.86	(0.08)	[70055]
	47(11,37) - 48(10,38)	(0,0,0)	134203.82	(0.08)	[70055]
	8(2, 6) - 8(1, 7)	(1,0,0)	134287.514	(*0.42)	[76000]
	27(7,21) - 28(6,22)	(0,1,0)	134482.98	(0.10)	[64011]
	47(7,41) - 46(8,38)	(0,2,0)	134533.145	(*1.56)	[76000]
	12(2,10) - 12(1,11)	(0,2,0)	134595.183	(*0.41)	[76000]
	21(6,16) - 22(5,17)	(0,0,0)	134943.30	(0.08)	[70055]
	12(1,11) - 12(0,12)	(0,2,0)	135023.451	(*0.23)	[76000]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{16}O$	41(6,36) - 40(7,33)	(0,1,0)	135096.083	(*0.20)	[76000]
	17(2,15) - 16(3,14)	(0,0,1)	135221.364	(*0.65)	[76000]
	6(3, 3) - 7(2, 6)	(0,2,0)	135317.939	(*0.23)	[76000]
	7(2, 5) - 7(1, 6)	(0,0,1)	135358.108	(*0.50)	[76000]
	5(1, 5) - 4(0, 4)	(1,0,0)	135366.164	(*0.28)	[76000]
	14(2,12) - 14(1,13)	(0,1,0)	135531.58	(0.10)	[64011]
	44(10,34) - 45(9,37)	(0,2,0)	135540.559	(*1.51)	[76000]
	5(1, 5) - 4(0, 4)	(0,0,0)	135696.02	(0.08)	[70055]
	10(2, 8) - 10(1, 9)	(0,2,0)	135826.454	(*0.33)	[76000]
	34(5,29) - 33(6,28)	(0,0,0)	135963.00	(0.08)	[70055]
	5(1, 5) - 4(0, 4)	(0,1,0)	136675.34	(0.10)	[64011]
	33(4,30) - 32(5,27)	(0,2,0)	136692.368	(*1.15)	[76000]
	8(2, 6) - 8(1, 7)	(0,1,0)	137234.31	(0.10)	[64011]
	52(12,40) - 53(11,43)	(0,0,0)	137585.05	(0.08)	[70055]
	5(1, 5) - 4(0, 4)	(0,2,0)	137707.928	(*0.17)	[76000]
	37(5,33) - 36(6,30)	(0,2,0)	137868.325	(*1.08)	[76000]
	21(6,16) - 22(5,17)	(1,0,0)	137875.920	(*1.81)	[76000]
	48(11,37) - 49(10,40)	(0,1,0)	138387.238	(*0.42)	[76000]
	14(2,12) - 14(1,13)	(0,2,0)	138439.784	(*0.50)	[76000]
	9(0, 9) - 8(1, 8)	(0,0,1)	138886.439	(*0.37)	[76000]
	33(8,26) - 34(7,27)	(0,2,0)	139088.828	(*0.88)	[76000]
	5(3, 2) - 6(2, 5)	(0,0,1)	139183.562	(*0.70)	[76000]
	5(3, 3) - 6(2, 4)	(0,0,0)	139355.06	(0.08)	[70055]
	26(7,19) - 27(6,22)	(0,0,0)	139474.54	(0.08)	[70055]
	6(2, 4) - 6(1, 5)	(0,0,0)	140306.17	(0.08)	[70055]
	5(3, 3) - 6(2, 4)	(1,0,0)	140319.154	(*0.48)	[76000]
	57(9,49) - 56(10,46)	(0,1,0)	140463.781	(*0.47)	[76000]
	46(7,39) - 45(8,38)	(0,1,0)	140549.261	(*0.28)	[76000]
	6(2, 4) - 6(1, 5)	(1,0,0)	140589.229	(*0.30)	[76000]
	8(2, 6) - 8(1, 7)	(0,2,0)	140623.595	(*0.26)	[76000]
	57(13,45) - 58(12,46)	(0,0,0)	140800.16	(0.08)	[70055]
	57(13,45) - 58(12,46)	(0,0,0)	140800.562	(*0.07)	[76000]
	32(8,24) - 33(7,27)	(0,1,0)	140967.656	(*0.13)	[76000]
	10(4, 7) - 11(3, 8)	(0,0,1)	141767.609	(*1.15)	[76000]
	5(2, 3) - 5(1, 4)	(0,0,1)	141831.070	(*0.28)	[76000]
	22(2,20) - 23(1,23)	(0,2,0)	141924.400	(*0.78)	[76000]
	16(5,11) - 17(4,14)	(0,1,0)	142044.09	(0.10)	[64011]
	11(4, 8) - 12(3, 9)	(0,2,0)	142067.529	(*0.39)	[76000]
	22(6,16) - 23(5,19)	(0,2,0)	142205.693	(*0.64)	[76000]
	56(9,47) - 55(10,46)	(0,0,0)	142690.18	(0.08)	[70055]
	16(2,14) - 16(1,15)	(0,0,0)	143057.11	(0.08)	[70055]
	31(8,24) - 32(7,25)	(0,0,0)	143357.80	(0.08)	[70055]
	6(2, 4) - 6(1, 5)	(0,1,0)	143663.781	(*0.04)	[76000]
	53(12,42) - 54(11,43)	(0,1,0)	143936.875	(*0.64)	[76000]
	5(3, 3) - 6(2, 4)	(0,1,0)	145331.275	(*0.05)	[76000]
	43(4,40) - 42(5,37)	(0,1,0)	145625.408	(*0.24)	[76000]
	16(2,14) - 16(1,15)	(0,1,0)	145740.026	(*0.04)	[76000]
	51(8,44) - 50(9,41)	(0,0,0)	145970.29	(0.08)	[70055]
	13(1,12) - 13(0,13)	(0,0,1)	146078.271	(*0.87)	[76000]
	40(6,34) - 39(7,33)	(0,0,0)	146393.72	(0.08)	[70055]
	10(4, 6) - 11(3, 9)	(0,0,0)	146550.08	(0.08)	[70055]
	4(2, 2) - 4(1, 3)	(0,0,0)	146605.52	(0.08)	[70055]
	15(5,10) - 16(4,13)	(0,0,1)	146848.648	(*1.62)	[76000]
	4(2, 2) - 4(1, 3)	(1,0,0)	146870.912	(*0.21)	[76000]
	37(9,29) - 38(8,30)	(0,1,0)	146992.295	(*0.22)	[76000]
	33(4,30) - 32(5,27)	(0,1,0)	147129.954	(*0.14)	[76000]
	6(2, 4) - 6(1, 5)	(0,2,0)	147184.818	(*0.19)	[76000]
	36(9,27) - 37(8,30)	(0,0,0)	147239.28	(0.08)	[70055]
	3(2, 1) - 3(1, 2)	(0,0,1)	147509.101	(*0.19)	[76000]
	38(9,29) - 39(8,32)	(0,2,0)	147660.541	(*1.32)	[76000]
	21(6,16) - 22(5,17)	(0,1,0)	148089.107	(*0.07)	[76000]
	10(4, 6) - 11(3, 9)	(1,0,0)	148116.145	(*0.98)	[76000]
	16(2,14) - 16(1,15)	(0,2,0)	148521.645	(*0.65)	[76000]
	58(13,45) - 59(12,48)	(0,1,0)	149288.012	(*0.93)	[76000]
	6(1, 6) - 5(0, 5)	(0,0,1)	149709.312	(*0.44)	[76000]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{16}O$	4(2, 2) - 4(1, 3)	(0,1,0)	150060.401	(*0.04)	[76000]
	15(5,11) - 16(4,12)	(0,0,0)	150381.10	(0.08)	[70055]
	41(6,36) - 40(7,33)	(0,0,0)	150486.92	(0.08)	[70055]
	27(7,21) - 28(6,22)	(0,2,0)	150675.168	(*0.89)	[76000]
	41(10,32) - 42(9,33)	(0,0,0)	150878.81	(0.08)	[70055]
	37(5,33) - 36(6,30)	(0,1,0)	151196.911	(*0.18)	[76000]
	2(2, 0) - 2(1, 1)	(0,0,0)	151378.63	(0.08)	[70055]
	5(3, 3) - 6(2, 4)	(0,2,0)	151584.312	(*0.28)	[76000]
	2(2, 0) - 2(1, 1)	(1,0,0)	151624.281	(*0.20)	[76000]
	18(2,16) - 17(3,15)	(0,2,0)	151680.868	(*0.29)	[76000]
	23(3,20) - 22(4,19)	(0,0,1)	151921.725	(*1.45)	[76000]
	52(8,44) - 51(9,43)	(0,1,0)	152220.681	(*0.43)	[76000]
	15(5,11) - 16(4,12)	(1,0,0)	152592.998	(*1.66)	[76000]
	42(10,32) - 43(9,35)	(0,1,0)	152915.867	(*0.35)	[76000]
	47(7,41) - 46(8,38)	(0,1,0)	153208.401	(*0.32)	[76000]
	16(5,11) - 17(4,14)	(0,2,0)	153307.461	(*0.60)	[76000]
	43(4,40) - 42(5,37)	(0,0,0)	153677.14	(0.08)	[70055]
	4(2, 2) - 4(1, 3)	(0,2,0)	153679.656	(*0.16)	[76000]
	2(2, 1) - 2(1, 2)	(0,0,1)	154137.548	(*0.25)	[76000]
	46(11,35) - 47(10,38)	(0,0,0)	154373.34	(0.08)	[70055]
	2(2, 0) - 2(1, 1)	(0,1,0)	154896.339	(*0.04)	[76000]
	10(4, 6) - 11(3, 9)	(0,1,0)	154925.338	(*0.05)	[76000]
	26(7,19) - 27(6,22)	(0,1,0)	154937.104	(*0.10)	[76000]
	20(6,14) - 21(5,17)	(0,0,0)	155389.62	(0.08)	[70055]
	13(1,12) - 12(2,11)	(0,0,1)	156544.379	(*0.59)	[76000]
	4(3, 2) - 5(2, 3)	(0,0,1)	156762.250	(*0.83)	[76000]
	33(4,30) - 32(5,27)	(0,0,0)	157135.415	(*0.03)	[76000]
	18(2,16) - 17(3,15)	(0,1,0)	157562.676	(*0.05)	[76000]
	51(12,40) - 52(11,41)	(0,0,0)	157687.346	(*0.03)	[76000]
	54(5,49) - 55(4,52)	(0,0,0)	157769.895	(*0.25)	[76000]
	3(2, 2) - 3(1, 3)	(0,0,0)	158199.74	(0.08)	[70055]
	3(2, 2) - 3(1, 3)	(1,0,0)	158411.759	(*0.19)	[76000]
	2(2, 0) - 2(1, 1)	(0,2,0)	158578.194	(*0.16)	[76000]
	47(11,37) - 48(10,38)	(0,1,0)	158599.496	(*0.55)	[76000]
	46(7,39) - 45(8,38)	(0,0,0)	158845.08	(0.08)	[70055]
	10(0,10) - 9(1, 9)	(0,2,0)	158895.147	(*0.23)	[76000]
	25(7,19) - 26(6,20)	(0,0,0)	159447.96	(0.08)	[70055]
	4(2, 3) - 4(1, 4)	(0,0,1)	159510.614	(*0.19)	[76000]
	32(8,24) - 33(7,27)	(0,2,0)	159540.648	(*1.25)	[76000]
	55(5,51) - 54(6,48)	(0,1,0)	159760.885	(*0.93)	[76000]
	10(0,10) - 9(1, 9)	(1,0,0)	159799.148	(*0.38)	[76000]
	10(0,10) - 9(1, 9)	(0,1,0)	159887.217	(*0.04)	[76000]
	18(2,16) - 18(1,17)	(0,0,0)	160342.99	(0.08)	[70055]
	18(2,16) - 17(3,15)	(1,0,0)	160527.636	(*0.95)	[76000]
	4(3, 1) - 5(2, 4)	(0,0,0)	160543.06	(0.08)	[70055]
	10(0,10) - 9(1, 9)	(0,0,0)	160827.88	(0.08)	[70055]
	56(13,43) - 57(12,46)	(0,0,0)	160831.418	(*0.07)	[76000]
	31(8,24) - 32(7,25)	(0,1,0)	161118.096	(*0.17)	[76000]
	15(5,11) - 16(4,12)	(0,1,0)	161153.650	(*0.06)	[76000]
	4(3, 1) - 5(2, 4)	(1,0,0)	161391.932	(*0.58)	[76000]
	3(2, 2) - 3(1, 3)	(0,1,0)	161799.203	(*0.04)	[76000]
	21(6,16) - 22(5,17)	(0,2,0)	161835.117	(*0.87)	[76000]
	9(4, 5) - 10(3, 8)	(0,0,1)	162493.031	(*1.50)	[76000]
	24(3,21) - 23(4,20)	(0,2,0)	162604.091	(*0.47)	[76000]
	57(9,49) - 56(10,46)	(0,0,0)	162973.170	(*0.03)	[76000]
	18(2,16) - 18(1,17)	(0,1,0)	162976.647	(*0.04)	[76000]
	14(1,13) - 14(0,14)	(1,0,0)	163031.582	(*0.83)	[76000]
	18(2,16) - 17(3,15)	(0,0,0)	163119.360	(*0.02)	[76000]
	30(8,22) - 31(7,25)	(0,0,0)	163567.623	(*0.02)	[76000]
	14(1,13) - 14(0,14)	(0,0,0)	163605.504	(*0.02)	[76000]
	36(5,31) - 35(6,30)	(0,2,0)	163607.250	(*0.52)	[76000]
	10(4, 6) - 11(3, 9)	(0,2,0)	163684.936	(*0.49)	[76000]
	37(5,33) - 36(6,30)	(0,0,0)	163924.886	(*0.02)	[76000]
	30(4,26) - 29(5,25)	(0,2,0)	164041.024	(*0.48)	[76000]
	52(12,40) - 53(11,43)	(0,1,0)	164086.484	(*0.82)	[76000]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{16}O$	58(9,49) - 57(10,48)	(0,1,0)	164734.322	(*0.69)	[76000]
	7(1, 7) - 6(0, 6)	(1,0,0)	164746.421	(*0.42)	[76000]
	9(4, 6) - 10(3, 7)	(0,0,0)	165123.721	(*0.02)	[76000]
	5(2, 4) - 5(1, 5)	(0,0,0)	165144.638	(*0.01)	[76000]
	7(1, 7) - 6(0, 6)	(0,0,0)	165225.412	(*0.02)	[76000]
	5(2, 4) - 5(1, 5)	(1,0,0)	165321.408	(*0.22)	[76000]
	42(6,36) - 41(7,35)	(0,2,0)	165445.279	(*0.95)	[76000]
	3(2, 2) - 3(1, 3)	(0,2,0)	165562.030	(*0.16)	[76000]
	18(2,16) - 18(1,17)	(0,2,0)	165681.672	(*0.93)	[76000]
	14(1,13) - 14(0,14)	(0,1,0)	165963.756	(*0.04)	[76000]
	7(1, 7) - 6(0, 6)	(0,1,0)	166061.033	(*0.04)	[76000]
	44(4,40) - 45(3,43)	(0,0,0)	166387.008	(*0.12)	[76000]
	4(3, 1) - 5(2, 4)	(0,1,0)	166507.883	(*0.05)	[76000]
	9(4, 6) - 10(3, 7)	(1,0,0)	166611.070	(*1.25)	[76000]
	35(4,32) - 34(5,29)	(0,1,0)	166835.105	(*0.19)	[76000]
	7(1, 7) - 6(0, 6)	(0,2,0)	166948.943	(*0.25)	[76000]
	36(9,27) - 37(8,30)	(0,1,0)	167248.437	(*0.28)	[76000]
	35(9,27) - 36(8,28)	(0,0,0)	167367.207	(*0.02)	[76000]
	55(5,51) - 54(6,48)	(0,0,0)	167655.930	(*0.08)	[76000]
	37(9,29) - 38(8,30)	(0,2,0)	167913.738	(*1.81)	[76000]
	41(4,38) - 40(5,35)	(0,1,0)	167978.718	(*0.26)	[76000]
	6(2, 5) - 6(1, 6)	(0,0,1)	168030.705	(*0.33)	[76000]
	14(1,13) - 14(0,14)	(0,2,0)	168345.363	(*0.37)	[76000]
	20(6,14) - 21(5,17)	(0,1,0)	168508.639	(*0.08)	[76000]
	24(2,22) - 25(1,25)	(0,0,0)	168789.992	(*0.05)	[76000]
	5(2, 4) - 5(1, 5)	(0,1,0)	168826.182	(*0.04)	[76000]
	57(13,45) - 58(12,46)	(0,1,0)	169351.664	(*1.18)	[76000]
	53(8,46) - 52(9,43)	(0,1,0)	169363.766	(*0.52)	[76000]
	34(3,31) - 35(2,34)	(0,0,0)	170293.687	(*0.06)	[76000]
	48(7,41) - 47(8,40)	(0,2,0)	170390.213	(*1.63)	[76000]
	54(5,49) - 55(4,52)	(0,1,0)	170506.434	(*0.85)	[76000]
	14(5, 9) - 15(4,12)	(0,0,0)	170754.654	(*0.02)	[76000]
	40(10,30) - 41(9,33)	(0,0,0)	171017.867	(*0.02)	[76000]
	47(7,41) - 46(8,38)	(0,0,0)	171036.665	(*0.03)	[76000]
	26(7,19) - 27(6,22)	(0,2,0)	171100.201	(*1.22)	[76000]
	24(3,21) - 23(4,20)	(0,1,0)	171566.852	(*0.07)	[76000]
	15(5,11) - 16(4,12)	(0,2,0)	172419.914	(*0.78)	[76000]
	5(2, 4) - 5(1, 5)	(0,2,0)	172670.304	(*0.17)	[76000]
	52(8,44) - 51(9,43)	(0,0,0)	172728.421	(*0.03)	[76000]
	4(3, 1) - 5(2, 4)	(0,2,0)	172746.791	(*0.33)	[76000]
	41(10,32) - 42(9,33)	(0,1,0)	173095.908	(*0.44)	[76000]
	9(4, 6) - 10(3, 7)	(0,1,0)	173495.850	(*0.06)	[76000]
	45(11,35) - 46(10,36)	(0,0,0)	174463.721	(*0.02)	[76000]
	25(7,19) - 26(6,20)	(0,1,0)	174900.713	(*0.13)	[76000]
	19(6,14) - 20(5,15)	(0,0,0)	175101.414	(*0.02)	[76000]
	7(2, 6) - 7(1, 7)	(0,0,0)	175275.702	(*0.01)	[76000]
	7(2, 6) - 7(1, 7)	(1,0,0)	175400.729	(*0.35)	[76000]
	43(6,38) - 42(7,35)	(0,1,0)	175786.381	(*0.32)	[76000]
	30(4,26) - 29(5,25)	(0,1,0)	176012.824	(*0.12)	[76000]
	41(4,38) - 40(5,35)	(0,0,0)	176295.980	(*0.04)	[76000]
	35(4,32) - 34(5,29)	(0,0,0)	176466.427	(*0.03)	[76000]
	3(3, 0) - 4(2, 3)	(0,0,1)	176849.586	(*0.97)	[76000]
	14(1,13) - 13(2,12)	(0,2,0)	177008.067	(*0.30)	[76000]
	50(12,38) - 51(11,41)	(0,0,0)	177729.391	(*0.04)	[76000]
	37(4,34) - 36(5,31)	(0,1,0)	177865.978	(*0.23)	[76000]
	24(2,22) - 25(1,25)	(0,1,0)	178188.158	(*0.27)	[76000]
	36(5,31) - 35(6,30)	(0,1,0)	178277.240	(*0.20)	[76000]
	8(1, 8) - 7(0, 7)	(0,0,1)	178424.878	(*0.70)	[76000]
	44(4,40) - 45(3,43)	(0,1,0)	178449.080	(*0.53)	[76000]
	39(4,36) - 38(5,33)	(0,1,0)	178611.623	(*0.25)	[76000]
	46(11,35) - 47(10,38)	(0,1,0)	178747.658	(*0.68)	[76000]
	3(3, 1) - 4(2, 2)	(0,0,0)	179006.143	(*0.02)	[76000]
	7(2, 6) - 7(1, 7)	(0,1,0)	179076.293	(*0.04)	[76000]
	24(7,17) - 25(6,20)	(0,0,0)	179560.984	(*0.02)	[76000]
	31(8,24) - 32(7,25)	(0,2,0)	179675.541	(*1.69)	[76000]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ – $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{16}O$	8(2, 7) – 8(1, 8)	(0,0,1)	179768.235	(*0.62)	[76000]
	3(3, 1) – 4(2, 2)	(1,0,0)	179770.447	(*0.66)	[76000]
	14(1,13) – 13(2,12)	(0,1,0)	179941.142	(*0.04)	[76000]
	24(3,21) – 23(4,20)	(0,0,0)	180045.344	(*0.02)	[76000]
	55(13,43) – 56(12,44)	(0,0,0)	180805.760	(*0.07)	[76000]
	14(1,13) – 13(2,12)	(1,0,0)	180930.597	(*0.67)	[76000]
	15(1,14) – 15(0,15)	(0,0,1)	181109.566	(*1.43)	[76000]
	34(3,31) – 35(2,34)	(0,1,0)	181262.783	(*0.40)	[76000]
	30(8,22) – 31(7,25)	(0,1,0)	181307.770	(*0.21)	[76000]
	8(4, 5) – 9(3, 6)	(0,0,1)	181338.510	(*1.85)	[76000]
	14(5, 9) – 15(4,12)	(0,1,0)	181501.824	(*0.07)	[76000]
	11(0,11) – 10(1,10)	(0,0,1)	181964.621	(*0.72)	[76000]
	20(6,14) – 21(5,17)	(0,2,0)	182224.795	(*1.14)	[76000]
	9(4, 6) – 10(3, 7)	(0,2,0)	182252.820	(*0.60)	[76000]
	42(6,36) – 41(7,35)	(0,1,0)	182543.474	(*0.33)	[76000]
	14(1,13) – 13(2,12)	(0,0,0)	182705.89	(0.10)	[74038]
	7(2, 6) – 7(1, 7)	(0,2,0)	183038.175	(*0.22)	[76000]
	29(8,22) – 30(7,23)	(0,0,0)	183582.71	(0.10)	[74038]
	51(12,40) – 52(11,41)	(0,1,0)	184166.707	(*1.01)	[76000]
	59(9,51) – 58(10,48)	(0,1,0)	184257.575	(*0.83)	[76000]
	3(3, 1) – 4(2, 2)	(0,1,0)	184956.668	(*0.06)	[76000]
	20(2,18) – 20(1,19)	(0,0,0)	184969.80	(0.10)	[74038]
	39(5,35) – 38(6,32)	(0,1,0)	185155.091	(*0.27)	[76000]
	8(4, 4) – 9(3, 7)	(0,0,0)	185278.60	(0.10)	[74038]
	8(4, 4) – 9(3, 7)	(1,0,0)	186658.402	(*1.52)	[76000]
	37(4,34) – 36(5,31)	(0,0,0)	187055.577	(*0.03)	[76000]
	39(4,36) – 38(5,33)	(0,0,0)	187338.076	(*0.04)	[76000]
	35(9,27) – 36(8,28)	(0,1,0)	187359.672	(*0.34)	[76000]
	30(4,26) – 29(5,25)	(0,0,0)	187370.33	(0.10)	[74038]
	58(9,49) – 57(10,48)	(0,0,0)	187432.846	(*0.05)	[76000]
	34(9,25) – 35(8,28)	(0,0,0)	187446.75	(0.10)	[74038]
	20(2,18) – 20(1,19)	(0,1,0)	187636.97	(0.10)	[74038]
	24(2,22) – 25(1,25)	(0,2,0)	187646.854	(*1.24)	[76000]
	19(6,14) – 20(5,15)	(0,1,0)	188212.572	(*0.10)	[76000]
	9(2, 8) – 9(1, 9)	(0,0,0)	188654.948	(*0.02)	[76000]
	9(2, 8) – 9(1, 9)	(1,0,0)	188711.535	(*0.54)	[76000]
	2(2, 1) – 1(1, 0)	(0,0,1)	189205.939	(*0.28)	[76000]
	56(13,43) – 57(12,46)	(0,1,0)	189358.920	(*1.45)	[76000]
	53(8,46) – 52(9,43)	(0,0,0)	189575.30	(0.10)	[74038]
	48(7,41) – 47(8,40)	(0,1,0)	189785.362	(*0.51)	[76000]
	13(5, 9) – 14(4,10)	(0,0,0)	190148.65	(0.10)	[74038]
	20(2,18) – 20(1,19)	(0,2,0)	190344.781	(*1.38)	[76000]
	43(6,38) – 42(7,35)	(0,0,0)	191020.89	(0.10)	[74038]
	25(7,19) – 26(6,20)	(0,2,0)	191051.654	(*1.60)	[76000]
	39(10,30) – 40(9,31)	(0,0,0)	191066.910	(*0.02)	[76000]
	39(10,30) – 40(9,31)	(0,0,0)	191067.23	(0.10)	[74038]
	3(3, 1) – 4(2, 2)	(0,2,0)	191181.340	(*0.37)	[76000]
	36(5,31) – 35(6,30)	(0,0,0)	192236.18	(0.10)	[74038]
	9(2, 8) – 9(1, 9)	(0,1,0)	192612.43	(0.10)	[74038]
	2(2, 0) – 1(1, 1)	(0,0,0)	192651.02	(0.30)	[65015]
	2(2, 0) – 1(1, 1)	(1,0,0)	192697.215	(*0.25)	[76000]
	14(5, 9) – 15(4,12)	(0,2,0)	192739.939	(*0.97)	[76000]
	9(1, 9) – 8(0, 8)	(1,0,0)	192975.871	(*0.59)	[76000]
	40(10,30) – 41(9,33)	(0,1,0)	193215.131	(*0.55)	[76000]
	9(1, 9) – 8(0, 8)	(0,0,0)	193609.49	(0.10)	[74038]
	8(4, 4) – 9(3, 7)	(0,1,0)	193630.744	(*0.07)	[76000]
	9(1, 9) – 8(0, 8)	(0,1,0)	194268.841	(*0.05)	[76000]
	44(11,33) – 45(10,36)	(0,0,0)	194491.500	(*0.03)	[76000]
	44(11,33) – 45(10,36)	(0,0,0)	194491.75	(0.10)	[74038]
	10(2, 9) – 10(1,10)	(0,0,1)	194766.759	(*1.00)	[76000]
	9(1, 9) – 8(0, 8)	(0,2,0)	194978.121	(*0.36)	[76000]
	24(7,17) – 25(6,20)	(0,1,0)	194993.828	(*0.16)	[76000]
	18(6,12) – 19(5,15)	(0,0,0)	195080.44	(0.10)	[74038]
	19(2,17) – 18(3,16)	(0,0,1)	195273.818	(*1.81)	[76000]
	22(3,19) – 22(2,20)	(0,0,0)	195320.394	(*0.03)	[76000]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{16}O$	22(3,19) - 22(2,20)	(0,0,0)	195320.70	(0.10)	[74038]
	49(7,43) - 48(8,40)	(0,1,0)	195972.619	(*0.52)	[76000]
	2(2, 0) - 1(1, 1)	(0,1,0)	196177.856	(*0.06)	[76000]
	9(2, 8) - 9(1, 9)	(0,2,0)	196729.340	(*0.32)	[76000]
	20(3,17) - 20(2,18)	(0,0,0)	197142.18	(0.10)	[74038]
	39(5,35) - 38(6,32)	(0,0,0)	197585.500	(*0.03)	[76000]
	49(12,38) - 50(11,39)	(0,0,0)	197709.45	(0.10)	[74038]
	45(11,35) - 46(10,36)	(0,1,0)	198817.760	(*0.83)	[76000]
	42(6,36) - 41(7,35)	(0,0,0)	198847.86	(0.10)	[74038]
	23(7,17) - 24(6,18)	(0,0,0)	199415.904	(*0.02)	[76000]
	54(8,46) - 53(9,45)	(0,1,0)	199417.650	(*0.78)	[76000]
	22(3,19) - 22(2,20)	(0,1,0)	199757.069	(*0.07)	[76000]
	2(2, 0) - 1(1, 1)	(0,2,0)	199867.512	(*0.20)	[76000]
	16(1,15) - 16(0,16)	(1,0,0)	200075.270	(*1.63)	[76000]
	24(3,21) - 24(2,22)	(0,0,0)	200287.418	(*0.03)	[76000]
	24(3,21) - 24(2,22)	(0,0,0)	200287.53	(0.15)	[70055]
	54(13,41) - 55(12,44)	(0,0,0)	200727.543	(*0.07)	[76000]
	16(1,15) - 16(0,16)	(0,0,0)	200809.18	(0.15)	[70055]
	13(5, 9) - 14(4,10)	(0,1,0)	200888.182	(*0.09)	[76000]
	29(8,22) - 30(7,23)	(0,1,0)	201307.924	(*0.26)	[76000]
	12(0,12) - 11(1,11)	(0,2,0)	201688.205	(*0.37)	[76000]
	53(5,49) - 52(6,46)	(0,1,0)	201784.485	(*0.84)	[76000]
	19(6,14) - 20(5,15)	(0,2,0)	201919.295	(*1.44)	[76000]
	20(3,17) - 20(2,18)	(0,1,0)	201972.18	(0.10)	[74038]
	12(0,12) - 11(1,11)	(1,0,0)	202207.247	(*0.68)	[76000]
	8(4, 4) - 9(3, 7)	(0,2,0)	202365.662	(*0.71)	[76000]
	12(0,12) - 11(1,11)	(0,1,0)	202562.47	(0.10)	[74038]
	12(0,12) - 11(1,11)	(0,0,0)	203391.55	(0.10)	[74038]
	59(14,46) - 60(13,47)	(0,0,0)	203542.732	(*0.14)	[76000]
	28(8,20) - 29(7,23)	(0,0,0)	203570.15	(0.10)	[74038]
	16(1,15) - 16(0,16)	(0,1,0)	203652.70	(0.10)	[74038]
	50(12,38) - 51(11,41)	(0,1,0)	204186.721	(*1.22)	[76000]
	18(3,15) - 18(2,16)	(0,0,0)	204246.736	(*0.02)	[76000]
	24(3,21) - 24(2,22)	(0,1,0)	204331.67	(0.10)	[74038]
	7(4, 4) - 8(3, 5)	(0,0,0)	204384.30	(0.10)	[74038]
	11(2,10) - 11(1,11)	(1,0,0)	205272.722	(*0.84)	[76000]
	11(2,10) - 11(1,11)	(0,0,0)	205300.57	(0.10)	[74038]
	7(4, 4) - 8(3, 5)	(1,0,0)	205674.748	(*1.79)	[76000]
	16(1,15) - 16(0,16)	(0,2,0)	206514.907	(*0.59)	[76000]
	10(1,10) - 9(0, 9)	(0,0,1)	206578.948	(*1.02)	[76000]
	59(9,51) - 58(10,48)	(0,0,0)	206786.909	(*0.05)	[76000]
	34(9,25) - 35(8,28)	(0,1,0)	207420.160	(*0.42)	[76000]
	33(9,25) - 34(8,26)	(0,0,0)	207421.38	(0.15)	[70055]
	18(6,12) - 19(5,15)	(0,1,0)	208172.172	(*0.12)	[76000]
	48(7,41) - 47(8,40)	(0,0,0)	208302.80	(0.15)	[70055]
	3(2, 2) - 2(1, 1)	(1,0,0)	208669.602	(*0.28)	[76000]
	3(2, 2) - 2(1, 1)	(0,0,0)	208700.32	(0.15)	[70055]
	55(13,43) - 56(12,44)	(0,1,0)	209310.061	(*1.74)	[76000]
	18(3,15) - 18(2,16)	(0,1,0)	209433.782	(*0.07)	[76000]
	11(2,10) - 11(1,11)	(0,1,0)	209454.195	(*0.04)	[76000]
	53(5,49) - 52(6,46)	(0,0,0)	209874.37	(0.15)	[70055]
	12(5, 7) - 13(4,10)	(0,0,0)	209936.05	(0.15)	[70055]
	15(1,14) - 14(2,13)	(0,0,1)	209991.420	(*1.24)	[76000]
	60(9,51) - 59(10,50)	(0,1,0)	210563.102	(*1.20)	[76000]
	38(10,28) - 39(9,31)	(0,0,0)	211052.832	(*0.03)	[76000]
	38(10,28) - 39(9,31)	(0,0,0)	211053.10	(0.15)	[70055]
	3(2, 1) - 2(1, 2)	(0,0,1)	211460.819	(*0.27)	[76000]
	13(5, 9) - 14(4,10)	(0,2,0)	212117.596	(*1.17)	[76000]
	3(2, 2) - 2(1, 1)	(0,1,0)	212177.490	(*0.06)	[76000]
	7(4, 4) - 8(3, 5)	(0,1,0)	212726.061	(*0.08)	[76000]
	12(2,11) - 12(1,12)	(0,0,1)	213007.158	(*1.49)	[76000]
	26(3,23) - 26(2,24)	(0,0,0)	213068.40	(0.15)	[70055]
	55(8,48) - 54(9,45)	(0,1,0)	213177.160	(*0.84)	[76000]
	39(10,30) - 40(9,31)	(0,1,0)	213245.437	(*0.65)	[76000]
	20(2,18) - 19(3,17)	(0,2,0)	213398.076	(*0.62)	[76000]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{16}O$	49(7,43) - 48(8,40)	(0,0,0)	213703.00	(0.15)	[70055]
	11(2,10) - 11(1,11)	(0,2,0)	213765.113	(*0.45)	[76000]
	43(11,33) - 44(10,34)	(0,0,0)	214451.631	(*0.03)	[76000]
	43(11,33) - 44(10,34)	(0,0,0)	214451.89	(0.15)	[70055]
	41(5,37) - 40(6,34)	(0,1,0)	214491.553	(*0.37)	[76000]
	16(3,13) - 16(2,14)	(0,0,0)	214689.38	(0.15)	[70055]
	17(6,12) - 18(5,13)	(0,0,0)	214728.33	(0.15)	[70055]
	45(6,40) - 44(7,37)	(0,1,0)	214760.519	(*0.48)	[76000]
	23(7,17) - 24(6,18)	(0,1,0)	214835.549	(*0.19)	[76000]
	18(3,15) - 18(2,16)	(0,2,0)	214899.748	(*1.62)	[76000]
	26(2,24) - 27(1,27)	(0,0,0)	215094.54	(0.15)	[70055]
	3(2, 2) - 2(1, 1)	(0,2,0)	215817.307	(*0.22)	[76000]
	22(2,20) - 22(1,21)	(0,0,0)	216643.315	(*0.03)	[76000]
	26(3,23) - 26(2,24)	(0,1,0)	216758.621	(*0.14)	[76000]
	48(12,36) - 49(11,39)	(0,0,0)	217633.516	(*0.04)	[76000]
	44(11,33) - 45(10,36)	(0,1,0)	218825.004	(*0.99)	[76000]
	20(2,18) - 19(3,17)	(0,1,0)	218995.836	(*0.06)	[76000]
	22(7,15) - 23(6,18)	(0,0,0)	219276.002	(*0.02)	[76000]
	22(2,20) - 22(1,21)	(0,1,0)	219465.578	(*0.06)	[76000]
	54(8,46) - 53(9,45)	(0,0,0)	220102.68	(0.15)	[70055]
	16(3,13) - 16(2,14)	(0,1,0)	220165.277	(*0.06)	[76000]
	53(13,41) - 54(12,42)	(0,0,0)	220597.14	(0.15)	[70055]
	53(13,41) - 54(12,42)	(0,0,0)	220598.000	(*0.08)	[76000]
	56(5,51) - 57(4,54)	(0,0,0)	220618.273	(*0.43)	[76000]
	12(5, 7) - 13(4,10)	(0,1,0)	220657.711	(*0.10)	[76000]
	11(1,11) - 10(0,10)	(1,0,0)	221163.508	(*0.86)	[76000]
	28(8,20) - 29(7,23)	(0,1,0)	221277.361	(*0.31)	[76000]
	7(4, 4) - 8(3, 5)	(0,2,0)	221449.883	(*0.82)	[76000]
	44(6,38) - 43(7,37)	(0,2,0)	221739.160	(*1.85)	[76000]
	18(6,12) - 19(5,15)	(0,2,0)	221857.131	(*1.76)	[76000]
	11(1,11) - 10(0,10)	(0,0,0)	221965.21	(0.15)	[70055]
	11(1,11) - 10(0,10)	(0,1,0)	222424.370	(*0.05)	[76000]
	36(3,33) - 37(2,36)	(0,0,0)	222868.850	(*0.10)	[76000]
	11(1,11) - 10(0,10)	(0,2,0)	222928.633	(*0.49)	[76000]
	58(14,44) - 59(13,47)	(0,0,0)	223347.070	(*0.14)	[76000]
	27(8,20) - 28(7,21)	(0,0,0)	223434.47	(0.15)	[70055]
	13(0,13) - 12(1,12)	(0,0,1)	223473.266	(*1.23)	[76000]
	4(2, 3) - 3(1, 2)	(0,0,1)	223516.044	(*0.34)	[76000]
	6(4, 2) - 7(3, 5)	(0,0,0)	223883.650	(*0.02)	[76000]
	49(12,38) - 50(11,39)	(0,1,0)	224145.268	(*1.45)	[76000]
	20(2,18) - 19(3,17)	(0,0,0)	224264.830	(*0.02)	[76000]
	46(4,42) - 47(3,45)	(0,0,0)	224473.088	(*0.21)	[76000]
	38(5,33) - 37(6,32)	(0,2,0)	224810.581	(*1.12)	[76000]
	13(2,12) - 13(1,13)	(1,0,0)	225027.641	(*1.40)	[76000]
	13(2,12) - 13(1,13)	(0,0,0)	225153.671	(*0.02)	[76000]
	26(2,24) - 27(1,27)	(0,1,0)	225833.514	(*0.40)	[76000]
	16(3,13) - 16(2,14)	(0,2,0)	225930.732	(*1.18)	[76000]
	14(3,11) - 14(2,12)	(0,0,0)	226300.019	(*0.02)	[76000]
	41(5,37) - 40(6,34)	(0,0,0)	226508.507	(*0.04)	[76000]
	32(9,23) - 33(8,26)	(0,0,0)	227335.566	(*0.03)	[76000]
	33(9,25) - 34(8,26)	(0,1,0)	227377.711	(*0.49)	[76000]
	17(6,12) - 18(5,13)	(0,1,0)	227808.072	(*0.14)	[76000]
	26(3,23) - 25(4,22)	(0,2,0)	228279.972	(*1.13)	[76000]
	32(4,28) - 31(5,27)	(0,2,0)	229168.081	(*1.28)	[76000]
	54(13,41) - 55(12,44)	(0,1,0)	229208.863	(*2.04)	[76000]
	11(5, 7) - 12(4, 8)	(0,0,0)	229347.744	(*0.02)	[76000]
	13(2,12) - 13(1,13)	(0,1,0)	229545.219	(*0.05)	[76000]
	45(6,40) - 44(7,37)	(0,0,0)	229749.885	(*0.04)	[76000]
	37(10,28) - 38(9,29)	(0,0,0)	230964.932	(*0.03)	[76000]
	16(1,15) - 15(2,14)	(0,2,0)	231071.227	(*0.54)	[76000]
	12(5, 7) - 13(4,10)	(0,2,0)	231867.303	(*1.38)	[76000]
	14(3,11) - 14(2,12)	(0,1,0)	231980.514	(*0.06)	[76000]
	6(4, 2) - 7(3, 5)	(0,1,0)	232210.148	(*0.09)	[76000]
	51(5,47) - 50(6,44)	(0,1,0)	232463.414	(*0.76)	[76000]
	38(10,28) - 39(9,31)	(0,1,0)	233212.213	(*0.77)	[76000]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{16}O$	55(8,48) - 54(9,45)	(0,0,0)	233345.396	(*0.04)	[76000]
	60(9,51) - 59(10,50)	(0,0,0)	233400.941	(*0.09)	[76000]
	16(1,15) - 15(2,14)	(0,1,0)	233724.880	(*0.05)	[76000]
	59(14,46) - 60(13,47)	(0,1,0)	234010.068	(*2.80)	[76000]
	13(2,12) - 13(1,13)	(0,2,0)	234091.430	(*0.63)	[76000]
	28(3,25) - 28(2,26)	(0,0,0)	234187.157	(*0.05)	[76000]
	16(1,15) - 15(2,14)	(1,0,0)	234250.573	(*1.50)	[76000]
	42(11,31) - 43(10,34)	(0,0,0)	234352.781	(*0.03)	[76000]
	16(6,10) - 17(5,13)	(0,0,0)	234421.686	(*0.02)	[76000]
	22(7,15) - 23(6,18)	(0,1,0)	234678.553	(*0.22)	[76000]
	4(2, 2) - 3(1, 3)	(1,0,0)	234989.283	(*0.32)	[76000]
	4(2, 2) - 3(1, 3)	(0,0,0)	235151.686	(*0.02)	[76000]
	12(1,12) - 11(0,11)	(0,0,1)	235224.596	(*1.44)	[76000]
	56(5,51) - 57(4,54)	(0,1,0)	235295.598	(*1.60)	[76000]
	36(3,33) - 37(2,36)	(0,1,0)	235342.049	(*0.63)	[76000]
	16(1,15) - 15(2,14)	(0,0,0)	236216.655	(*0.02)	[76000]
	26(3,23) - 25(4,22)	(0,1,0)	237062.250	(*0.10)	[76000]
	12(3, 9) - 12(2,10)	(0,0,0)	237068.87	(0.15)	[70055]
	47(12,36) - 48(11,37)	(0,0,0)	237502.080	(*0.05)	[76000]
	43(5,39) - 42(6,36)	(0,1,0)	237521.157	(*0.47)	[76000]
	28(3,25) - 28(2,26)	(0,1,0)	237602.222	(*0.21)	[76000]
	12(3, 9) - 12(2,10)	(1,0,0)	237623.522	(*1.44)	[76000]
	14(3,11) - 14(2,12)	(0,2,0)	237952.324	(*0.89)	[76000]
	51(7,45) - 50(8,42)	(0,1,0)	238034.485	(*0.79)	[76000]
	46(4,42) - 47(3,45)	(0,1,0)	238243.297	(*0.87)	[76000]
	11(3, 8) - 11(2, 9)	(0,0,1)	238650.915	(*1.48)	[76000]
	4(2, 2) - 3(1, 3)	(0,1,0)	238697.625	(*0.06)	[76000]
	43(11,33) - 44(10,34)	(0,1,0)	238765.117	(*1.16)	[76000]
	21(7,15) - 22(6,16)	(0,0,0)	238992.557	(*0.03)	[76000]
	44(6,38) - 43(7,37)	(0,1,0)	239195.120	(*0.56)	[76000]
	38(5,33) - 37(6,32)	(0,1,0)	239752.482	(*0.35)	[76000]
	11(5, 7) - 12(4, 8)	(0,1,0)	240057.256	(*0.12)	[76000]
	52(13,39) - 53(12,42)	(0,0,0)	240420.023	(*0.08)	[76000]
	6(4, 2) - 7(3, 5)	(0,2,0)	240917.434	(*0.92)	[76000]
	18(1,17) - 18(0,18)	(0,0,0)	240942.781	(*0.02)	[76000]
	51(5,47) - 50(6,44)	(0,0,0)	241044.741	(*0.06)	[76000]
	27(8,20) - 28(7,21)	(0,1,0)	241126.037	(*0.36)	[76000]
	32(4,28) - 31(5,27)	(0,1,0)	241193.706	(*0.19)	[76000]
	5(2, 4) - 4(1, 3)	(1,0,0)	241426.511	(*0.42)	[76000]
	5(2, 4) - 4(1, 3)	(0,0,0)	241615.762	(*0.02)	[76000]
	50(7,43) - 49(8,42)	(0,1,0)	242239.609	(*0.86)	[76000]
	4(2, 2) - 3(1, 3)	(0,2,0)	242404.382	(*0.24)	[76000]
	14(0,14) - 13(1,13)	(0,2,0)	242754.134	(*0.57)	[76000]
	12(3, 9) - 12(2,10)	(0,1,0)	242872.822	(*0.05)	[76000]
	14(0,14) - 13(1,13)	(1,0,0)	242926.656	(*1.24)	[76000]
	5(4, 2) - 6(3, 3)	(0,0,0)	243087.725	(*0.02)	[76000]
	57(14,44) - 58(13,45)	(0,0,0)	243108.125	(*0.15)	[76000]
	26(8,18) - 27(7,21)	(0,0,0)	243245.324	(*0.03)	[76000]
	14(0,14) - 13(1,13)	(0,1,0)	243522.604	(*0.05)	[76000]
	48(12,36) - 49(11,39)	(0,1,0)	244047.814	(*1.68)	[76000]
	14(0,14) - 13(1,13)	(0,0,0)	244254.171	(*0.02)	[76000]
	18(1,17) - 18(0,18)	(0,1,0)	244386.519	(*0.07)	[76000]
	5(2, 4) - 4(1, 3)	(0,1,0)	245002.644	(*0.06)	[76000]
	26(3,23) - 25(4,22)	(0,0,0)	245339.367	(*0.03)	[76000]
	10(3, 7) - 10(2, 8)	(0,0,0)	245563.425	(*0.02)	[76000]
	9(3, 6) - 9(2, 7)	(0,0,1)	245765.351	(*0.90)	[76000]
	10(3, 7) - 10(2, 8)	(1,0,0)	246054.197	(*0.84)	[76000]
	31(9,23) - 32(8,24)	(0,0,0)	247169.510	(*0.03)	[76000]
	32(9,23) - 33(8,26)	(0,1,0)	247274.121	(*0.58)	[76000]
	16(6,10) - 17(5,13)	(0,1,0)	247485.146	(*0.17)	[76000]
	18(1,17) - 18(0,18)	(0,2,0)	247852.195	(*0.94)	[76000]
	15(2,14) - 15(1,15)	(0,0,0)	248057.371	(*0.02)	[76000]
	5(2, 4) - 4(1, 3)	(0,2,0)	248551.895	(*0.28)	[76000]
	56(8,48) - 55(9,47)	(0,1,0)	248828.559	(*1.29)	[76000]
	10(5, 5) - 11(4, 8)	(0,0,0)	248830.937	(*0.02)	[76000]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{16}O$	12(3, 9) - 12(2,10)	(0,2,0)	248964.379	(*0.66)	[76000]
	43(5,39) - 42(6,36)	(0,0,0)	248995.335	(*0.04)	[76000]
	53(13,41) - 54(12,42)	(0,1,0)	249056.648	(*2.37)	[76000]
	7(3, 4) - 7(2, 5)	(0,0,1)	250073.916	(*0.41)	[76000]
	13(1,13) - 12(0,12)	(1,0,0)	250214.698	(*1.34)	[76000]
	36(10,26) - 37(9,29)	(0,0,0)	250816.436	(*0.04)	[76000]
	47(6,42) - 46(7,39)	(0,1,0)	250980.296	(*0.67)	[76000]
	49(5,45) - 48(6,42)	(0,1,0)	250997.988	(*0.70)	[76000]
	13(1,13) - 12(0,12)	(0,0,0)	251199.620	(*0.02)	[76000]
	8(3, 5) - 8(2, 6)	(0,0,0)	251210.591	(*0.02)	[76000]
	11(5, 7) - 12(4, 8)	(0,2,0)	251253.568	(*1.60)	[76000]
	5(4, 2) - 6(3, 3)	(0,1,0)	251401.199	(*0.10)	[76000]
	10(3, 7) - 10(2, 8)	(0,1,0)	251428.462	(*0.05)	[76000]
	13(1,13) - 12(0,12)	(0,1,0)	251450.114	(*0.06)	[76000]
	8(3, 5) - 8(2, 6)	(1,0,0)	251649.421	(*0.48)	[76000]
	13(1,13) - 12(0,12)	(0,2,0)	251738.583	(*0.65)	[76000]
	5(3, 2) - 5(2, 3)	(0,0,1)	252147.794	(*0.44)	[76000]
	45(5,41) - 44(6,38)	(0,1,0)	252410.468	(*0.56)	[76000]
	32(4,28) - 31(5,27)	(0,0,0)	252564.151	(*0.03)	[76000]
	15(2,14) - 15(1,15)	(0,1,0)	252730.968	(*0.06)	[76000]
	3(3, 0) - 3(2, 1)	(0,0,1)	252856.529	(*0.81)	[76000]
	37(10,28) - 38(9,29)	(0,1,0)	253105.795	(*0.89)	[76000]
	4(3, 2) - 4(2, 3)	(0,0,1)	253124.839	(*0.63)	[76000]
	6(3, 4) - 6(2, 5)	(0,0,1)	253654.572	(*0.33)	[76000]
	58(14,44) - 59(13,47)	(0,1,0)	253790.428	(*3.23)	[76000]
	38(5,33) - 37(6,32)	(0,0,0)	253936.192	(*0.04)	[76000]
	15(6,10) - 16(5,11)	(0,0,0)	253956.668	(*0.03)	[76000]
	41(11,31) - 42(10,32)	(0,0,0)	254194.611	(*0.04)	[76000]
	6(3, 3) - 6(2, 4)	(0,0,0)	254280.544	(*0.02)	[76000]
	24(2,22) - 24(1,23)	(0,0,0)	254283.374	(*0.03)	[76000]
	21(7,15) - 22(6,16)	(0,1,0)	254380.596	(*0.26)	[76000]
	6(3, 3) - 6(2, 4)	(1,0,0)	254688.118	(*0.32)	[76000]
	6(2, 5) - 5(1, 4)	(0,0,1)	254795.300	(*0.68)	[76000]
	8(3, 6) - 8(2, 7)	(0,0,1)	254957.067	(*0.61)	[76000]
	4(3, 1) - 4(2, 2)	(0,0,0)	255553.313	(*0.02)	[76000]
	51(7,45) - 50(8,42)	(0,0,0)	255595.366	(*0.04)	[76000]
	44(6,38) - 43(7,37)	(0,0,0)	255818.651	(*0.05)	[76000]
	5(2, 3) - 4(1, 4)	(0,0,1)	255873.201	(*0.42)	[76000]
	4(3, 1) - 4(2, 2)	(1,0,0)	255947.531	(*0.47)	[76000]
	3(3, 1) - 3(2, 2)	(0,0,0)	255958.056	(*0.02)	[76000]
	5(3, 3) - 5(2, 4)	(0,0,0)	256246.953	(*0.02)	[76000]
	3(3, 1) - 3(2, 2)	(1,0,0)	256347.972	(*0.57)	[76000]
	5(3, 3) - 5(2, 4)	(1,0,0)	256633.038	(*0.37)	[76000]
	57(8,50) - 56(9,47)	(0,1,0)	256919.037	(*1.26)	[76000]
	8(3, 5) - 8(2, 6)	(0,1,0)	257099.235	(*0.06)	[76000]
	7(3, 5) - 7(2, 6)	(0,0,0)	257099.968	(*0.02)	[76000]
	46(12,34) - 47(11,37)	(0,0,0)	257319.051	(*0.06)	[76000]
	47(5,43) - 46(6,40)	(0,1,0)	257380.825	(*0.64)	[76000]
	24(2,22) - 24(1,23)	(0,1,0)	257420.291	(*0.09)	[76000]
	7(3, 5) - 7(2, 6)	(1,0,0)	257475.873	(*0.36)	[76000]
	10(3, 8) - 10(2, 9)	(0,0,1)	257494.589	(*1.15)	[76000]
	15(2,14) - 15(1,15)	(0,2,0)	257556.652	(*0.88)	[76000]
	10(3, 7) - 10(2, 8)	(0,2,0)	257575.362	(*0.46)	[76000]
	32(4,28) - 32(3,29)	(0,0,0)	258388.933	(*0.12)	[76000]
	42(11,31) - 43(10,34)	(0,1,0)	258646.305	(*1.33)	[76000]
	20(7,13) - 21(6,16)	(0,0,0)	258666.986	(*0.03)	[76000]
	9(3, 7) - 9(2, 8)	(0,0,0)	258942.195	(*0.02)	[76000]
	9(3, 7) - 9(2, 8)	(1,0,0)	259297.383	(*0.64)	[76000]
	10(5, 5) - 11(4, 8)	(0,1,0)	259525.318	(*0.13)	[76000]
	30(4,26) - 30(3,27)	(0,0,0)	259599.582	(*0.10)	[76000]
	5(4, 2) - 6(3, 3)	(0,2,0)	260094.680	(*1.01)	[76000]
	6(3, 3) - 6(2, 4)	(0,1,0)	260176.026	(*0.07)	[76000]
	51(13,39) - 52(12,40)	(0,0,0)	260195.303	(*0.09)	[76000]
	49(5,45) - 48(6,42)	(0,0,0)	260269.442	(*0.06)	[76000]
	26(8,18) - 27(7,21)	(0,1,0)	260920.154	(*0.42)	[76000]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{16}O$	50(7,43) - 49(8,42)	(0,0,0)	261062.860	(*0.06)	[76000]
	4(3, 1) - 4(2, 2)	(0,1,0)	261450.125	(*0.07)	[76000]
	12(3,10) - 12(2,11)	(0,0,1)	261762.927	(*1.86)	[76000]
	3(3, 1) - 3(2, 2)	(0,1,0)	261855.090	(*0.08)	[76000]
	5(3, 3) - 5(2, 4)	(0,1,0)	262144.767	(*0.07)	[76000]
	11(3, 9) - 11(2,10)	(0,0,0)	262256.893	(*0.02)	[76000]
	4(4, 0) - 5(3, 3)	(0,0,0)	262334.039	(*0.02)	[76000]
	28(2,26) - 29(1,29)	(0,0,0)	262524.652	(*0.09)	[76000]
	11(3, 9) - 11(2,10)	(1,0,0)	262576.573	(*1.11)	[76000]
	56(14,42) - 57(13,45)	(0,0,0)	262827.828	(*0.15)	[76000]
	25(8,18) - 26(7,19)	(0,0,0)	262969.605	(*0.04)	[76000]
	7(3, 5) - 7(2, 6)	(0,1,0)	262999.658	(*0.06)	[76000]
	45(5,41) - 44(6,38)	(0,0,0)	263216.665	(*0.05)	[76000]
	8(3, 5) - 8(2, 6)	(0,2,0)	263264.725	(*0.30)	[76000]
	30(3,27) - 30(2,28)	(0,0,0)	263544.142	(*0.07)	[76000]
	47(12,36) - 48(11,37)	(0,1,0)	263895.250	(*1.93)	[76000]
	32(4,28) - 32(3,29)	(0,1,0)	264129.526	(*0.67)	[76000]
	9(3, 7) - 9(2, 8)	(0,1,0)	264846.138	(*0.06)	[76000]
	34(4,30) - 34(3,31)	(0,0,0)	265482.304	(*0.15)	[76000]
	47(6,42) - 46(7,39)	(0,0,0)	265608.501	(*0.05)	[76000]
	30(4,26) - 30(3,27)	(0,1,0)	266030.473	(*0.49)	[76000]
	6(3, 3) - 6(2, 4)	(0,2,0)	266345.145	(*0.25)	[76000]
	30(3,27) - 30(2,28)	(0,1,0)	266815.483	(*0.31)	[76000]
	30(9,21) - 31(8,24)	(0,0,0)	266943.039	(*0.04)	[76000]
	15(6,10) - 16(5,11)	(0,1,0)	267006.398	(*0.19)	[76000]
	31(9,23) - 32(8,24)	(0,1,0)	267090.934	(*0.66)	[76000]
	47(5,43) - 46(6,40)	(0,0,0)	267428.499	(*0.05)	[76000]
	13(3,11) - 13(2,12)	(0,0,0)	267537.431	(*0.02)	[76000]
	4(3, 1) - 4(2, 2)	(0,2,0)	267619.031	(*0.32)	[76000]
	28(4,24) - 28(3,25)	(0,0,0)	267719.921	(*0.08)	[76000]
	13(3,11) - 13(2,12)	(1,0,0)	267803.211	(*1.95)	[76000]
	3(3, 1) - 3(2, 2)	(0,2,0)	268023.693	(*0.37)	[76000]
	9(5, 5) - 10(4, 6)	(0,0,0)	268168.445	(*0.03)	[76000]
	11(3, 9) - 11(2,10)	(0,1,0)	268169.741	(*0.06)	[76000]
	5(3, 3) - 5(2, 4)	(0,2,0)	268314.092	(*0.28)	[76000]
	52(13,39) - 53(12,42)	(0,1,0)	268856.223	(*2.70)	[76000]
	7(3, 5) - 7(2, 6)	(0,2,0)	269170.291	(*0.26)	[76000]
	56(8,48) - 55(9,47)	(0,0,0)	269762.320	(*0.09)	[76000]
	34(4,30) - 34(3,31)	(0,1,0)	270527.905	(*0.88)	[76000]
	35(10,26) - 36(9,27)	(0,0,0)	270605.121	(*0.04)	[76000]
	4(4, 0) - 5(3, 3)	(0,1,0)	270633.562	(*0.11)	[76000]
	10(5, 5) - 11(4, 8)	(0,2,0)	270705.043	(*1.82)	[76000]
	9(3, 7) - 9(2, 8)	(0,2,0)	271019.498	(*0.36)	[76000]
	7(2, 6) - 6(1, 5)	(1,0,0)	271195.499	(*0.66)	[76000]
	7(2, 6) - 6(1, 5)	(0,0,0)	271528.970	(*0.02)	[76000]
	36(10,26) - 37(9,29)	(0,1,0)	272938.715	(*1.02)	[76000]
	14(6, 8) - 15(5,11)	(0,0,0)	273462.766	(*0.03)	[76000]
	13(3,11) - 13(2,12)	(0,1,0)	273467.363	(*0.06)	[76000]
	57(14,44) - 58(13,45)	(0,1,0)	273527.777	(*3.68)	[76000]
	17(2,16) - 17(1,17)	(0,0,0)	273752.935	(*0.02)	[76000]
	40(11,29) - 41(10,32)	(0,0,0)	273982.332	(*0.05)	[76000]
	20(7,13) - 21(6,16)	(0,1,0)	274039.168	(*0.30)	[76000]
	11(3, 9) - 11(2,10)	(0,2,0)	274349.054	(*0.55)	[76000]
	28(2,26) - 29(1,29)	(0,1,0)	274745.680	(*0.60)	[76000]
	28(4,24) - 28(3,25)	(0,1,0)	274778.428	(*0.35)	[76000]
	7(2, 6) - 6(1, 5)	(0,1,0)	274789.262	(*0.07)	[76000]
	15(3,13) - 15(2,14)	(0,0,0)	275240.160	(*0.02)	[76000]
	38(3,35) - 39(2,38)	(0,0,0)	275375.148	(*0.18)	[76000]
	22(2,20) - 21(3,19)	(0,2,0)	276278.824	(*1.26)	[76000]
	57(8,50) - 56(9,47)	(0,0,0)	276992.84	(0.20)	[70055]
	45(12,34) - 46(11,35)	(0,0,0)	277085.96	(0.20)	[70055]
	7(2, 6) - 6(1, 5)	(0,2,0)	278212.023	(*0.40)	[76000]
	19(7,13) - 20(6,14)	(0,0,0)	278250.97	(0.20)	[70055]
	41(11,31) - 42(10,32)	(0,1,0)	278468.496	(*1.52)	[76000]
	53(7,47) - 52(8,44)	(0,1,0)	278711.217	(*1.11)	[76000]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{16}O$	17(2,16) - 17(1,17)	(0,1,0)	278755.000	(*0.07)	[76000]
	9(5, 5) - 10(4, 6)	(0,1,0)	278849.336	(*0.14)	[76000]
	4(4, 0) - 5(3, 3)	(0,2,0)	279312.238	(*1.09)	[76000]
	13(3,11) - 13(2,12)	(0,2,0)	279658.969	(*0.77)	[76000]
	50(13,37) - 51(12,40)	(0,0,0)	279926.187	(*0.10)	[76000]
	25(8,18) - 26(7,19)	(0,1,0)	280628.527	(*0.48)	[76000]
	26(4,22) - 26(3,23)	(0,0,0)	280807.28	(0.20)	[70055]
	15(3,13) - 15(2,14)	(0,1,0)	281200.233	(*0.06)	[76000]
	58(5,53) - 59(4,56)	(0,0,0)	281362.875	(*0.68)	[76000]
	48(4,44) - 49(3,47)	(0,0,0)	281401.961	(*0.35)	[76000]
	22(2,20) - 21(3,19)	(0,1,0)	281511.574	(*0.07)	[76000]
	6(2, 4) - 5(1, 5)	(1,0,0)	281635.292	(*0.49)	[76000]
	36(4,32) - 36(3,33)	(0,0,0)	281688.98	(0.20)	[70055]
	36(4,32) - 36(3,33)	(0,0,0)	281689.417	(*0.19)	[76000]
	15(1,15) - 14(0,14)	(0,0,0)	281762.60	(0.20)	[70055]
	15(1,15) - 14(0,14)	(0,1,0)	281814.224	(*0.06)	[76000]
	15(1,15) - 14(0,14)	(0,2,0)	281895.327	(*0.86)	[76000]
	6(2, 4) - 5(1, 5)	(0,0,0)	282036.514	(*0.02)	[76000]
	6(2, 4) - 5(1, 5)	(0,0,0)	282036.58	(0.20)	[70055]
	16(0,16) - 15(1,15)	(0,2,0)	282112.971	(*0.83)	[76000]
	20(1,19) - 20(0,20)	(0,0,0)	282292.80	(0.20)	[70055]
	20(1,19) - 20(0,20)	(0,0,0)	282292.805	(*0.03)	[76000]
	55(14,42) - 56(13,43)	(0,0,0)	282507.809	(*0.16)	[76000]
	24(8,16) - 25(7,19)	(0,0,0)	282636.078	(*0.04)	[76000]
	24(8,16) - 25(7,19)	(0,0,0)	282636.24	(0.20)	[70055]
	16(0,16) - 15(1,15)	(0,1,0)	282803.444	(*0.06)	[76000]
	8(2, 7) - 7(1, 6)	(0,0,1)	283132.514	(*1.17)	[76000]
	49(6,44) - 48(7,41)	(0,1,0)	283133.944	(*0.88)	[76000]
	16(0,16) - 15(1,15)	(0,0,0)	283464.60	(0.20)	[70055]
	16(0,16) - 15(1,15)	(0,0,0)	283464.728	(*0.02)	[76000]
	46(12,34) - 47(11,37)	(0,1,0)	283691.277	(*2.19)	[76000]
	17(2,16) - 17(1,17)	(0,2,0)	283906.959	(*1.25)	[76000]
	18(1,17) - 17(2,16)	(0,2,0)	284007.123	(*0.91)	[76000]
	6(2, 4) - 5(1, 5)	(0,1,0)	285639.674	(*0.07)	[76000]
	17(3,15) - 17(2,16)	(0,0,0)	285743.55	(0.20)	[70055]
	17(3,15) - 17(2,16)	(0,0,0)	285743.564	(*0.03)	[76000]
	33(5,29) - 34(2,32)	(0,0,0)	285768.27	(0.20)	[70055]
	36(4,32) - 36(3,33)	(0,1,0)	286094.791	(*1.13)	[76000]
	18(1,17) - 17(2,16)	(0,1,0)	286339.006	(*0.06)	[76000]
	22(2,20) - 21(3,19)	(0,0,0)	286416.32	(0.20)	[70055]
	22(2,20) - 21(3,19)	(0,0,0)	286416.332	(*0.03)	[76000]
	20(1,19) - 20(0,20)	(0,1,0)	286432.696	(*0.11)	[76000]
	14(6, 8) - 15(5,11)	(0,1,0)	286497.496	(*0.21)	[76000]
	29(9,21) - 30(8,22)	(0,0,0)	286651.066	(*0.05)	[76000]
	29(9,21) - 30(8,22)	(0,0,0)	286651.46	(0.20)	[70055]
	30(9,21) - 31(8,24)	(0,1,0)	286847.129	(*0.75)	[76000]
	15(3,13) - 15(2,14)	(0,2,0)	287415.051	(*1.08)	[76000]
	8(5, 3) - 9(4, 6)	(0,0,0)	287485.44	(0.20)	[70055]
	8(5, 3) - 9(4, 6)	(0,0,0)	287485.621	(*0.03)	[76000]
	26(4,22) - 26(3,23)	(0,1,0)	288379.128	(*0.24)	[76000]
	18(1,17) - 17(2,16)	(0,0,0)	288519.96	(0.20)	[70055]
	18(1,17) - 17(2,16)	(0,0,0)	288519.985	(*0.02)	[76000]
	51(13,39) - 52(12,40)	(0,1,0)	288609.312	(*3.06)	[76000]
	6(2, 4) - 5(1, 5)	(0,2,0)	289400.082	(*0.33)	[76000]
	38(3,35) - 39(2,38)	(0,1,0)	289522.461	(*0.97)	[76000]
	34(10,24) - 35(9,27)	(0,0,0)	290338.176	(*0.05)	[76000]
	20(1,19) - 20(0,20)	(0,2,0)	290604.771	(*1.47)	[76000]
	17(3,15) - 17(2,16)	(0,1,0)	291752.977	(*0.07)	[76000]
	35(10,26) - 36(9,27)	(0,1,0)	292709.164	(*1.15)	[76000]
	13(6, 8) - 14(5, 9)	(0,0,0)	292882.684	(*0.03)	[76000]
	56(14,42) - 57(13,45)	(0,1,0)	293224.020	(*4.15)	[76000]
	19(7,13) - 20(6,14)	(0,1,0)	293608.254	(*0.33)	[76000]
	39(11,29) - 40(10,30)	(0,0,0)	293717.461	(*0.06)	[76000]
	53(7,47) - 52(8,44)	(0,0,0)	296004.354	(*0.06)	[76000]
	26(2,24) - 26(1,25)	(0,0,0)	296168.71	(0.20)	[70055]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{16}O$	26(2,24) - 26(1,25)	(0,0,0)	296168.776	(*0.04)	[76000]
	24(4,20) - 24(3,21)	(0,0,0)	296535.461	(*0.05)	[76000]
	24(4,20) - 24(3,21)	(0,0,0)	296535.49	(0.20)	[70055]
	44(12,32) - 45(11,35)	(0,0,0)	296806.168	(*0.07)	[76000]
	48(4,44) - 49(3,47)	(0,1,0)	297071.098	(*1.39)	[76000]
	49(6,44) - 48(7,41)	(0,0,0)	297257.207	(*0.06)	[76000]
	18(7,11) - 19(6,14)	(0,0,0)	297782.57	(0.20)	[70055]
	18(7,11) - 19(6,14)	(0,0,0)	297782.602	(*0.04)	[76000]
	17(3,15) - 17(2,16)	(0,2,0)	298007.927	(*1.55)	[76000]
	9(2, 8) - 8(1, 7)	(1,0,0)	298111.065	(*0.97)	[76000]
	8(5, 3) - 9(4, 6)	(0,1,0)	298152.293	(*0.16)	[76000]
	58(5,53) - 59(4,56)	(0,1,0)	298184.406	(*2.66)	[76000]
	40(11,29) - 41(10,32)	(0,1,0)	298236.711	(*1.71)	[76000]
	9(2, 8) - 8(1, 7)	(0,0,0)	298576.255	(*0.03)	[76000]
	52(7,45) - 51(8,44)	(0,1,0)	298864.700	(*1.37)	[76000]
	19(3,17) - 19(2,18)	(0,0,0)	299316.803	(*0.03)	[76000]
	49(13,37) - 50(12,38)	(0,0,0)	299614.496	(*0.11)	[76000]
	26(2,24) - 26(1,25)	(0,1,0)	299800.478	(*0.13)	[76000]
	59(8,52) - 58(9,49)	(0,1,0)	300182.051	(*1.78)	[76000]
	32(3,29) - 32(2,30)	(0,0,0)	300273.720	(*0.09)	[76000]
	24(8,16) - 25(7,19)	(0,1,0)	300278.766	(*0.54)	[76000]
	58(8,50) - 57(9,49)	(0,1,0)	301160.237	(*2.00)	[76000]
	46(6,40) - 45(7,39)	(0,1,0)	301252.951	(*0.91)	[76000]
	9(2, 8) - 8(1, 7)	(0,1,0)	301673.176	(*0.07)	[76000]
	19(2,18) - 19(1,19)	(0,0,0)	301896.609	(*0.03)	[76000]
	54(14,40) - 55(13,43)	(0,0,0)	302149.809	(*0.17)	[76000]
	23(8,16) - 24(7,17)	(0,0,0)	302236.082	(*0.05)	[76000]
	45(12,34) - 46(11,35)	(0,1,0)	303437.637	(*2.45)	[76000]
	32(3,29) - 32(2,30)	(0,1,0)	303591.895	(*0.44)	[76000]
	59(15,45) - 60(14,46)	(0,0,0)	304416.672	(*0.29)	[76000]
	24(4,20) - 24(3,21)	(0,1,0)	304474.920	(*0.17)	[76000]
	9(2, 8) - 8(1, 7)	(0,2,0)	304932.806	(*0.58)	[76000]
	7(2, 5) - 6(1, 6)	(0,0,1)	305324.373	(*0.80)	[76000]
	19(3,17) - 19(2,18)	(0,1,0)	305401.905	(*0.08)	[76000]
	28(3,25) - 27(4,24)	(0,1,0)	305455.136	(*0.15)	[76000]
	13(6, 8) - 14(5, 9)	(0,1,0)	305903.191	(*0.24)	[76000]
	28(9,19) - 29(8,22)	(0,0,0)	306303.414	(*0.05)	[76000]
	29(9,21) - 30(8,22)	(0,1,0)	306538.199	(*0.84)	[76000]
	7(5, 3) - 8(4, 4)	(0,0,0)	306738.957	(*0.03)	[76000]
	40(5,35) - 39(6,34)	(0,1,0)	307068.659	(*0.56)	[76000]
	38(4,34) - 38(3,35)	(0,0,0)	307185.992	(*0.24)	[76000]
	19(2,18) - 19(1,19)	(0,1,0)	307274.669	(*0.10)	[76000]
	50(13,37) - 51(12,40)	(0,1,0)	308318.227	(*3.42)	[76000]
	10(2, 9) - 9(1, 8)	(0,0,1)	308725.765	(*1.72)	[76000]
	30(2,28) - 31(1,31)	(0,0,0)	309548.305	(*0.14)	[76000]
	51(6,46) - 50(7,43)	(0,1,0)	309643.468	(*1.11)	[76000]
	33(10,24) - 34(9,25)	(0,0,0)	310016.746	(*0.06)	[76000]
	3(3, 0) - 2(2, 1)	(0,0,1)	310179.801	(*0.73)	[76000]
	38(4,34) - 38(3,35)	(0,1,0)	311073.069	(*1.44)	[76000]
	34(4,30) - 33(5,29)	(0,1,0)	311218.734	(*0.31)	[76000]
	12(6, 6) - 13(5, 9)	(0,0,0)	312258.520	(*0.04)	[76000]
	34(10,24) - 35(9,27)	(0,1,0)	312424.055	(*1.29)	[76000]
	22(4,18) - 22(3,19)	(0,0,0)	312542.553	(*0.05)	[76000]
	19(2,18) - 19(1,19)	(0,2,0)	312801.223	(*1.80)	[76000]
	55(14,42) - 56(13,43)	(0,1,0)	312880.785	(*4.64)	[76000]
	18(7,11) - 19(6,14)	(0,1,0)	313124.574	(*0.37)	[76000]
	3(3, 1) - 2(2, 0)	(0,0,0)	313279.710	(*0.03)	[76000]
	3(3, 1) - 2(2, 0)	(1,0,0)	313393.293	(*0.54)	[76000]
	38(11,27) - 39(10,30)	(0,0,0)	313403.645	(*0.07)	[76000]
	28(3,25) - 27(4,24)	(0,0,0)	313412.509	(*0.03)	[76000]
	17(1,17) - 16(0,16)	(0,2,0)	313432.995	(*1.17)	[76000]
	17(1,17) - 16(0,16)	(0,1,0)	313536.596	(*0.07)	[76000]
	17(1,17) - 16(0,16)	(0,0,0)	313660.809	(*0.03)	[76000]
	21(3,19) - 21(2,20)	(0,0,0)	316098.876	(*0.04)	[76000]
	21(3,19) - 21(2,20)	(0,0,0)	316099.01	(0.20)	[70055]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{16}O$	43(12,32) - 44(11,33)	(0,0,0)	316481.219	(*0.08)	[76000]
	55(7,49) - 54(8,46)	(0,1,0)	317088.873	(*1.50)	[76000]
	17(7,11) - 18(6,12)	(0,0,0)	317250.402	(*0.04)	[76000]
	7(5, 3) - 8(4, 4)	(0,1,0)	317391.797	(*0.17)	[76000]
	39(11,29) - 40(10,30)	(0,1,0)	317952.566	(*1.90)	[76000]
	52(7,45) - 51(8,44)	(0,0,0)	318088.868	(*0.10)	[76000]
	46(6,40) - 45(7,39)	(0,0,0)	318238.524	(*0.07)	[76000]
	3(3, 1) - 2(2, 0)	(0,1,0)	319136.240	(*0.09)	[76000]
	48(13,35) - 49(12,38)	(0,0,0)	319262.285	(*0.12)	[76000]
	40(5,35) - 40(4,36)	(0,0,0)	319278.002	(*0.44)	[76000]
	42(5,37) - 42(4,38)	(0,0,0)	319699.891	(*0.53)	[76000]
	23(8,16) - 24(7,17)	(0,1,0)	319862.918	(*0.60)	[76000]
	18(0,18) - 17(1,17)	(0,2,0)	320061.888	(*1.23)	[76000]
	59(8,52) - 58(9,49)	(0,0,0)	320087.936	(*0.09)	[76000]
	22(4,18) - 22(3,19)	(0,1,0)	320702.663	(*0.12)	[76000]
	18(0,18) - 17(1,17)	(0,1,0)	320707.488	(*0.07)	[76000]
	18(0,18) - 17(1,17)	(0,0,0)	321330.140	(*0.03)	[76000]
	40(5,35) - 39(6,34)	(0,0,0)	321420.990	(*0.05)	[76000]
	53(14,40) - 54(13,41)	(0,0,0)	321755.414	(*0.18)	[76000]
	22(8,14) - 23(7,17)	(0,0,0)	321782.453	(*0.05)	[76000]
	21(3,19) - 21(2,20)	(0,1,0)	322293.795	(*0.09)	[76000]
	11(2,10) - 10(1, 9)	(1,0,0)	322438.169	(*1.43)	[76000]
	58(8,50) - 57(9,49)	(0,0,0)	322438.566	(*0.16)	[76000]
	34(4,30) - 33(5,29)	(0,0,0)	322475.806	(*0.04)	[76000]
	11(2,10) - 10(1, 9)	(0,0,0)	323026.404	(*0.03)	[76000]
	51(6,46) - 50(7,43)	(0,0,0)	323094.074	(*0.07)	[76000]
	44(12,32) - 45(11,35)	(0,1,0)	323137.180	(*2.73)	[76000]
	30(2,28) - 31(1,31)	(0,1,0)	323351.504	(*0.89)	[76000]
	22(1,21) - 22(0,22)	(0,0,0)	323526.418	(*0.04)	[76000]
	58(15,43) - 59(14,46)	(0,0,0)	323966.637	(*0.29)	[76000]
	59(6,54) - 58(7,51)	(0,1,0)	324004.163	(*2.22)	[76000]
	3(3, 1) - 2(2, 0)	(0,2,0)	325262.806	(*0.38)	[76000]
	12(6, 6) - 13(5, 9)	(0,1,0)	325264.504	(*0.26)	[76000]
	27(9,19) - 28(8,20)	(0,0,0)	325900.684	(*0.06)	[76000]
	11(2,10) - 10(1, 9)	(0,1,0)	325921.842	(*0.07)	[76000]
	6(5, 1) - 7(4, 4)	(0,0,0)	325960.406	(*0.03)	[76000]
	28(9,19) - 29(8,22)	(0,1,0)	326173.598	(*0.94)	[76000]
	40(3,37) - 41(2,40)	(0,0,0)	326411.492	(*0.30)	[76000]
	42(5,37) - 42(4,38)	(0,1,0)	326519.437	(*3.22)	[76000]
	20(4,16) - 20(3,17)	(0,0,0)	326867.525	(*0.04)	[76000]
	40(5,35) - 40(4,36)	(0,1,0)	327134.800	(*2.67)	[76000]
	38(5,33) - 38(4,34)	(0,0,0)	327217.569	(*0.37)	[76000]
	49(13,37) - 50(12,38)	(0,1,0)	327984.789	(*3.80)	[76000]
	22(1,21) - 22(0,22)	(0,1,0)	328421.634	(*0.16)	[76000]
	53(6,48) - 52(7,45)	(0,1,0)	328723.739	(*1.35)	[76000]
	11(2,10) - 10(1, 9)	(0,2,0)	328979.925	(*0.81)	[76000]
	4(3, 2) - 3(2, 1)	(0,0,1)	329131.782	(*0.54)	[76000]
	32(10,22) - 33(9,25)	(0,0,0)	329645.426	(*0.07)	[76000]
	44(5,39) - 44(4,40)	(0,0,0)	329690.770	(*0.62)	[76000]
	11(6, 6) - 12(5, 7)	(0,0,0)	331580.297	(*0.04)	[76000]
	33(10,24) - 34(9,25)	(0,1,0)	332084.684	(*1.43)	[76000]
	21(2,20) - 21(1,21)	(0,0,0)	332091.417	(*0.04)	[76000]
	4(3, 1) - 3(2, 2)	(0,0,0)	332505.226	(*0.03)	[76000]
	4(3, 1) - 3(2, 2)	(1,0,0)	332525.055	(*0.46)	[76000]
	17(7,11) - 18(6,12)	(0,1,0)	332577.422	(*0.41)	[76000]
	37(11,27) - 38(10,28)	(0,0,0)	333043.043	(*0.08)	[76000]
	59(6,54) - 58(7,51)	(0,0,0)	333360.746	(*0.20)	[76000]
	55(7,49) - 54(8,46)	(0,0,0)	333984.871	(*0.08)	[76000]
	8(2, 6) - 7(1, 7)	(1,0,0)	333989.456	(*0.77)	[76000]
	8(2, 6) - 7(1, 7)	(0,0,0)	334673.281	(*0.03)	[76000]
	20(1,19) - 19(2,18)	(0,2,0)	334774.398	(*1.55)	[76000]
	20(4,16) - 20(3,17)	(0,1,0)	335128.597	(*0.10)	[76000]
	44(5,39) - 44(4,40)	(0,1,0)	335474.412	(*3.81)	[76000]
	50(4,46) - 51(3,49)	(0,0,0)	335943.445	(*0.56)	[76000]
	38(5,33) - 38(4,34)	(0,1,0)	336031.177	(*2.17)	[76000]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{16}O$	23(3,21) - 23(2,22)	(0,0,0)	336089.259	(*0.05)	[76000]
	42(12,30) - 43(11,33)	(0,0,0)	336113.707	(*0.10)	[76000]
	6(5, 1) - 7(4, 4)	(0,1,0)	336599.328	(*0.18)	[76000]
	16(7, 9) - 17(6,12)	(0,0,0)	336669.578	(*0.05)	[76000]
	20(1,19) - 19(2,18)	(0,1,0)	336760.692	(*0.07)	[76000]
	57(6,52) - 56(7,49)	(0,1,0)	337356.915	(*1.87)	[76000]
	38(11,27) - 39(10,30)	(0,1,0)	337619.633	(*2.10)	[76000]
	21(2,20) - 21(1,21)	(0,1,0)	337892.327	(*0.15)	[76000]
	18(4,14) - 18(3,15)	(0,0,0)	338306.021	(*0.03)	[76000]
	4(3, 1) - 3(2, 2)	(0,1,0)	338348.547	(*0.09)	[76000]
	8(2, 6) - 7(1, 7)	(0,1,0)	338376.239	(*0.08)	[76000]
	55(6,50) - 54(7,47)	(0,1,0)	338522.793	(*1.59)	[76000]
	20(1,19) - 19(2,18)	(0,0,0)	338611.826	(*0.03)	[76000]
	47(13,35) - 48(12,36)	(0,0,0)	338871.363	(*0.13)	[76000]
	22(8,14) - 23(7,17)	(0,1,0)	339393.398	(*0.66)	[76000]
	28(2,26) - 28(1,27)	(0,0,0)	340316.557	(*0.06)	[76000]
	21(8,14) - 22(7,15)	(0,0,0)	341275.352	(*0.06)	[76000]
	53(6,48) - 52(7,45)	(0,0,0)	341323.526	(*0.09)	[76000]
	52(14,38) - 53(13,41)	(0,0,0)	341326.234	(*0.20)	[76000]
	40(4,36) - 40(3,37)	(0,0,0)	341403.975	(*0.30)	[76000]
	36(5,31) - 36(4,32)	(0,0,0)	341674.555	(*0.30)	[76000]
	8(2, 6) - 7(1, 7)	(0,2,0)	342229.937	(*0.48)	[76000]
	40(3,37) - 41(2,40)	(0,1,0)	342339.566	(*1.44)	[76000]
	23(3,21) - 23(2,22)	(0,1,0)	342435.982	(*0.13)	[76000]
	34(3,31) - 34(2,32)	(0,0,0)	342762.057	(*0.12)	[76000]
	43(12,32) - 44(11,33)	(0,1,0)	342791.926	(*3.01)	[76000]
	57(15,43) - 58(14,44)	(0,0,0)	343485.590	(*0.31)	[76000]
	24(2,22) - 23(3,21)	(0,1,0)	343923.814	(*0.10)	[76000]
	4(3, 1) - 3(2, 2)	(0,2,0)	344461.383	(*0.36)	[76000]
	11(6, 6) - 12(5, 7)	(0,1,0)	344572.000	(*0.28)	[76000]
	28(2,26) - 28(1,27)	(0,1,0)	344613.712	(*0.20)	[76000]
	40(4,36) - 40(3,37)	(0,1,0)	344972.956	(*1.80)	[76000]
	5(5, 1) - 6(4, 2)	(0,0,0)	345149.070	(*0.04)	[76000]
	13(2,12) - 12(1,11)	(0,0,0)	345338.481	(*0.03)	[76000]
	26(9,17) - 27(8,20)	(0,0,0)	345448.602	(*0.07)	[76000]
	27(9,19) - 28(8,20)	(0,1,0)	345754.121	(*1.03)	[76000]
	19(1,19) - 18(0,18)	(0,2,0)	346118.654	(*1.67)	[76000]
	34(3,31) - 34(2,32)	(0,1,0)	346365.135	(*0.62)	[76000]
	19(1,19) - 18(0,18)	(0,1,0)	346379.230	(*0.08)	[76000]
	16(4,12) - 16(3,13)	(0,0,0)	346523.905	(*0.03)	[76000]
	18(4,14) - 18(3,15)	(0,1,0)	346591.820	(*0.09)	[76000]
	19(1,19) - 18(0,18)	(0,0,0)	346652.145	(*0.03)	[76000]
	48(13,35) - 49(12,38)	(0,1,0)	347611.039	(*4.18)	[76000]
	57(6,52) - 56(7,49)	(0,0,0)	347829.535	(*0.15)	[76000]
	13(2,12) - 12(1,11)	(0,1,0)	347991.765	(*0.08)	[76000]
	24(2,22) - 23(3,21)	(0,0,0)	348387.919	(*0.03)	[76000]
	5(3, 2) - 4(2, 3)	(0,0,1)	348510.381	(*0.43)	[76000]
	31(10,22) - 32(9,23)	(0,0,0)	349226.531	(*0.08)	[76000]
	46(5,41) - 46(4,42)	(0,0,0)	349785.122	(*0.73)	[76000]
	55(6,50) - 54(7,47)	(0,0,0)	350110.578	(*0.11)	[76000]
	13(2,12) - 12(1,11)	(0,2,0)	350806.562	(*1.06)	[76000]
	10(6, 4) - 11(5, 7)	(0,0,0)	350862.844	(*0.04)	[76000]
	5(3, 3) - 4(2, 2)	(1,0,0)	351188.637	(*0.43)	[76000]
	5(3, 3) - 4(2, 2)	(0,0,0)	351257.201	(*0.03)	[76000]
	36(5,31) - 36(4,32)	(0,1,0)	351289.232	(*1.72)	[76000]
	32(10,22) - 33(9,25)	(0,1,0)	351695.543	(*1.57)	[76000]
	14(4,10) - 14(3,11)	(0,0,0)	351873.899	(*0.03)	[76000]
	11(4, 7) - 11(3, 8)	(0,0,1)	351921.906	(*1.85)	[76000]
	16(7, 9) - 17(6,12)	(0,1,0)	351981.594	(*0.45)	[76000]
	57(7,51) - 56(8,48)	(0,1,0)	351995.823	(*1.94)	[76000]
	36(11,25) - 37(10,28)	(0,0,0)	352638.566	(*0.09)	[76000]
	9(4, 5) - 9(3, 6)	(0,0,1)	353141.141	(*1.34)	[76000]
	10(4, 7) - 10(3, 8)	(0,0,1)	353433.636	(*1.49)	[76000]
	50(4,46) - 51(3,49)	(0,1,0)	353615.070	(*2.13)	[76000]
	7(4, 3) - 7(3, 4)	(0,0,1)	353689.530	(*1.66)	[76000]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ – $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{16}O$	8(4, 5) – 8(3, 6)	(0,0,1)	353691.835	(*1.41)	[76000]
	6(4, 3) – 6(3, 4)	(0,0,1)	353859.553	(*2.00)	[76000]
	46(5,41) – 46(4,42)	(0,1,0)	354620.027	(*4.48)	[76000]
	16(4,12) – 16(3,13)	(0,1,0)	354799.987	(*0.07)	[76000]
	12(4, 8) – 12(3, 9)	(0,0,0)	355045.543	(*0.03)	[76000]
	32(2,30) – 33(1,33)	(0,0,0)	355154.199	(*0.23)	[76000]
	41(12,30) – 42(11,31)	(0,0,0)	355705.676	(*0.11)	[76000]
	5(5, 1) – 6(4, 2)	(0,1,0)	355774.180	(*0.20)	[76000]
	15(7, 9) – 16(6,10)	(0,0,0)	356040.637	(*0.05)	[76000]
	10(4, 6) – 10(3, 7)	(0,0,0)	356755.219	(*0.03)	[76000]
	20(0,20) – 19(1,19)	(0,2,0)	356970.850	(*1.88)	[76000]
	5(3, 3) – 4(2, 2)	(0,1,0)	357087.010	(*0.09)	[76000]
	13(4,10) – 13(3,11)	(0,0,0)	357165.36	(0.20)	[70055]
	13(4,10) – 13(3,11)	(0,0,0)	357165.410	(*0.03)	[76000]
	37(11,27) – 38(10,28)	(0,1,0)	357240.102	(*2.31)	[76000]
	15(4,12) – 15(3,13)	(0,0,0)	357241.19	(0.20)	[70055]
	15(4,12) – 15(3,13)	(0,0,0)	357241.209	(*0.03)	[76000]
	60(8,52) – 59(9,51)	(0,1,0)	357291.851	(*2.97)	[76000]
	10(4, 6) – 10(3, 7)	(1,0,0)	357313.574	(*1.46)	[76000]
	11(4, 8) – 11(3, 9)	(0,0,0)	357387.57	(0.20)	[70055]
	11(4, 8) – 11(3, 9)	(0,0,0)	357387.604	(*0.03)	[76000]
	8(4, 4) – 8(3, 5)	(0,0,0)	357581.482	(*0.03)	[76000]
	20(0,20) – 19(1,19)	(0,1,0)	357602.665	(*0.08)	[76000]
	9(4, 6) – 9(3, 7)	(0,0,0)	357671.78	(0.20)	[70055]
	9(4, 6) – 9(3, 7)	(0,0,0)	357671.851	(*0.03)	[76000]
	7(4, 4) – 7(3, 5)	(0,0,0)	357892.478	(*0.03)	[76000]
	6(4, 2) – 6(3, 3)	(0,0,0)	357925.885	(*0.03)	[76000]
	6(4, 2) – 6(3, 3)	(0,0,0)	357925.96	(0.20)	[70055]
	11(4, 8) – 11(3, 9)	(1,0,0)	357931.901	(*1.72)	[76000]
	17(4,14) – 17(3,15)	(0,0,0)	357962.89	(0.20)	[70055]
	17(4,14) – 17(3,15)	(0,0,0)	357962.919	(*0.03)	[76000]
	5(4, 2) – 5(3, 3)	(0,0,0)	358013.09	(0.20)	[70055]
	5(4, 2) – 5(3, 3)	(0,0,0)	358013.193	(*0.03)	[76000]
	4(4, 0) – 4(3, 1)	(0,0,0)	358037.928	(*0.03)	[76000]
	4(4, 0) – 4(3, 1)	(0,0,0)	358038.08	(0.20)	[70055]
	8(4, 4) – 8(3, 5)	(1,0,0)	358129.917	(*1.39)	[76000]
	20(0,20) – 19(1,19)	(0,0,0)	358215.630	(*0.03)	[76000]
	20(0,20) – 19(1,19)	(0,0,0)	358215.64	(0.20)	[70055]
	9(4, 6) – 9(3, 7)	(1,0,0)	358216.674	(*1.35)	[76000]
	7(4, 4) – 7(3, 5)	(1,0,0)	358437.023	(*1.54)	[76000]
	46(13,33) – 47(12,36)	(0,0,0)	358443.594	(*0.15)	[76000]
	6(4, 2) – 6(3, 3)	(1,0,0)	358471.081	(*1.75)	[76000]
	5(4, 2) – 5(3, 3)	(1,0,0)	358557.781	(*0.99)	[76000]
	21(8,14) – 22(7,15)	(0,1,0)	358870.594	(*0.72)	[76000]
	25(3,23) – 25(2,24)	(0,0,0)	359151.228	(*0.06)	[76000]
	19(4,16) – 19(3,17)	(0,0,0)	359770.702	(*0.04)	[76000]
$^{16}O^{34}S^{16}O$	23(4,20) – 22(5,17)	(0,0,0)	3093.068	(*0.02)	[76000]
	12(2,10) – 11(3, 9)	(0,0,0)	5433.933	(*0.03)	[76000]
	48(9,39) – 47(10,38)	(0,0,0)	5730.151	(*0.09)	[76000]
	43(8,36) – 42(9,33)	(0,0,0)	6010.424	(*0.06)	[76000]
	33(6,28) – 32(7,25)	(0,0,0)	6391.100	(*0.04)	[76000]
	21(5,17) – 22(4,18)	(0,0,0)	6991.319	(*0.03)	[76000]
	38(7,31) – 37(8,30)	(0,0,0)	7456.000	(*0.05)	[76000]
	12(2,10) – 13(1,13)	(0,0,0)	7911.749	(*0.04)	[76000]
	26(3,23) – 27(2,26)	(0,0,0)	8283.194	(*0.26)	[76000]
	32(7,25) – 33(6,28)	(0,1,0)	8694.0	(0.1)	[64015]
	10(2, 8) – 11(1,11)	(0,0,0)	9650.63	(0.05)	[59013]
	37(8,30) – 38(7,31)	(0,1,0)	9948.1	(0.1)	[64015]
	1(1, 1) – 2(0, 2)	(0,0,0)	10547.91	(0.05)	[59013]
	28(5,23) – 27(6,22)	(0,0,0)	11695.05	(0.10)	[64015]
	12(2,10) – 13(1,13)	(0,1,0)	12464.0	(0.1)	[64015]
	31(7,25) – 32(6,26)	(0,0,0)	12567.30	(0.10)	[64015]
	15(2,14) – 14(3,11)	(0,0,0)	13184.8	(0.1)	[62014]
	12(3, 9) – 13(3,12)	(0,0,0)	13207.9	(0.1)	[62014]
	29(5,25) – 28(6,22)	(0,1,0)	13272.4	(0.1)	[64015]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{34}S^{16}O$	25(2,24) - 24(3,21)	(0,1,0)	13778.5	(0.1)	[64015]
	10(2, 8) - 11(1,11)	(0,1,0)	13876.3	(0.1)	[64015]
	36(8,28) - 37(7,31)	(0,0,0)	14547.10	(0.05)	[62014]
	41(9,33) - 42(8,34)	(0,0,0)	14583.05	(0.05)	[62014]
	19(3,17) - 18(4,14)	(0,0,0)	14754.70	(0.05)	[62014]
	26(6,20) - 27(5,23)	(0,0,0)	14850.4	(0.1)	[62014]
	46(10,36) - 47(9,39)	(0,0,0)	15271.208	(*0.09)	[76000]
	18(3,15) - 17(4,14)	(0,1,0)	15406.8	(0.1)	[63016]
	34(6,28) - 33(7,27)	(0,1,0)	15737.8	(0.1)	[64015]
	14(2,12) - 15(1,15)	(0,0,0)	15994.1	(0.1)	[64015]
	37(3,35) - 36(4,32)	(0,0,0)	17055.107	(*3.14)	[76000]
	21(5,17) - 22(4,18)	(0,1,0)	17636.8	(0.1)	[63016]
	5(2, 4) - 6(1, 5)	(0,0,0)	17970.42	(0.10)	[54008]
	12(3, 9) - 13(2,12)	(0,1,0)	19095.3	(0.1)	[64015]
	25(2,24) - 24(3,21)	(0,0,0)	20260.80	(0.10)	[64015]
	16(4,12) - 17(3,15)	(0,0,0)	20548.19	(0.05)	[64019]
	8(2, 6) - 9(1, 9)	(0,0,0)	20699.26	(0.05)	[64019]
	14(2,12) - 15(1,15)	(0,1,0)	20981.8	(0.1)	[64015]
	5(2, 4) - 6(1, 5)	(0,1,0)	21297.8	(0.1)	[64015]
	18(3,15) - 17(4,14)	(0,0,0)	23732.99	(0.05)	[64019]
	8(2, 6) - 9(1, 9)	(0,1,0)	24678.2	(0.1)	[64015]
	15(4,12) - 16(3,13)	(0,0,0)	25171.04	(0.05)	[64019]
	29(5,25) - 28(6,22)	(0,0,0)	26038.35	(0.05)	[63016]
	49(9,41) - 48(10,38)	(0,0,0)	26505.40	(0.05)	[63016]
	17(2,16) - 16(3,13)	(0,1,0)	27296.5	(0.1)	[64015]
	39(7,33) - 38(8,30)	(0,0,0)	27398.00	(0.05)	[63016]
	26(6,20) - 27(5,23)	(0,1,0)	27632.7	(0.1)	[64015]
	44(8,36) - 43(9,35)	(0,0,0)	27657.15	(0.05)	[63016]
	31(7,25) - 32(6,26)	(0,1,0)	27723.8	(0.1)	[64015]
	8(1, 7) - 7(2, 6)	(0,1,0)	27756.6	(0.1)	[64015]
	16(4,12) - 17(3,15)	(0,1,0)	28677.7	(0.1)	[63016]
	4(0, 4) - 3(1, 3)	(0,1,0)	29863.8	(0.1)	[64015]
	24(4,20) - 23(5,19)	(0,1,0)	29895.2	(0.1)	[63016]
	8(1, 7) - 7(2, 6)	(0,0,0)	30975.45	(0.05)	[64019]
	34(6,28) - 33(7,27)	(0,0,0)	30977.38	(0.05)	[64019]
	4(0, 4) - 3(1, 3)	(0,0,0)	31011.18	(0.05)	[64019]
	25(6,20) - 26(5,21)	(0,0,0)	32272.34	(0.05)	[64019]
	35(6,30) - 34(7,27)	(0,1,0)	33149.3	(0.1)	[64015]
	17(2,16) - 16(3,13)	(0,0,0)	33212.81	(0.05)	[64019]
	15(4,12) - 16(3,13)	(0,1,0)	33437.9	(0.1)	[64015]
	16(2,14) - 17(1,17)	(0,0,0)	33672.10	(0.10)	[64015]
	35(8,28) - 36(7,29)	(0,0,0)	34811.01	(0.05)	[64019]
	30(7,23) - 31(6,26)	(0,0,0)	35126.56	(0.05)	[64019]
	40(9,31) - 41(8,34)	(0,0,0)	35664.80	(0.10)	[64015]
	45(10,36) - 46(9,37)	(0,0,0)	35905.60	(0.10)	[64015]
	20(5,15) - 21(4,18)	(0,0,0)	36294.54	(0.05)	[64019]
	21(3,19) - 20(4,16)	(0,1,0)	38992.4	(0.1)	[64015]
	23(2,22) - 22(3,19)	(0,0,0)	39024.10	(0.10)	[64015]
	19(2,18) - 18(3,15)	(0,1,0)	39138.5	(0.1)	[64015]
	6(2, 4) - 7(1, 7)	(0,0,0)	39819.20	(0.10)	[64015]
	24(4,20) - 23(5,19)	(0,0,0)	40652.42	(0.05)	[64019]
	25(4,22) - 24(5,19)	(0,0,0)	41540.90	(0.05)	[64019]
	9(3, 7) - 10(2, 8)	(0,0,0)	43619.91	(0.10)	[65015]
	10(3, 7) - 11(2,10)	(0,0,0)	44226.24	(0.10)	[65015]
	19(2,18) - 18(3,15)	(0,0,0)	45079.68	(0.10)	[65015]
	28(3,25) - 29(2,28)	(0,0,0)	45354.229	(*0.67)	[76000]
	21(3,19) - 20(4,16)	(0,0,0)	47002.34	(0.06)	[64011]
	21(2,20) - 20(3,17)	(0,0,0)	47293.11	(0.10)	[64011]
	50(9,41) - 49(10,40)	(0,0,0)	47920.301	(*0.19)	[76000]
	45(8,38) - 44(9,35)	(0,0,0)	48184.792	(*0.12)	[76000]
	35(6,30) - 34(7,27)	(0,0,0)	48233.110	(*0.07)	[76000]
	40(7,33) - 39(8,32)	(0,0,0)	50703.743	(*0.10)	[76000]
	19(5,15) - 20(4,16)	(0,0,0)	51519.484	(*0.05)	[76000]
	2(1, 1) - 2(0, 2)	(0,0,0)	51822.09	(0.10)	[65015]
	29(7,23) - 30(6,24)	(0,0,0)	54852.179	(*0.08)	[76000]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{34}S^{16}O$	24(6,18) - 25(5,21)	(0,0,0)	55664.222	(*0.06)	[76000]
	34(8,26) - 35(7,29)	(0,0,0)	56006.690	(*0.10)	[76000]
	39(9,31) - 40(8,32)	(0,0,0)	56179.094	(*0.12)	[76000]
	35(3,33) - 34(4,30)	(0,0,0)	56285.118	(*1.87)	[76000]
	44(10,34) - 45(9,37)	(0,0,0)	56596.171	(*0.14)	[76000]
	49(11,39) - 50(10,40)	(0,0,0)	56768.227	(*0.25)	[76000]
	4(1, 3) - 4(0, 4)	(0,0,0)	57687.50	(0.10)	[65015]
	14(4,10) - 15(3,13)	(0,0,0)	57729.804	(*0.04)	[76000]
	30(5,25) - 29(6,24)	(0,0,0)	58010.584	(*0.05)	[76000]
	14(2,12) - 13(2,11)	(0,0,0)	58552.60	(0.10)	[65015]
	18(2,16) - 19(1,19)	(0,0,0)	60157.381	(*0.13)	[76000]
	3(2, 2) - 4(1, 3)	(0,0,0)	64316.383	(*0.02)	[76000]
	4(2, 2) - 5(1, 5)	(0,0,0)	65375.042	(*0.02)	[76000]
	31(5,27) - 30(6,24)	(0,0,0)	66636.015	(*0.09)	[76000]
	1(1, 1) - 0(0, 0)	(0,0,0)	67750.301	(*0.02)	[76000]
	6(1, 5) - 6(0, 6)	(0,0,0)	67768.79	(0.10)	[63011]
	41(7,35) - 40(8,32)	(0,0,0)	69796.418	(*0.18)	[76000]
	13(4,10) - 14(3,11)	(0,0,0)	70255.520	(*0.04)	[76000]
	46(8,38) - 45(9,37)	(0,0,0)	70685.753	(*0.29)	[76000]
	6(0, 6) - 5(1, 5)	(0,0,0)	74404.569	(*0.02)	[76000]
	23(6,18) - 24(5,19)	(0,0,0)	74580.840	(*0.10)	[76000]
	23(3,21) - 22(4,18)	(0,0,0)	74698.112	(*0.05)	[76000]
	18(5,13) - 19(4,16)	(0,0,0)	76031.295	(*0.07)	[76000]
	28(7,21) - 29(6,24)	(0,0,0)	76220.207	(*0.14)	[76000]
	36(6,30) - 35(7,29)	(0,0,0)	76252.537	(*0.13)	[76000]
	33(8,26) - 34(7,27)	(0,0,0)	76312.896	(*0.18)	[76000]
	38(9,29) - 39(8,32)	(0,0,0)	76866.719	(*0.23)	[76000]
	43(10,34) - 44(9,35)	(0,0,0)	77063.075	(*0.28)	[76000]
	20(3,17) - 19(4,16)	(0,0,0)	77231.396	(*0.04)	[76000]
	48(11,37) - 49(10,40)	(0,0,0)	77234.263	(*0.37)	[76000]
	27(4,24) - 26(5,21)	(0,0,0)	78195.118	(*0.08)	[76000]
	8(3, 5) - 9(2, 8)	(0,0,0)	78397.033	(*0.03)	[76000]
	10(1, 9) - 9(2, 8)	(0,0,0)	82124.317	(*0.03)	[76000]
	8(1, 7) - 8(0, 8)	(0,0,0)	83043.775	(*0.03)	[76000]
	33(3,31) - 32(4,28)	(0,0,0)	85973.142	(*1.09)	[76000]
	7(3, 5) - 8(2, 6)	(0,0,0)	88720.604	(*0.04)	[76000]
	30(3,27) - 31(2,30)	(0,0,0)	89307.345	(*1.44)	[76000]
	37(6,32) - 36(7,29)	(0,0,0)	90196.662	(*0.21)	[76000]
	47(8,40) - 46(9,37)	(0,0,0)	90863.612	(*0.48)	[76000]
	26(4,22) - 25(5,21)	(0,0,0)	92428.878	(*0.05)	[76000]
	17(5,13) - 18(4,14)	(0,0,0)	93852.163	(*0.09)	[76000]
	20(2,18) - 21(1,21)	(0,0,0)	94250.687	(*0.27)	[76000]
	42(7,35) - 41(8,34)	(0,0,0)	95241.956	(*0.36)	[76000]
	2(2, 0) - 3(1, 3)	(0,0,0)	95810.418	(*0.03)	[76000]
	12(4, 8) - 13(3,11)	(0,0,0)	95922.876	(*0.06)	[76000]
	25(3,23) - 24(4,20)	(0,0,0)	96075.192	(*0.10)	[76000]
	22(6,16) - 23(5,19)	(0,0,0)	96193.987	(*0.14)	[76000]
	27(7,21) - 28(6,22)	(0,0,0)	96204.234	(*0.20)	[76000]
	32(8,24) - 33(7,27)	(0,0,0)	96987.955	(*0.28)	[76000]
	37(9,29) - 38(8,30)	(0,0,0)	97236.841	(*0.38)	[76000]
	42(10,32) - 43(9,35)	(0,0,0)	97507.014	(*0.48)	[76000]
	47(11,37) - 48(10,38)	(0,0,0)	97581.131	(*0.60)	[76000]
	3(1, 3) - 2(0, 2)	(0,0,0)	102031.888	(*0.02)	[76000]
	10(1, 9) - 10(0,10)	(0,0,0)	104391.640	(*0.03)	[76000]
	31(3,29) - 30(4,26)	(0,0,0)	104914.876	(*0.62)	[76000]
	33(5,29) - 32(6,26)	(0,0,0)	106374.118	(*0.21)	[76000]
	32(5,27) - 31(6,26)	(0,0,0)	107567.650	(*0.15)	[76000]
	27(3,25) - 26(4,22)	(0,0,0)	109260.376	(*0.19)	[76000]
	29(4,26) - 28(5,23)	(0,0,0)	111902.681	(*0.17)	[76000]
	11(4, 8) - 12(3, 9)	(0,0,0)	112532.400	(*0.07)	[76000]
	43(7,37) - 42(8,34)	(0,0,0)	112552.945	(*0.50)	[76000]
	29(3,27) - 28(4,24)	(0,0,0)	112577.829	(*0.35)	[76000]
	6(3, 3) - 7(2, 6)	(0,0,0)	114574.470	(*0.04)	[76000]
	48(8,40) - 47(9,39)	(0,0,0)	114705.313	(*0.83)	[76000]
	16(2,14) - 15(3,13)	(0,0,0)	115291.373	(*0.04)	[76000]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{34}S^{16}O$	21(6,16) - 22(5,17)	(0,0,0)	115722.337	(*0.18)	[76000]
	16(5,11) - 17(4,14)	(0,0,0)	115744.797	(*0.12)	[76000]
	26(7,19) - 27(6,22)	(0,0,0)	116859.971	(*0.28)	[76000]
	31(8,24) - 32(7,25)	(0,0,0)	117202.095	(*0.40)	[76000]
	36(9,27) - 37(8,30)	(0,0,0)	117632.286	(*0.55)	[76000]
	41(10,32) - 42(9,33)	(0,0,0)	117802.395	(*0.72)	[76000]
	46(11,35) - 47(10,38)	(0,0,0)	117863.615	(*0.91)	[76000]
	8(0, 8) - 7(1, 7)	(0,0,0)	118478.532	(*0.03)	[76000]
	38(6,32) - 37(7,31)	(0,0,0)	123913.330	(*0.40)	[76000]
	12(2,10) - 12(1,11)	(0,0,0)	124496.455	(*0.03)	[76000]
	10(2, 8) - 10(1, 9)	(0,0,0)	124614.078	(*0.03)	[76000]
	8(2, 6) - 8(1, 7)	(0,0,0)	128668.789	(*0.03)	[76000]
	14(2,12) - 14(1,13)	(0,0,0)	129803.36	(0.10)	[64011]
	5(3, 3) - 6(2, 4)	(0,0,0)	130584.353	(*0.05)	[76000]
	39(6,34) - 38(7,31)	(0,0,0)	131936.059	(*0.49)	[76000]
	12(1,11) - 12(0,12)	(0,0,0)	132114.04	(0.10)	[64011]
	5(1, 5) - 4(0, 4)	(0,0,0)	133471.47	(0.10)	[64011]
	49(8,42) - 48(9,39)	(0,0,0)	134016.806	(*1.12)	[76000]
	22(2,20) - 23(1,23)	(0,0,0)	134417.311	(*0.55)	[76000]
	10(4, 6) - 11(3, 9)	(0,0,0)	134535.348	(*0.08)	[76000]
	15(5,11) - 16(4,12)	(0,0,0)	134703.445	(*0.14)	[76000]
	6(2, 4) - 6(1, 5)	(0,0,0)	134826.12	(0.10)	[64011]
	12(1,11) - 11(2,10)	(0,0,0)	134873.84	(0.10)	[64011]
	22(3,19) - 21(4,18)	(0,0,0)	135566.28	(0.20)	[65015]
	20(6,14) - 21(5,17)	(0,0,0)	136343.910	(*0.24)	[76000]
	25(7,19) - 26(6,20)	(0,0,0)	136848.311	(*0.37)	[76000]
	30(8,22) - 31(7,25)	(0,0,0)	137521.137	(*0.54)	[76000]
	35(9,27) - 36(8,28)	(0,0,0)	137836.490	(*0.74)	[76000]
	40(10,30) - 41(9,33)	(0,0,0)	138042.080	(*0.99)	[76000]
	45(11,35) - 46(10,36)	(0,0,0)	138052.318	(*1.28)	[76000]
	32(3,29) - 33(2,32)	(0,0,0)	138206.111	(*2.72)	[76000]
	4(2, 2) - 4(1, 3)	(0,0,0)	141158.76	(0.10)	[64011]
	31(4,28) - 30(5,25)	(0,0,0)	141195.631	(*0.35)	[76000]
	44(7,37) - 43(8,36)	(0,0,0)	141511.657	(*0.89)	[76000]
	16(2,14) - 16(1,15)	(0,0,0)	141653.16	(0.10)	[64011]
	35(5,31) - 34(6,28)	(0,0,0)	144436.385	(*0.45)	[76000]
	2(2, 0) - 2(1, 1)	(0,0,0)	146020.435	(*0.04)	[76000]
	28(4,24) - 27(5,23)	(0,0,0)	149209.816	(*0.12)	[76000]
	4(3, 1) - 5(2, 4)	(0,0,0)	151917.609	(*0.06)	[76000]
	9(4, 6) - 10(3, 7)	(0,0,0)	152953.760	(*0.09)	[76000]
	3(2, 2) - 3(1, 3)	(0,0,0)	153015.056	(*0.04)	[76000]
	14(5, 9) - 15(4,12)	(0,0,0)	155233.078	(*0.17)	[76000]
	45(7,39) - 44(8,36)	(0,0,0)	155479.791	(*1.05)	[76000]
	19(6,14) - 20(5,15)	(0,0,0)	156033.766	(*0.29)	[76000]
	24(7,17) - 25(6,20)	(0,0,0)	157059.154	(*0.46)	[76000]
	29(8,22) - 30(7,23)	(0,0,0)	157588.822	(*0.68)	[76000]
	49(12,38) - 50(11,39)	(0,0,0)	157986.437	(*2.14)	[76000]
	34(9,25) - 35(8,28)	(0,0,0)	158002.676	(*0.96)	[76000]
	39(10,30) - 40(9,31)	(0,0,0)	158173.326	(*1.30)	[76000]
	44(11,33) - 45(10,36)	(0,0,0)	158173.582	(*1.69)	[76000]
	50(8,42) - 49(9,41)	(0,0,0)	160002.592	(*1.75)	[76000]
	5(2, 4) - 5(1, 5)	(0,0,0)	160143.598	(*0.03)	[76000]
	41(4,38) - 40(5,35)	(0,0,0)	160403.342	(*4.92)	[76000]
	18(2,16) - 18(1,17)	(0,0,0)	160802.570	(*0.04)	[76000]
	34(5,29) - 33(6,28)	(0,0,0)	161392.279	(*0.39)	[76000]
	10(0,10) - 9(1, 9)	(0,0,0)	162020.358	(*0.03)	[76000]
	7(1, 7) - 6(0, 6)	(0,0,0)	162775.893	(*0.04)	[76000]
	33(4,30) - 32(5,27)	(0,0,0)	164323.248	(*0.65)	[76000]
	14(1,13) - 14(0,14)	(0,0,0)	165620.635	(*0.05)	[76000]
	3(3, 1) - 4(2, 2)	(0,0,0)	170284.871	(*0.06)	[76000]
	7(2, 6) - 7(1, 7)	(0,0,0)	170546.918	(*0.03)	[76000]
	41(6,36) - 40(7,33)	(0,0,0)	172919.366	(*0.95)	[76000]
	8(4, 4) - 9(3, 7)	(0,0,0)	173207.430	(*0.11)	[76000]
	13(5, 9) - 14(4,10)	(0,0,0)	174576.699	(*0.20)	[76000]
	40(6,34) - 39(7,33)	(0,0,0)	174817.494	(*0.92)	[76000]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{34}S^{16}O$	18(2,16) - 17(3,15)	(0,0,0)	174850.238	(*0.04)	[76000]
	18(6,12) - 19(5,15)	(0,0,0)	176093.740	(*0.34)	[76000]
	23(7,17) - 24(6,18)	(0,0,0)	176940.855	(*0.55)	[76000]
	28(8,20) - 29(7,23)	(0,0,0)	177647.898	(*0.83)	[76000]
	48(12,36) - 49(11,39)	(0,0,0)	178000.840	(*2.74)	[76000]
	33(9,25) - 34(8,26)	(0,0,0)	178041.514	(*1.19)	[76000]
	43(11,33) - 44(10,34)	(0,0,0)	178216.660	(*2.14)	[76000]
	38(10,28) - 39(9,31)	(0,0,0)	178238.645	(*1.63)	[76000]
	39(4,36) - 38(5,33)	(0,0,0)	178418.689	(*3.13)	[76000]
	24(2,22) - 25(1,25)	(0,0,0)	178845.749	(*1.09)	[76000]
	35(4,32) - 34(5,29)	(0,0,0)	179375.529	(*1.14)	[76000]
	37(5,33) - 36(6,30)	(0,0,0)	179720.739	(*0.84)	[76000]
	9(2, 8) - 9(1, 9)	(0,0,0)	184287.682	(*0.04)	[76000]
	37(4,34) - 36(5,31)	(0,0,0)	184533.839	(*1.92)	[76000]
	2(2, 0) - 1(1, 1)	(0,0,0)	187294.441	(*0.05)	[76000]
	20(2,18) - 20(1,19)	(0,0,0)	187475.199	(*0.05)	[76000]
	14(1,13) - 13(2,12)	(0,0,0)	188366.491	(*0.04)	[76000]
	20(3,17) - 20(2,18)	(0,0,0)	189123.89	(0.10)	[74038]
	22(3,19) - 22(2,20)	(0,0,0)	189392.475	(*0.05)	[76000]
	34(3,31) - 35(2,34)	(0,0,0)	189944.861	(*4.71)	[76000]
	46(7,39) - 45(8,38)	(0,0,0)	190124.650	(*1.80)	[76000]
	9(1, 9) - 8(0, 8)	(0,0,0)	191013.39	(0.10)	[74038]
	7(4, 4) - 8(3, 5)	(0,0,0)	192254.918	(*0.12)	[76000]
	12(5, 7) - 13(4,10)	(0,0,0)	194416.924	(*0.23)	[76000]
	18(3,15) - 18(2,16)	(0,0,0)	194812.06	(0.10)	[74038]
	17(6,12) - 18(5,13)	(0,0,0)	195742.598	(*0.40)	[76000]
	22(7,15) - 23(6,18)	(0,0,0)	196855.174	(*0.65)	[76000]
	24(3,21) - 24(2,22)	(0,0,0)	197044.30	(0.10)	[74038]
	27(8,20) - 28(7,21)	(0,0,0)	197556.367	(*1.00)	[76000]
	47(12,36) - 48(11,37)	(0,0,0)	197952.020	(*3.39)	[76000]
	32(9,23) - 33(8,26)	(0,0,0)	198019.766	(*1.44)	[76000]
	42(11,31) - 43(10,34)	(0,0,0)	198194.738	(*2.63)	[76000]
	37(10,28) - 38(9,29)	(0,0,0)	198218.242	(*1.98)	[76000]
	47(7,41) - 46(8,38)	(0,0,0)	198260.701	(*1.87)	[76000]
	24(3,21) - 23(4,20)	(0,0,0)	198348.54	(0.10)	[74038]
	11(2,10) - 11(1,11)	(0,0,0)	201376.411	(*0.04)	[76000]
	3(2, 2) - 2(1, 1)	(0,0,0)	203225.14	(0.10)	[74038]
	16(1,15) - 16(0,16)	(0,0,0)	203504.113	(*0.07)	[76000]
	12(0,12) - 11(1,11)	(0,0,0)	204136.203	(*0.04)	[76000]
	16(3,13) - 16(2,14)	(0,0,0)	204525.157	(*0.06)	[76000]
	39(5,35) - 38(6,32)	(0,0,0)	210817.315	(*1.46)	[76000]
	30(4,26) - 29(5,25)	(0,0,0)	211418.528	(*0.29)	[76000]
	6(4, 2) - 7(3, 5)	(0,0,0)	211762.922	(*0.13)	[76000]
	43(6,38) - 42(7,35)	(0,0,0)	212384.618	(*1.65)	[76000]
	26(3,23) - 26(2,24)	(0,0,0)	212981.530	(*0.14)	[76000]
	11(5, 7) - 12(4, 8)	(0,0,0)	213807.648	(*0.25)	[76000]
	16(6,10) - 17(5,13)	(0,0,0)	215468.680	(*0.46)	[76000]
	14(3,11) - 14(2,12)	(0,0,0)	215999.705	(*0.06)	[76000]
	21(7,15) - 22(6,16)	(0,0,0)	216594.318	(*0.75)	[76000]
	26(8,18) - 27(7,21)	(0,0,0)	217414.184	(*1.16)	[76000]
	46(12,34) - 47(11,37)	(0,0,0)	217845.246	(*4.08)	[76000]
	31(9,23) - 32(8,24)	(0,0,0)	217904.227	(*1.69)	[76000]
	41(11,31) - 42(10,32)	(0,0,0)	218105.268	(*3.15)	[76000]
	36(10,26) - 37(9,29)	(0,0,0)	218131.977	(*2.35)	[76000]
	11(1,11) - 10(0,10)	(0,0,0)	219355.005	(*0.04)	[76000]
	36(5,31) - 35(6,30)	(0,0,0)	220450.651	(*0.84)	[76000]
	22(2,20) - 22(1,21)	(0,0,0)	221114.956	(*0.06)	[76000]
	13(2,12) - 13(1,13)	(0,0,0)	221735.627	(*0.06)	[76000]
	26(2,24) - 27(1,27)	(0,0,0)	225582.158	(*2.00)	[76000]
	12(3, 9) - 12(2,10)	(0,0,0)	227031.868	(*0.05)	[76000]
	4(2, 2) - 3(1, 3)	(0,0,0)	229857.627	(*0.05)	[76000]
	42(6,36) - 41(7,35)	(0,0,0)	229983.884	(*1.82)	[76000]
	5(4, 2) - 6(3, 3)	(0,0,0)	230933.533	(*0.14)	[76000]
	10(5, 5) - 11(4, 8)	(0,0,0)	233296.754	(*0.28)	[76000]
	15(6,10) - 16(5,11)	(0,0,0)	235004.627	(*0.51)	[76000]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{34}S^{16}O$	5(2, 4) - 4(1, 3)	(0,0,0)	235927.510	(*0.05)	[76000]
	10(3, 7) - 10(2, 8)	(0,0,0)	235951.920	(*0.04)	[76000]
	41(5,37) - 40(6,34)	(0,0,0)	236023.541	(*2.42)	[76000]
	20(2,18) - 19(3,17)	(0,0,0)	236225.085	(*0.05)	[76000]
	20(7,13) - 21(6,16)	(0,0,0)	236296.654	(*0.86)	[76000]
	25(8,18) - 26(7,19)	(0,0,0)	237170.594	(*1.33)	[76000]
	28(3,25) - 28(2,26)	(0,0,0)	237521.401	(*0.25)	[76000]
	45(12,34) - 46(11,35)	(0,0,0)	237681.830	(*4.83)	[76000]
	30(9,21) - 31(8,24)	(0,0,0)	237724.020	(*1.96)	[76000]
	40(11,29) - 41(10,32)	(0,0,0)	237955.512	(*3.70)	[76000]
	35(10,26) - 36(9,27)	(0,0,0)	237974.223	(*2.75)	[76000]
	49(7,43) - 48(8,40)	(0,0,0)	240410.711	(*3.03)	[76000]
	16(1,15) - 15(2,14)	(0,0,0)	241509.004	(*0.05)	[76000]
	48(7,41) - 47(8,40)	(0,0,0)	241889.524	(*3.27)	[76000]
	8(3, 5) - 8(2, 6)	(0,0,0)	241985.466	(*0.04)	[76000]
	18(1,17) - 18(0,18)	(0,0,0)	243935.843	(*0.11)	[76000]
	14(0,14) - 13(1,13)	(0,0,0)	244481.484	(*0.05)	[76000]
	15(2,14) - 15(1,15)	(0,0,0)	245178.627	(*0.08)	[76000]
	6(3, 3) - 6(2, 4)	(0,0,0)	245302.271	(*0.05)	[76000]
	4(3, 1) - 4(2, 2)	(0,0,0)	246686.166	(*0.07)	[76000]
	3(3, 1) - 3(2, 2)	(0,0,0)	247127.443	(*0.07)	[76000]
	5(3, 3) - 5(2, 4)	(0,0,0)	247440.335	(*0.06)	[76000]
	7(3, 5) - 7(2, 6)	(0,0,0)	248364.783	(*0.05)	[76000]
	13(1,13) - 12(0,12)	(0,0,0)	248698.677	(*0.05)	[76000]
	30(4,26) - 30(3,27)	(0,0,0)	249100.301	(*0.55)	[76000]
	45(6,40) - 44(7,37)	(0,0,0)	249300.231	(*2.69)	[76000]
	4(4, 0) - 5(3, 3)	(0,0,0)	250156.234	(*0.15)	[76000]
	9(3, 7) - 9(2, 8)	(0,0,0)	250358.373	(*0.04)	[76000]
	32(4,28) - 32(3,29)	(0,0,0)	251759.650	(*0.71)	[76000]
	9(5, 5) - 10(4, 6)	(0,0,0)	252615.760	(*0.31)	[76000]
	43(5,39) - 42(6,36)	(0,0,0)	253431.299	(*3.91)	[76000]
	11(3, 9) - 11(2,10)	(0,0,0)	253936.284	(*0.04)	[76000]
	28(4,24) - 28(3,25)	(0,0,0)	254278.440	(*0.41)	[76000]
	14(6, 8) - 15(5,11)	(0,0,0)	254517.463	(*0.57)	[76000]
	19(7,13) - 20(6,14)	(0,0,0)	255893.406	(*0.96)	[76000]
	24(8,16) - 25(7,19)	(0,0,0)	256866.037	(*1.51)	[76000]
	29(9,21) - 30(8,22)	(0,0,0)	257469.281	(*2.23)	[76000]
	39(11,29) - 40(10,30)	(0,0,0)	257746.305	(*4.27)	[76000]
	34(10,24) - 35(9,27)	(0,0,0)	257755.000	(*3.15)	[76000]
	13(3,11) - 13(2,12)	(0,0,0)	259617.155	(*0.05)	[76000]
	24(2,22) - 24(1,23)	(0,0,0)	260327.008	(*0.13)	[76000]
	34(4,30) - 34(3,31)	(0,0,0)	263437.457	(*0.96)	[76000]
	26(3,23) - 25(4,22)	(0,0,0)	264682.836	(*0.15)	[76000]
	26(4,22) - 26(3,23)	(0,0,0)	265489.203	(*0.29)	[76000]
	7(2, 6) - 6(1, 5)	(0,0,0)	265554.057	(*0.05)	[76000]
	15(3,13) - 15(2,14)	(0,0,0)	267871.010	(*0.06)	[76000]
	30(3,27) - 30(2,28)	(0,0,0)	270230.007	(*0.46)	[76000]
	17(2,16) - 17(1,17)	(0,0,0)	271410.116	(*0.10)	[76000]
	8(5, 3) - 9(4, 6)	(0,0,0)	271917.246	(*0.33)	[76000]
	28(2,26) - 29(1,29)	(0,0,0)	272787.883	(*3.45)	[76000]
	13(6, 8) - 14(5, 9)	(0,0,0)	273930.746	(*0.62)	[76000]
	18(7,11) - 19(6,14)	(0,0,0)	275435.465	(*1.06)	[76000]
	23(8,16) - 24(7,17)	(0,0,0)	276485.937	(*1.69)	[76000]
	6(2, 4) - 5(1, 5)	(0,0,0)	276999.580	(*0.05)	[76000]
	28(9,19) - 29(8,22)	(0,0,0)	277153.500	(*2.51)	[76000]
	33(10,24) - 34(9,25)	(0,0,0)	277474.379	(*3.57)	[76000]
	38(11,27) - 39(10,30)	(0,0,0)	277482.277	(*4.86)	[76000]
	32(4,28) - 31(5,27)	(0,0,0)	278834.580	(*0.58)	[76000]
	17(3,15) - 17(2,16)	(0,0,0)	279075.223	(*0.07)	[76000]
	15(1,15) - 14(0,14)	(0,0,0)	279429.946	(*0.06)	[76000]
	24(4,20) - 24(3,21)	(0,0,0)	280408.168	(*0.19)	[76000]
	47(6,42) - 46(7,39)	(0,0,0)	282337.615	(*4.20)	[76000]
	16(0,16) - 15(1,15)	(0,0,0)	283183.518	(*0.06)	[76000]
	36(4,32) - 36(3,33)	(0,0,0)	284658.332	(*1.41)	[76000]
	20(1,19) - 20(0,20)	(0,0,0)	285178.546	(*0.21)	[76000]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{34}S^{16}O$	38(5,33) - 37(6,32)	(0,0,0)	285362.343	(*1.58)	[76000]
	44(6,38) - 43(7,37)	(0,0,0)	290449.092	(*3.25)	[76000]
	7(5, 3) - 8(4, 4)	(0,0,0)	291146.437	(*0.35)	[76000]
	9(2, 8) - 8(1, 7)	(0,0,0)	292257.222	(*0.06)	[76000]
	18(1,17) - 17(2,16)	(0,0,0)	293122.891	(*0.06)	[76000]
	12(6, 6) - 13(5, 9)	(0,0,0)	293297.820	(*0.67)	[76000]
	19(3,17) - 19(2,18)	(0,0,0)	293481.712	(*0.08)	[76000]
	17(7,11) - 18(6,12)	(0,0,0)	294905.270	(*1.17)	[76000]
	22(8,14) - 23(7,17)	(0,0,0)	296047.410	(*1.86)	[76000]
	22(4,18) - 22(3,19)	(0,0,0)	296499.762	(*0.12)	[76000]
	27(9,19) - 28(8,20)	(0,0,0)	296775.832	(*2.80)	[76000]
	32(10,22) - 33(9,25)	(0,0,0)	297138.223	(*3.99)	[76000]
	22(2,20) - 21(3,19)	(0,0,0)	298256.822	(*0.07)	[76000]
	19(2,18) - 19(1,19)	(0,0,0)	300049.125	(*0.16)	[76000]
	26(2,24) - 26(1,25)	(0,0,0)	303139.782	(*0.31)	[76000]
	3(3, 1) - 2(2, 0)	(0,0,0)	304332.081	(*0.08)	[76000]
	40(5,35) - 40(4,36)	(0,0,0)	307370.880	(*2.90)	[76000]
	32(3,29) - 32(2,30)	(0,0,0)	309816.127	(*0.85)	[76000]
	6(5, 1) - 7(4, 4)	(0,0,0)	310341.375	(*0.37)	[76000]
	38(5,33) - 38(4,34)	(0,0,0)	310380.610	(*2.55)	[76000]
	21(3,19) - 21(2,20)	(0,0,0)	311196.638	(*0.09)	[76000]
	17(1,17) - 16(0,16)	(0,0,0)	311485.349	(*0.07)	[76000]
	20(4,16) - 20(3,17)	(0,0,0)	311487.401	(*0.09)	[76000]
	11(6, 6) - 12(5, 7)	(0,0,0)	312604.180	(*0.72)	[76000]
	42(5,37) - 42(4,38)	(0,0,0)	313808.272	(*3.43)	[76000]
	16(7, 9) - 17(6,12)	(0,0,0)	314322.246	(*1.26)	[76000]
	38(4,34) - 38(3,35)	(0,0,0)	315193.760	(*2.22)	[76000]
	21(8,14) - 22(7,15)	(0,0,0)	315548.984	(*2.04)	[76000]
	11(2,10) - 10(1, 9)	(0,0,0)	316339.776	(*0.07)	[76000]
	26(9,17) - 27(8,20)	(0,0,0)	316343.520	(*3.08)	[76000]
	31(10,22) - 32(9,23)	(0,0,0)	316748.680	(*4.42)	[76000]
	18(0,18) - 17(1,17)	(0,0,0)	320597.164	(*0.08)	[76000]
	36(5,31) - 36(4,32)	(0,0,0)	321285.656	(*2.19)	[76000]
	4(3, 1) - 3(2, 2)	(0,0,0)	323528.736	(*0.08)	[76000]
	18(4,14) - 18(3,15)	(0,0,0)	323806.682	(*0.08)	[76000]
	22(1,21) - 22(0,22)	(0,0,0)	325997.431	(*0.42)	[76000]
	5(5, 1) - 6(4, 2)	(0,0,0)	329499.871	(*0.39)	[76000]
	8(2, 6) - 7(1, 7)	(0,0,0)	330191.096	(*0.06)	[76000]
	44(5,39) - 44(4,40)	(0,0,0)	330522.345	(*4.55)	[76000]
	21(2,20) - 21(1,21)	(0,0,0)	330667.603	(*0.30)	[76000]
	10(6, 4) - 11(5, 7)	(0,0,0)	331867.770	(*0.77)	[76000]
	23(3,21) - 23(2,22)	(0,0,0)	332173.712	(*0.14)	[76000]
	16(4,12) - 16(3,13)	(0,0,0)	332836.214	(*0.08)	[76000]
	28(3,25) - 27(4,24)	(0,0,0)	333363.959	(*0.30)	[76000]
	15(7, 9) - 16(6,10)	(0,0,0)	333685.543	(*1.36)	[76000]
	20(8,12) - 21(7,15)	(0,0,0)	334999.160	(*2.21)	[76000]
	25(9,17) - 26(8,18)	(0,0,0)	335858.844	(*3.37)	[76000]
	30(10,20) - 31(9,23)	(0,0,0)	336309.855	(*4.86)	[76000]
	34(5,29) - 34(4,30)	(0,0,0)	337875.821	(*1.80)	[76000]
	13(2,12) - 12(1,11)	(0,0,0)	338320.334	(*0.08)	[76000]
	14(4,10) - 14(3,11)	(0,0,0)	338785.687	(*0.07)	[76000]
	5(3, 3) - 4(2, 2)	(0,0,0)	342208.891	(*0.07)	[76000]
	20(1,19) - 19(2,18)	(0,0,0)	342231.598	(*0.07)	[76000]
	12(4, 8) - 12(3, 9)	(0,0,0)	342332.041	(*0.07)	[76000]
	10(4, 6) - 10(3, 7)	(0,0,0)	344245.411	(*0.08)	[76000]
	19(1,19) - 18(0,18)	(0,0,0)	344581.032	(*0.09)	[76000]
	13(4,10) - 13(3,11)	(0,0,0)	344807.922	(*0.07)	[76000]
	15(4,12) - 15(3,13)	(0,0,0)	344987.570	(*0.07)	[76000]
	11(4, 8) - 11(3, 9)	(0,0,0)	344998.203	(*0.07)	[76000]
	8(4, 4) - 8(3, 5)	(0,0,0)	345168.769	(*0.11)	[76000]
	9(4, 6) - 9(3, 7)	(0,0,0)	345285.703	(*0.09)	[76000]
	7(4, 4) - 7(3, 5)	(0,0,0)	345519.780	(*0.12)	[76000]
	6(4, 2) - 6(3, 3)	(0,0,0)	345553.235	(*0.13)	[76000]
	5(4, 2) - 5(3, 3)	(0,0,0)	345651.453	(*0.14)	[76000]
	4(4, 0) - 4(3, 1)	(0,0,0)	345678.961	(*0.15)	[76000]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{34}S^{16}O$	17(4,14) - 17(3,15)	(0,0,0)	345929.271	(*0.07)	[76000]
	28(2,26) - 28(1,27)	(0,0,0)	347482.960	(*0.67)	[76000]
	19(4,16) - 19(3,17)	(0,0,0)	348117.490	(*0.08)	[76000]

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{33}S^{16}O$	19(3,17) - 18(4,14)					(0,0,0)	9592.3	(0.2)	[64015]
	19(3,17) - 18(4,14)					(0,0,0)	9593.0	(0.2)	[64015]
	1(1, 1) - 2(0, 2)					(0,0,0)	11368.0	(0.2)	[68017]
	1(1, 1) - 2(0, 2)					(0,0,0)	11373.2	(0.2)	[68017]
	1(1, 1) - 2(0, 2)					(0,0,0)	11379.9	(0.2)	[68017]
	39(7,33) - 38(8,30)					(0,0,0)	14372.8	(0.2)	[64015]
	39(7,33) - 38(8,30)					(0,0,0)	14373.2	(0.2)	[64015]
	22(5,17) - 23(4,20)					(0,1,0)	14862.95	(0.5)	[62015]
	14(2,12) - 15(1,15)					(0,0,0)	15252.7	(0.2)	[62015]
	14(2,12) - 15(1,15)					(0,0,0)	15254.1	(0.2)	[62015]
	14(2,12) - 15(1,15)					(0,0,0)	15266.2	(0.2)	[62015]
	14(2,12) - 15(1,15)					(0,0,0)	15267.5	(0.2)	[62015]
	21(5,17) - 22(4,18)		45/2		47/2	(0,0,0)	15278.45	(0.1)	[62013]
	21(5,17) - 22(4,18)		43/2		45/2	(0,0,0)	15279.85	(0.1)	[62013]
	12(3, 9) - 13(2,12)		23/2		25/2	(0,0,0)	16634.8	(0.2)	[62013]
	12(3, 9) - 13(2,12)		21/2		23/2	(0,0,0)	16637.5	(0.2)	[62013]
	29(5,25) - 28(6,22)					(0,0,0)	16752.9	(0.2)	[62015]
	18(3,15) - 17(4,14)		37/2		35/2	(0,0,0)	16758.5	(0.1)	[62013]
	18(3,15) - 17(4,14)		39/2		37/2	(0,0,0)	16761.2	(0.1)	[62013]
	34(6,28) - 33(7,27)		69/2		67/2	(0,0,0)	19250.9	(0.1)	[62013]
	34(6,28) - 33(7,27)		71/2		69/2	(0,0,0)	19251.7	(0.1)	[62013]
	40(7,33) - 39(8,32)					(0,1,0)	19556.20	(0.20)	[64015]
	40(7,33) - 39(8,32)					(0,1,0)	19556.90	(0.20)	[64015]
	32(7,25) - 33(6,28)					(0,1,0)	20086.2	(0.2)	[62015]
	32(7,25) - 33(6,28)					(0,1,0)	20086.7	(0.2)	[62015]
	14(2,12) - 15(1,15)					(0,1,0)	20291.95	(0.20)	[62015]
	14(2,12) - 15(1,15)					(0,1,0)	20293.30	(0.20)	[62015]
	14(2,12) - 15(1,15)					(0,1,0)	20305.25	(0.20)	[62015]
	14(2,12) - 15(1,15)					(0,1,0)	20306.55	(0.20)	[62015]
	5(2, 4) - 6(1, 5)		7/2		9/2	(0,0,0)	20602.1	(0.1)	[62013]
	5(2, 4) - 6(1, 5)		13/2		15/2	(0,0,0)	20603.6	(0.1)	[62013]
	5(2, 4) - 6(1, 5)		9/2		11/2	(0,0,0)	20608.2	(0.1)	[62013]
	5(2, 4) - 6(1, 5)		11/2		13/2	(0,0,0)	20609.6	(0.1)	[62013]
	24(4,20) - 23(5,19)					(0,1,0)	20911.25	(0.20)	[64015]
	24(4,20) - 23(5,19)					(0,1,0)	20912.05	(0.5)	[62015]
	24(4,20) - 23(5,19)					(0,1,0)	20912.90	(0.20)	[64015]
	35(6,30) - 34(7,27)					(0,1,0)	21702.85	(0.5)	[62015]
	8(2, 6) - 9(1, 9)		17/2		19/2	(0,0,0)	22314.75	(0.05)	[62013]
	8(2, 6) - 9(1, 9)		15/2		17/2	(0,0,0)	22316.35	(0.05)	[62013]
	8(2, 6) - 9(1, 9)		19/2		21/2	(0,0,0)	22324.4	(0.1)	[62013]
	8(2, 6) - 9(1, 9)		17/2		15/2	(0,0,0)	22326.0	(0.1)	[62013]
	12(3, 9) - 13(2,12)		23/2		25/2	(0,1,0)	22614.00	(0.20)	[62015]
	12(3, 9) - 13(2,12)		21/2		23/2	(0,1,0)	22616.60	(0.20)	[62015]
	37(8,30) - 38(7,31)					(0,1,0)	23328.30	(0.20)	[64015]
	37(8,30) - 38(7,31)					(0,1,0)	23328.80	(0.20)	[64015]
	25(4,22) - 24(5,19)					(0,1,0)	23875.45	(0.5)	[62015]
	31(7,25) - 32(6,26)					(0,0,0)	23969.8	(0.2)	[62015]
	31(7,25) - 32(6,26)					(0,0,0)	23970.3	(0.2)	[62015]
	5(2, 4) - 6(1, 5)		7/2		9/2	(0,1,0)	23982.45	(0.20)	[62015]
	5(2, 4) - 6(1, 5)		13/2		15/2	(0,1,0)	23983.95	(0.20)	[62015]
	5(2, 4) - 6(1, 5)		9/2		11/2	(0,1,0)	23988.45	(0.02)	[62015]
	5(2, 4) - 6(1, 5)		11/2		13/2	(0,1,0)	23989.85	(0.02)	[62015]
	25(2,24) - 24(3,21)					(0,0,0)	24127.3	(0.2)	[62015]
	25(2,24) - 24(3,21)					(0,0,0)	24127.9	(0.2)	[62015]
	25(2,24) - 24(3,21)					(0,0,0)	24137.0	(0.2)	[62015]
	25(2,24) - 24(3,21)					(0,0,0)	24137.6	(0.2)	[62015]
	26(6,20) - 27(5,23)		55/2		57/2	(0,0,0)	24165.5	(0.1)	[62013]
	26(6,20) - 27(5,23)		53/2		55/2	(0,0,0)	24165.9	(0.1)	[62013]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ – $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{33}S^{16}O$	8(1, 7) – 7(2, 6)		17/2		15/2	(0,1,0)	24997.80	(0.02)	[62015]
	8(1, 7) – 7(2, 6)		15/2		13/2	(0,1,0)	24998.85	(0.02)	[62015]
	8(1, 7) – 7(2, 6)		19/2		17/2	(0,1,0)	25003.50	(0.20)	[62015]
	8(1, 7) – 7(2, 6)		13/2		11/2	(0,1,0)	25004.55	(0.20)	[62015]
	17(2,16) – 16(3,13)					(0,1,0)	25146.1	(0.2)	[62015]
	17(2,16) – 16(3,13)					(0,1,0)	25146.5	(0.2)	[62015]
	17(2,16) – 16(3,13)					(0,1,0)	25150.8	(0.2)	[62015]
	17(2,16) – 16(3,13)					(0,1,0)	25151.3	(0.2)	[62015]
	16(4,12) – 17(3,15)					(0,0,0)	26037.15	(0.2)	[62015]
	16(4,12) – 17(3,15)					(0,0,0)	26037.5	(0.2)	[62015]
	21(5,17) – 22(4,18)					(0,1,0)	26062.20	(0.20)	[64015]
	21(5,17) – 22(4,18)					(0,1,0)	26063.40	(0.20)	[64015]
	8(2, 6) – 9(1, 9)					(0,1,0)	26347.70	(0.20)	[64015]
	8(2, 6) – 9(1, 9)					(0,1,0)	26349.35	(0.20)	[64015]
	8(2, 6) – 9(1, 9)					(0,1,0)	26357.30	(0.20)	[64015]
	8(2, 6) – 9(1, 9)					(0,1,0)	26358.90	(0.20)	[64015]
	36(8,28) – 37(7,31)					(0,0,0)	27451.3	(0.2)	[62016]
	36(8,28) – 37(7,31)					(0,0,0)	27451.7	(0.2)	[62016]
	8(1, 7) – 7(2, 6)		17/2		15/2	(0,0,0)	28269.10	(0.05)	[62016]
	8(1, 7) – 7(2, 6)		15/2		13/2	(0,0,0)	28270.10	(0.05)	[62016]
	8(1, 7) – 7(2, 6)		19/2		17/2	(0,0,0)	28274.85	(0.05)	[62016]
	8(1, 7) – 7(2, 6)		13/2		11/2	(0,0,0)	28275.80	(0.05)	[62016]
	4(0, 4) – 3(1, 3)		9/2		7/2	(0,1,0)	29025.70	(0.05)	[62016]
	4(0, 4) – 3(1, 3)		7/2		5/2	(0,1,0)	29028.40	(0.05)	[62016]
	4(0, 4) – 3(1, 3)		11/2		9/2	(0,1,0)	29031.20	(0.05)	[62016]
	4(0, 4) – 3(1, 3)		5/2		3/2	(0,1,0)	29033.80	(0.05)	[62016]
	41(9,33) – 42(8,34)					(0,0,0)	29271.6	(0.2)	[62016]
	4(0, 4) – 3(1, 3)		9/2		7/2	(0,0,0)	30190.30	(0.05)	[62016]
	4(0, 4) – 3(1, 3)		7/2		5/2	(0,0,0)	30192.90	(0.05)	[62016]
	4(0, 4) – 3(1, 3)		11/2		9/2	(0,0,0)	30195.85	(0.05)	[62016]
	4(0, 4) – 3(1, 3)		5/2		3/2	(0,0,0)	30198.45	(0.05)	[62016]
	50(9,41) – 49(10,40)					(0,0,0)	31257.6	(0.2)	[65015]
	15(4,12) – 16(3,13)					(0,0,0)	31653.6	(0.2)	[65015]
	15(4,12) – 16(3,13)					(0,0,0)	31655.6	(0.2)	[65015]
	24(4,20) – 23(5,19)					(0,0,0)	31797.35	(0.2)	[65015]
	24(4,20) – 23(5,19)					(0,0,0)	31799.2	(0.2)	[65015]
	16(2,14) – 17(1,17)					(0,0,0)	31938.8	(0.2)	[65015]
	16(2,14) – 17(1,17)					(0,0,0)	31939.9	(0.2)	[65015]
	30(5,25) – 29(6,24)					(0,1,0)	34205.10	(0.20)	[64015]
	30(5,25) – 29(6,24)					(0,1,0)	34206.30	(0.20)	[64015]
	21(3,19) – 20(4,16)					(0,1,0)	34232.40	(0.20)	[64015]
	21(3,19) – 20(4,16)					(0,1,0)	34233.80	(0.20)	[64015]
	16(4,12) – 17(3,15)					(0,1,0)	34294.00	(0.20)	[64015]
	25(4,22) – 24(5,19)					(0,0,0)	34425.1	(0.2)	[65015]
	35(6,30) – 34(7,27)					(0,0,0)	37008.7	(0.2)	[68017]
	40(7,33) – 39(8,32)					(0,0,0)	37262.05	(0.2)	[65015]
	40(7,33) – 39(8,32)					(0,0,0)	37262.8	(0.2)	[65015]
	6(2, 4) – 7(1, 7)					(0,0,0)	41854.65	(0.2)	[68017]
	6(2, 4) – 7(1, 7)					(0,0,0)	41856.4	(0.2)	[68017]
	6(2, 4) – 7(1, 7)					(0,0,0)	41862.95	(0.2)	[68017]
	6(2, 4) – 7(1, 7)					(0,0,0)	41864.7	(0.2)	[68017]
	25(6,20) – 26(5,21)					(0,0,0)	41937.0	(0.2)	[68017]
	25(6,20) – 26(5,21)					(0,0,0)	41937.7	(0.2)	[68017]
	21(3,19) – 20(4,16)					(0,0,0)	42383.8	(0.2)	[64015]
	21(3,19) – 20(4,16)					(0,0,0)	42385.1	(0.2)	[64015]
	20(5,15) – 21(4,18)					(0,0,0)	43762.4	(0.2)	[68017]
	19(2,18) – 18(3,15)					(0,0,0)	44168.2	(0.2)	[68017]
	19(2,18) – 18(3,15)					(0,0,0)	44168.7	(0.2)	[68017]
	19(2,18) – 18(3,15)					(0,0,0)	44174.5	(0.2)	[68017]
	19(2,18) – 18(3,15)					(0,0,0)	44175.0	(0.2)	[68017]
	30(7,23) – 31(6,26)					(0,0,0)	46226.0	(0.2)	[68017]
	30(7,23) – 31(6,26)					(0,0,0)	46226.5	(0.2)	[68017]
	30(5,25) – 29(6,24)					(0,0,0)	47448.45	(0.2)	[68017]
	30(5,25) – 29(6,24)					(0,0,0)	47449.65	(0.2)	[68017]
	35(8,28) – 36(7,29)					(0,0,0)	47746.0	(0.2)	[68017]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{33}S^{16}O$	21(2,20) - 20(3,17)					(0,0,0)	47813.3	(0.2)	[68017]
	10(3, 7) - 11(2,10)					(0,0,0)	48001.4	(0.2)	[68017]
	10(3, 7) - 11(2,10)					(0,0,0)	48003.1	(0.2)	[68017]
	9(3, 7) - 10(2, 8)					(0,0,0)	48174.5	(0.2)	[68017]
	9(3, 7) - 10(2, 8)					(0,0,0)	48175.0	(0.2)	[68017]
	9(3, 7) - 10(2, 8)					(0,0,0)	48177.8	(0.2)	[68017]
	9(3, 7) - 10(2, 8)					(0,0,0)	48178.3	(0.2)	[68017]
	40(9,31) - 41(8,34)					(0,0,0)	50227.1	(0.2)	[68017]
	45(10,36) - 46(9,37)					(0,0,0)	52180.2	(0.2)	[68017]
	2(1, 1) - 2(0, 2)					(0,0,0)	52643.3	(0.2)	[68017]
	2(1, 1) - 2(0, 2)					(0,0,0)	52647.75	(0.2)	[68017]
	2(1, 1) - 2(0, 2)					(0,0,0)	52649.6	(0.2)	[68017]
	2(1, 1) - 2(0, 2)					(0,0,0)	52653.9	(0.2)	[68017]
	14(2,12) - 13(3,11)					(0,0,0)	53385.1	(0.2)	[68017]
	14(2,12) - 13(3,11)					(0,0,0)	53385.6	(0.2)	[68017]
	14(2,12) - 13(3,11)					(0,0,0)	53389.7	(0.2)	[68017]
	14(2,12) - 13(3,11)					(0,0,0)	53390.25	(0.2)	[68017]
	18(2,16) - 19(1,19)					(0,0,0)	57410.0	(0.2)	[68017]
	18(2,16) - 19(1,19)					(0,0,0)	57411.1	(0.2)	[68017]
	18(2,16) - 19(1,19)					(0,0,0)	57424.35	(0.2)	[68017]
	18(2,16) - 19(1,19)					(0,0,0)	57425.4	(0.2)	[68017]
	31(5,27) - 30(6,24)					(0,0,0)	57473.4	(0.2)	[68017]
	31(5,27) - 30(6,24)					(0,0,0)	57473.7	(0.2)	[68017]
	4(1, 3) - 4(0, 4)					(0,0,0)	58425.4	(0.2)	[68017]
	4(1, 3) - 4(0, 4)					(0,0,0)	58427.8	(0.2)	[68017]
	4(1, 3) - 4(0, 4)					(0,0,0)	58432.3	(0.2)	[68017]
	4(1, 3) - 4(0, 4)					(0,0,0)	58434.6	(0.2)	[68017]

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{36}S^{16}O$	22(4,18) - 21(5,17)	(0,0,0)	8445.80	(0.10)	[64014]
	32(6,26) - 31(7,25)	(0,0,0)	8563.30	(0.10)	[64014]
	1(1, 1) - 2(0, 2)	(0,0,0)	9030.10	(0.10)	[64014]
	37(7,31) - 36(8,28)	(0,0,0)	9251.30	(0.10)	[64014]
	16(4,12) - 17(3,15)	(0,0,0)	10547.00	(0.10)	[64014]
	35(8,28) - 36(7,29)	(0,0,0)	10907.00	(0.10)	[64014]
	5(2, 4) - 6(1, 5)	(0,0,0)	13121.80	(0.10)	[64014]
	15(4,12) - 16(3,13)	(0,0,0)	13125.00	(0.10)	[64014]
	25(6,20) - 26(5,21)	(0,0,0)	14360.80	(0.10)	[64014]
	12(2,10) - 11(3, 9)	(0,0,0)	14405.20	(0.10)	[64014]
	30(7,23) - 31(6,26)	(0,0,0)	14683.10	(0.10)	[64014]
	5(2, 4) - 6(1, 5)	(0,1,0)	16352.30	(0.10)	[64014]
	23(4,20) - 22(5,17)	(0,0,0)	16524.60	(0.10)	[64014]
	14(2,12) - 15(1,15)	(0,0,0)	17616.30	(0.10)	[64014]
	8(2, 6) - 9(1, 9)	(0,0,0)	17808.60	(0.10)	[64014]
	15(2,14) - 14(3,11)	(0,0,0)	18263.00	(0.10)	[64014]
	20(5,15) - 21(4,18)	(0,0,0)	22604.25	(0.10)	[64014]
	19(3,17) - 18(4,14)	(0,0,0)	24075.70	(0.10)	[64014]
	33(6,28) - 32(7,25)	(0,0,0)	26963.30	(0.10)	[64014]
	28(5,23) - 27(6,22)	(0,0,0)	30359.80	(0.10)	[64014]
	4(0, 4) - 3(1, 3)	(0,1,0)	31393.60	(0.10)	[64014]
	4(0, 4) - 3(1, 3)	(0,0,0)	32508.85	(0.10)	[64014]
	9(3, 7) - 10(2, 8)	(0,0,0)	35197.90	(0.10)	[64014]
	8(1, 7) - 7(2, 6)	(0,0,0)	35947.80	(0.10)	[64014]
	6(2, 4) - 7(1, 7)	(0,0,0)	36113.80	(0.10)	[64014]
	17(2,16) - 16(3,13)	(0,0,0)	36645.70	(0.10)	[64014]
	18(3,15) - 17(4,14)	(0,0,0)	36747.60	(0.10)	[64014]
	19(5,15) - 20(4,16)	(0,0,0)	36842.80	(0.10)	[64014]
	16(2,14) - 17(1,17)	(0,0,0)	37184.60	(0.10)	[64014]
	10(3, 7) - 11(2,10)	(0,0,0)	37345.60	(0.10)	[64014]
	24(6,18) - 25(5,21)	(0,0,0)	38567.60	(0.10)	[64014]
$^{16}O^{32}S^{18}O$	6(2, 5) - 7(1, 6)	(0,1,0)	8153.20	(0.02)	[64012]
	28(6,23) - 29(5,24)	(0,0,0)	8360.60	(0.20)	[64015]
	23(5,18) - 24(4,21)	(0,0,0)	8412.20	(0.20)	[64015]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ – $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{18}O$	12(2,10) - 13(1,13)	(0,0,0)	8735.25	(0.20)	[64015]
	20(3,18) - 19(4,15)	(0,0,0)	9167.50	(0.20)	[64015]
	13(2,11) - 14(1,14)	(0,0,0)	9605.80	(0.20)	[64015]
	13(2,11) - 12(3,10)	(0,0,0)	9610.00	(0.20)	[63010]
	25(4,22) - 24(5,19)	(0,0,0)	10019.80	(0.20)	[63010]
	19(3,16) - 18(4,15)	(0,1,0)	10034.30	(0.02)	[64012]
	11(2, 9) - 12(1,12)	(0,0,0)	10047.00	(0.20)	[63010]
	16(2,15) - 15(3,12)	(0,0,0)	12064.30	(0.20)	[64015]
	34(7,28) - 35(6,29)	(0,1,0)	12109.90	(0.02)	[64012]
	13(3,10) - 14(2,13)	(0,0,0)	12658.00	(0.20)	[64015]
	14(2,12) - 15(1,15)	(0,0,0)	12681.65	(0.20)	[64015]
	30(5,25) - 29(6,24)	(0,0,0)	12763.20	(0.20)	[64015]
	41(7,35) - 40(8,32)	(0,0,0)	12817.40	(0.20)	[64015]
	31(5,27) - 30(6,24)	(0,1,0)	13095.05	(0.02)	[64012]
	12(2,10) - 13(1,13)	(0,1,0)	13108.50	(0.02)	[64012]
	28(6,22) - 29(5,25)	(0,0,0)	13120.10	(0.20)	[63010]
	1(1, 1) - 2(0, 2)	(0,0,0)	13291.25	(0.20)	[63010]
	17(4,14) - 18(3,15)	(0,1,0)	13461.20	(0.02)	[64012]
	10(2, 8) - 11(1,11)	(0,0,0)	13477.75	(0.20)	[63010]
	13(2,11) - 14(1,14)	(0,1,0)	14160.60	(0.02)	[64012]
	11(2, 9) - 12(1,12)	(0,1,0)	14261.50	(0.02)	[64012]
	11(3, 9) - 12(2,10)	(0,0,0)	14330.05	(0.20)	[63010]
	1(1, 1) - 2(0, 2)	(0,1,0)	14424.30	(0.02)	[64012]
	34(7,27) - 35(6,30)	(0,1,0)	14573.50	(0.02)	[64012]
	8(1, 7) - 7(2, 6)	(0,1,0)	15114.05	(0.02)	[64012]
	18(4,14) - 19(3,17)	(0,1,0)	15235.00	(0.02)	[64012]
	25(4,21) - 24(5,20)	(0,1,0)	15303.90	(0.02)	[64012]
	17(2,16) - 16(3,13)	(0,1,0)	16527.90	(0.02)	[64012]
	21(3,19) - 20(4,16)	(0,1,0)	17147.05	(0.02)	[64012]
	10(2, 8) - 11(1,11)	(0,1,0)	17553.80	(0.02)	[64012]
	33(7,27) - 34(6,28)	(0,0,0)	17727.75	(0.20)	[63010]
	15(2,13) - 16(1,16)	(0,0,0)	17949.10	(0.20)	[63010]
	26(4,23) - 25(5,20)	(0,1,0)	18081.20	(0.02)	[64012]
	19(3,16) - 18(4,15)	(0,0,0)	18095.30	(0.20)	[63010]
	8(1, 7) - 7(2, 6)	(0,0,0)	18261.70	(0.20)	[63010]
	13(3,10) - 14(2,13)	(0,1,0)	18321.30	(0.02)	[64012]
	22(5,18) - 23(4,19)	(0,0,0)	18597.70	(0.20)	[63010]
	9(2, 7) - 10(1,10)	(0,0,0)	18925.20	(0.20)	[63010]
	33(7,26) - 34(6,29)	(0,0,0)	19561.90	(0.20)	[63010]
	36(6,31) - 35(7,28)	(0,0,0)	19813.30	(0.20)	[63010]
	11(3, 9) - 12(2,10)	(0,1,0)	19972.30	(0.02)	[64012]
	28(6,23) - 29(5,24)	(0,1,0)	20916.10	(0.02)	[64012]
	31(5,26) - 30(6,25)	(0,1,0)	21781.50	(0.02)	[64012]
	17(2,16) - 16(3,13)	(0,0,0)	22326.70	(0.20)	[63010]
	9(2, 7) - 10(1,10)	(0,1,0)	22879.80	(0.02)	[64012]
	39(8,32) - 40(7,33)	(0,1,0)	22946.70	(0.02)	[64012]
	36(6,30) - 35(7,29)	(0,0,0)	23337.20	(0.20)	[63010]
	39(8,31) - 40(7,34)	(0,1,0)	23853.80	(0.02)	[64012]
	17(4,13) - 18(3,16)	(0,0,0)	24344.30	(0.20)	[63010]
	4(0, 4) - 3(1, 3)	(0,1,0)	24796.80	(0.02)	[64012]
	37(6,32) - 36(7,29)	(0,1,0)	24935.30	(0.02)	[64012]
	21(3,19) - 20(4,16)	(0,0,0)	25012.40	(0.20)	[63010]
	18(2,17) - 17(3,14)	(0,1,0)	25145.10	(0.02)	[64012]
	16(2,14) - 17(1,17)	(0,0,0)	25362.70	(0.20)	[63010]
	31(5,27) - 30(6,24)	(0,0,0)	25503.95	(0.20)	[63010]
	28(6,22) - 29(5,25)	(0,1,0)	25548.60	(0.02)	[64012]
	25(4,21) - 24(5,20)	(0,0,0)	25701.35	(0.20)	[63010]
	4(0, 4) - 3(1, 3)	(0,0,0)	25913.05	(0.20)	[63010]
	38(8,31) - 39(7,32)	(0,0,0)	26029.90	(0.20)	[63010]
	8(2, 6) - 9(1, 9)	(0,0,0)	26252.60	(0.20)	[63010]
	12(3, 9) - 13(2,12)	(0,0,0)	26567.20	(0.20)	[63010]
	38(8,30) - 39(7,33)	(0,0,0)	26706.90	(0.20)	[63010]
	22(5,17) - 23(4,20)	(0,0,0)	27018.70	(0.20)	[63010]
	5(2, 4) - 6(1, 5)	(0,0,0)	27599.80	(0.20)	[63010]
	16(4,13) - 17(3,14)	(0,0,0)	27983.70	(0.20)	[63010]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{18}O$	26(4,23) - 25(5,20)	(0,0,0)	28202.60	(0.20)	[63010]
	14(2,12) - 13(3,11)	(0,1,0)	28883.90	(0.02)	[64012]
	22(5,18) - 23(4,19)	(0,1,0)	28916.90	(0.02)	[64012]
	27(6,22) - 28(5,23)	(0,0,0)	29029.40	(0.20)	[63010]
	8(2, 6) - 9(1, 9)	(0,1,0)	30100.55	(0.02)	[64012]
	5(2, 4) - 6(1, 5)	(0,1,0)	30847.20	(0.02)	[64012]
	18(2,17) - 17(3,14)	(0,0,0)	30962.70	(0.20)	[63010]
	19(2,18) - 18(3,15)	(0,1,0)	31942.70	(0.02)	[64012]
	22(3,20) - 21(4,17)	(0,1,0)	32227.00	(0.02)	[64012]
	17(4,13) - 18(3,16)	(0,1,0)	32263.70	(0.02)	[64012]
	12(3, 9) - 13(2,12)	(0,1,0)	32306.20	(0.02)	[64012]
	32(5,28) - 31(6,25)	(0,1,0)	32342.00	(0.02)	[64012]
	27(6,21) - 28(5,24)	(0,0,0)	32436.80	(0.20)	[63010]
	33(7,27) - 34(6,28)	(0,1,0)	32453.90	(0.02)	[64012]
	44(9,36) - 45(8,37)	(0,1,0)	33095.55	(0.02)	[64012]
	44(9,35) - 45(8,38)	(0,1,0)	33418.15	(0.02)	[64012]
	43(9,35) - 44(8,36)	(0,0,0)	33830.10	(0.20)	[63010]
	43(9,34) - 44(8,37)	(0,0,0)	34071.95	(0.20)	[63010]
	33(7,26) - 34(6,29)	(0,1,0)	34220.85	(0.02)	[64012]
	31(5,26) - 30(6,25)	(0,0,0)	34421.90	(0.20)	[63010]
	14(2,12) - 13(3,11)	(0,0,0)	34462.20	(0.20)	[63010]
	20(3,17) - 19(4,16)	(0,1,0)	34558.20	(0.02)	[64012]
	17(2,15) - 18(1,18)	(0,0,0)	34849.60	(0.20)	[63010]
	27(4,24) - 26(5,21)	(0,1,0)	35959.40	(0.02)	[64012]
	16(4,13) - 17(3,14)	(0,1,0)	36007.10	(0.02)	[64012]
	20(2,19) - 19(3,16)	(0,1,0)	36743.60	(0.02)	[64012]
	22(5,17) - 23(4,20)	(0,1,0)	37194.20	(0.02)	[64012]
	10(3, 8) - 11(2, 9)	(0,0,0)	37345.20	(0.20)	[63010]
	19(2,18) - 18(3,15)	(0,0,0)	37783.90	(0.20)	[63010]
	32(7,26) - 33(6,27)	(0,0,0)	37826.50	(0.20)	[63010]
	32(7,25) - 33(6,28)	(0,0,0)	39127.40	(0.20)	[64015]
	37(6,32) - 36(7,29)	(0,0,0)	39594.40	(0.20)	[64015]
	21(5,17) - 22(4,18)	(0,0,0)	39724.40	(0.20)	[64015]
	22(3,20) - 21(4,17)	(0,0,0)	40061.40	(0.20)	[64015]
	11(3, 8) - 12(2,11)	(0,0,0)	41461.40	(0.20)	[64015]
	16(4,12) - 17(3,15)	(0,0,0)	41768.90	(0.20)	[64015]
	9(1, 8) - 8(2, 7)	(0,0,0)	41999.00	(0.20)	[64015]
	20(2,19) - 19(3,16)	(0,0,0)	42615.20	(0.20)	[64015]
	20(3,17) - 19(4,16)	(0,0,0)	42631.40	(0.20)	[64015]
	37(6,31) - 36(7,30)	(0,0,0)	44398.8	(0.20)	[65016]
	32(5,28) - 31(6,25)	(0,0,0)	44731.50	(0.20)	[65016]
	21(2,20) - 20(3,17)	(0,0,0)	45307.30	(0.20)	[65016]
	21(5,16) - 22(4,19)	(0,0,0)	45736.60	(0.20)	[65016]
	22(2,21) - 21(3,18)	(0,0,0)	45742.00	(0.20)	[65016]
	6(2, 4) - 7(1, 7)	(0,0,0)	45881.40	(0.20)	[65016]
	27(4,22) - 26(5,21)	(0,0,0)	46046.90	(0.20)	[65016]
	5(0, 5) - 4(1, 4)	(0,0,0)	46232.40	(0.20)	[65016]
	37(8,29) - 38(7,32)	(0,0,0)	46309.00	(0.20)	[65016]
	18(2,16) - 19(1,19)	(0,0,0)	46314.00	(0.20)	[65016]
	26(4,22) - 25(5,21)	(0,0,0)	49091.75	(0.20)	[65016]
	26(6,21) - 27(5,22)	(0,0,0)	49312.70	(0.20)	[65016]
	4(2, 3) - 5(1, 4)	(0,0,0)	49650.00	(0.20)	[65016]
	15(4,12) - 16(3,13)	(0,0,0)	49699.00	(0.20)	[65016]
	26(6,20) - 27(5,23)	(0,0,0)	51717.00	(0.20)	[65016]
	3(1, 2) - 3(0, 3)	(0,0,0)	54377.62	(0.20)	[65016]
	4(1, 3) - 4(0, 4)	(0,0,0)	57394.60	(0.20)	[65016]
	5(1, 4) - 5(0, 5)	(0,0,0)	61323.00	(0.20)	[63015]
	10(1, 9) - 9(2, 8)	(0,0,0)	66210.26	(0.20)	[65016]
	6(1, 5) - 6(0, 6)	(0,0,0)	66262.22	(0.20)	[65016]
	6(0, 6) - 5(1, 5)	(0,0,0)	66887.51	(0.20)	[65016]
	1(1, 1) - 0(0, 0)	(0,0,0)	67430.60	(0.20)	[65016]
	21(3,18) - 20(4,17)	(0,0,0)	68240.32	(0.20)	[65016]
	14(4,11) - 15(3,12)	(0,0,0)	70670.75	(0.20)	[65016]
	4(2, 2) - 5(1, 5)	(0,0,0)	70966.64	(0.20)	[65016]
	7(1, 6) - 7(0, 7)	(0,0,0)	72318.12	(0.20)	[65016]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{18}O$	8(1, 7) - 8(0, 8)	(0,0,0)	79599.06	(0.20)	[65016]
	7(0, 7) - 6(1, 6)	(0,0,0)	87752.92	(0.20)	[65016]
	9(1, 8) - 9(0, 9)	(0,0,0)	88201.66	(0.20)	[65016]
	11(1,10) - 10(2, 9)	(0,0,0)	90833.55	(0.20)	[65016]
	13(4,10) - 14(3,11)	(0,0,0)	91008.52	(0.20)	[65016]
	22(3,19) - 21(4,18)	(0,0,0)	94940.18	(0.20)	[65016]
	8(2, 6) - 8(1, 7)	(0,0,0)	131766.91	(0.20)	[65016]
	15(2,13) - 15(1,14)	(0,0,0)	131783.64	(0.20)	[65016]
	7(2, 5) - 7(1, 6)	(0,0,0)	134717.73	(0.20)	[65016]
	27(7,21) - 28(6,22)	(0,0,0)	135306.96	(0.20)	[65016]
	16(2,14) - 16(1,16)	(0,0,0)	136657.55	(0.20)	[65016]
	13(1,12) - 13(0,13)	(0,0,0)	136749.31	(0.20)	[65016]
	6(2, 4) - 6(1, 5)	(0,0,0)	137821.47	(0.20)	[65016]
	5(2, 3) - 5(1, 4)	(0,0,0)	140880.19	(0.20)	[65016]
	13(1,12) - 12(2,11)	(0,0,0)	141009.79	(0.20)	[65016]
	18(2,16) - 17(3,15)	(0,0,0)	141890.31	(0.20)	[65016]
	17(2,15) - 17(1,16)	(0,0,0)	143096.29	(0.20)	[65016]
	4(2, 2) - 4(1, 3)	(0,0,0)	143714.92	(0.20)	[65016]
	6(1, 6) - 5(0, 5)	(0,0,0)	144375.42	(0.20)	[65016]
$^{18}O^{32}S^{18}O$	8(1, 7) - 7(2, 6)	(0,1,0)	9102.9	(0.20)	[64012]
	12(2,10) - 13(1,13)	(0,0,0)	9250.06	(0.20)	[64015]
	14(3,11) - 15(2,14)	(0,1,0)	11137.30	(0.20)	[64012]
	14(2,12) - 15(1,15)	(0,0,0)	11364.95	(0.20)	[64015]
	8(1, 7) - 7(2, 6)	(0,0,0)	12073.4	(0.20)	[63010]
	40(8,32) - 41(7,35)	(0,0,0)	12741.40	(0.20)	[63010]
	23(5,19) - 24(4,20)	(0,0,0)	13043.10	(0.20)	[63010]
	12(2,10) - 13(1,13)	(0,1,0)	13342.50	(0.20)	[64015]
	21(3,19) - 20(4,16)	(0,0,0)	14007.70	(0.20)	[63010]
	1(1, 1) - 2(0, 2)	(0,0,0)	14117.55	(0.20)	[63010]
	10(2, 8) - 11(1,11)	(0,0,0)	15055.11	(0.20)	[63010]
	37(6,32) - 36(7,29)	(0,0,0)	15905.00	(0.20)	[63010]
	17(2,16) - 16(3,13)	(0,0,0)	16232.35	(0.20)	[63010]
	18(4,14) - 19(3,17)	(0,0,0)	17201.25	(0.20)	[63010]
	14(2,12) - 13(3,11)	(0,1,0)	17634.30	(0.20)	[64012]
	17(4,14) - 18(3,15)	(0,0,0)	17853.90	(0.20)	[63010]
	26(4,22) - 25(5,21)	(0,1,0)	19403.45	(0.20)	[64012]
	27(4,24) - 26(5,21)	(0,1,0)	20380.90	(0.20)	[64012]
	34(7,27) - 35(6,30)	(0,0,0)	21269.40	(0.20)	[63010]
	16(2,14) - 17(1,17)	(0,0,0)	21542.10	(0.20)	[63010]
	4(0, 4) - 3(1, 3)	(0,1,0)	21815.00	(0.20)	[64012]
	11(3, 9) - 12(2,10)	(0,0,0)	22553.10	(0.20)	[63010]
	23(5,19) - 24(4,20)	(0,1,0)	22758.30	(0.20)	[64012]
	45(9,37) - 46(8,38)	(0,0,0)	22790.00	(0.20)	[64015]
	4(0, 4) - 3(1, 3)	(0,0,0)	22865.95	(0.20)	[63010]
	14(2,12) - 13(3,11)	(0,0,0)	22889.20	(0.20)	[63010]
	18(4,14) - 19(3,17)	(0,1,0)	24658.10	(0.20)	[64012]
	43(7,37) - 42(8,34)	(0,0,0)	24731.60	(0.20)	[64015]
	17(4,14) - 18(3,15)	(0,1,0)	25407.35	(0.20)	[64012]
	20(3,17) - 19(4,16)	(0,0,0)	26479.60	(0.20)	[64015]
	19(2,18) - 18(3,15)	(0,1,0)	27014.70	(0.20)	[64012]
	11(3, 9) - 12(2,10)	(0,1,0)	27863.90	(0.20)	[64012]
	8(2, 6) - 9(1, 9)	(0,0,0)	28101.88	(0.20)	[63010]
	26(4,22) - 25(5,21)	(0,0,0)	29185.90	(0.20)	[63010]
	27(4,24) - 26(5,21)	(0,0,0)	29907.00	(0.20)	[63010]
	28(6,22) - 29(5,25)	(0,0,0)	30190.20	(0.20)	[63010]
	39(8,32) - 40(7,33)	(0,0,0)	30711.70	(0.20)	[63010]
	5(2, 4) - 6(1, 5)	(0,0,0)	31050.60	(0.20)	[63010]
	8(2, 6) - 9(1, 9)	(0,1,0)	31713.75	(0.20)	[64012]
	12(3, 9) - 13(2,12)	(0,0,0)	31919.30	(0.20)	[63010]
	19(2,18) - 18(3,15)	(0,0,0)	32533.10	(0.20)	[64015]
	32(5,27) - 31(6,26)	(0,0,0)	33376.50	(0.20)	[63010]
	5(2, 4) - 6(1, 5)	(0,1,0)	34112.85	(0.20)	[64012]
	34(7,27) - 35(6,30)	(0,1,0)	35071.50	(0.20)	[64012]
	23(3,21) - 22(4,18)	(0,1,0)	35229.00	(0.20)	[64015]
	21(2,20) - 20(3,17)	(0,1,0)	36287.40	(0.20)	[64015]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{18}O^{32}S^{18}O$	12(3, 9) - 13(2,12)	(0,1,0)	37325.80	(0.20)	[64012]
	33(7,27) - 34(6,28)	(0,0,0)	38475.00	(0.20)	[64015]
	22(5,17) - 23(4,20)	(0,0,0)	39724.40	(0.20)	[64015]
	4(1, 3) - 4(0, 4)	(0,0,0)	55568.22	(0.20)	[65016]
	10(0,10) - 9(1, 9)	(0,0,0)	140506.64	(0.20)	[65016]
	4(2, 2) - 4(1, 3)	(0,0,0)	140557.39	(0.20)	[65016]
$^{16}O^{34}S^{18}O$	33(7,27) - 34(6,28)	(0,1,0)	8315.20	(0.20)	[64015]
	11(2, 9) - 12(1,12)	(0,0,0)	8402.00	(0.20)	[63017]
	18(3,15) - 17(4,14)	(0,0,0)	8588.90	(0.20)	[63017]
	27(6,22) - 28(5,23)	(0,0,0)	8785.30	(0.20)	[63017]
	13(2,11) - 14(1,14)	(0,0,0)	9640.90	(0.20)	[63017]
	11(3, 9) - 12(2,10)	(0,1,0)	9950.70	(0.20)	[64015]
	33(7,26) - 34(6,29)	(0,1,0)	10750.70	(0.20)	[64015]
	24(4,20) - 23(5,19)	(0,1,0)	10763.60	(0.20)	[64015]
	10(2, 8) - 11(1,11)	(0,0,0)	11115.10	(0.20)	[63017]
	13(3,10) - 14(2,13)	(0,1,0)	11295.80	(0.20)	[64015]
	22(5,18) - 23(4,19)	(0,1,0)	11481.10	(0.20)	[64015]
	22(5,17) - 23(4,20)	(0,0,0)	11716.6	(0.20)	[63017]
	20(3,18) - 19(4,15)	(0,1,0)	12078.50	(0.20)	[64015]
	16(2,15) - 15(3,12)	(0,1,0)	12101.30	(0.20)	[64015]
	29(5,24) - 28(6,23)	(0,0,0)	12264.2	(0.20)	[63017]
	17(4,13) - 18(3,16)	(0,0,0)	13102.80	(0.20)	[63017]
	27(6,21) - 28(5,24)	(0,0,0)	13214.65	(0.20)	[63017]
	14(2,12) - 15(1,15)	(0,0,0)	13651.70	(0.20)	[63017]
	13(2,11) - 12(3,10)	(0,1,0)	14329.00	(0.20)	[64015]
	32(7,26) - 33(6,27)	(0,0,0)	14361.50	(0.20)	[63017]
	16(4,13) - 17(3,14)	(0,0,0)	14450.10	(0.20)	[63017]
	10(2, 8) - 11(1,11)	(0,1,0)	15084.85	(0.20)	[64015]
	25(4,22) - 24(5,19)	(0,1,0)	15154.70	(0.20)	[64015]
	26(2,25) - 25(3,22)	(0,0,0)	15896.10	(0.20)	[65016]
	9(2, 7) - 10(1,10)	(0,0,0)	15938.80	(0.20)	[63017]
	45(8,38) - 44(9,35)	(0,0,0)	15973.60	(0.20)	[64015]
	32(7,25) - 33(6,28)	(0,0,0)	16160.40	(0.20)	[63017]
	38(8,30) - 39(7,33)	(0,1,0)	16371.80	(0.20)	[64015]
	45(8,37) - 44(9,36)	(0,0,0)	16507.05	(0.20)	[64015]
	16(2,15) - 15(3,12)	(0,0,0)	17694.75	(0.20)	[63017]
	14(2,12) - 15(1,15)	(0,1,0)	18313.40	(0.20)	[64015]
	37(8,30) - 38(7,31)	(0,0,0)	19027.45	(0.20)	[64015]
	12(3, 9) - 13(2,12)	(0,0,0)	19285.00	(0.20)	[63017]
	20(3,18) - 19(4,15)	(0,0,0)	19705.20	(0.20)	[63017]
	37(8,29) - 38(7,32)	(0,0,0)	19729.20	(0.20)	[63017]
	13(2,11) - 12(3,10)	(0,0,0)	19774.20	(0.20)	[63017]
	9(2, 7) - 10(1,10)	(0,1,0)	19787.30	(0.20)	[64015]
	40(7,34) - 39(8,31)	(0,0,0)	19817.45	(0.20)	[63017]
	15(2,13) - 16(1,16)	(0,0,0)	19896.55	(0.20)	[63017]
	17(4,13) - 18(3,16)	(0,1,0)	20770.40	(0.20)	[64015]
	8(1, 7) - 7(2, 6)	(0,1,0)	20779.25	(0.20)	[64015]
	24(4,20) - 23(5,19)	(0,0,0)	20852.30	(0.20)	[63017]
	27(6,22) - 28(5,23)	(0,1,0)	20967.90	(0.20)	[64015]
	40(7,33) - 39(8,32)	(0,0,0)	21212.45	(0.20)	[63017]
	17(2,16) - 16(3,13)	(0,1,0)	21547.10	(0.20)	[64015]
	22(5,17) - 23(4,20)	(0,1,0)	21576.30	(0.20)	[64015]
	5(2, 4) - 6(1, 5)	(0,0,0)	22171.70	(0.20)	[63017]
	16(4,13) - 17(3,14)	(0,1,0)	22251.30	(0.20)	[64015]
	8(2, 6) - 9(1, 9)	(0,0,0)	22738.50	(0.20)	[63017]
	21(5,17) - 22(4,18)	(0,0,0)	22981.40	(0.20)	[63017]
	35(6,30) - 34(7,27)	(0,0,0)	23190.30	(0.20)	[63017]
	42(9,34) - 43(8,35)	(0,0,0)	23247.80	(0.20)	[63017]
	42(9,33) - 43(8,36)	(0,0,0)	23513.20	(0.20)	[63017]
	8(1, 7) - 7(2, 6)	(0,0,0)	23822.90	(0.20)	[63017]
	19(3,16) - 18(4,15)	(0,1,0)	24805.60	(0.20)	[64015]
	12(3, 9) - 13(2,12)	(0,1,0)	24845.00	(0.20)	[64015]
	25(4,22) - 24(5,19)	(0,0,0)	24973.75	(0.20)	[63017]
	27(6,21) - 28(5,24)	(0,1,0)	25271.00	(0.20)	[64015]
	5(2, 4) - 6(1, 5)	(0,1,0)	25315.10	(0.20)	[64015]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{34}S^{18}O$	30(5,26) - 29(6,23)	(0,0,0)	25373.00	(0.20)	[63017]
	8(2, 6) - 9(1, 9)	(0,1,0)	26480.95	(0.20)	[64015]
	4(0, 4) - 3(1, 3)	(0,1,0)	26521.30	(0.20)	[64015]
	25(2,24) - 24(3,21)	(0,0,0)	26570.40	(0.20)	[65016]
	35(6,29) - 34(7,28)	(0,0,0)	26713.60	(0.20)	[63017]
	17(2,16) - 16(3,13)	(0,0,0)	27151.95	(0.20)	[63017]
	21(3,19) - 20(4,16)	(0,1,0)	27449.10	(0.20)	[64015]
	4(0, 4) - 3(1, 3)	(0,0,0)	27603.40	(0.20)	[63017]
	10(3, 8) - 11(2, 9)	(0,0,0)	27782.85	(0.20)	[63017]
	36(6,31) - 35(7,28)	(0,1,0)	27932.20	(0.20)	[64015]
	16(2,14) - 17(1,17)	(0,0,0)	28312.60	(0.20)	[63017]
	32(7,26) - 33(6,27)	(0,1,0)	28654.40	(0.20)	[64015]
	18(2,17) - 17(3,14)	(0,1,0)	29216.90	(0.20)	[64015]
	26(6,21) - 27(5,22)	(0,0,0)	29374.40	(0.20)	[63017]
	16(4,12) - 17(3,15)	(0,0,0)	30294.45	(0.20)	[63017]
	21(5,16) - 22(4,19)	(0,0,0)	30338.35	(0.20)	[63017]
	32(7,25) - 33(6,28)	(0,1,0)	30383.75	(0.20)	[64015]
	7(2, 5) - 8(1, 8)	(0,0,0)	31348.60	(0.20)	[63017]
	26(6,20) - 27(5,23)	(0,0,0)	32505.70	(0.20)	[63017]
	31(5,27) - 30(6,24)	(0,1,0)	32566.50	(0.20)	[64015]
	19(3,16) - 18(4,15)	(0,0,0)	32649.00	(0.20)	[63017]
	21(5,17) - 22(4,18)	(0,1,0)	32985.50	(0.20)	[64015]
	26(4,23) - 25(5,20)	(0,1,0)	33089.90	(0.20)	[64015]
	10(3, 8) - 11(2, 9)	(0,1,0)	33270.40	(0.20)	[64015]
	36(6,30) - 35(7,29)	(0,1,0)	33398.75	(0.20)	[64015]
	11(3, 8) - 12(2,11)	(0,0,0)	33831.40	(0.20)	[63017]
	30(5,25) - 29(6,24)	(0,0,0)	33858.40	(0.20)	[63017]
	25(4,21) - 24(5,20)	(0,1,0)	33864.70	(0.20)	[64015]
	31(7,25) - 32(6,26)	(0,0,0)	34447.00	(0.20)	[63017]
	18(2,17) - 17(3,14)	(0,0,0)	34836.00	(0.20)	[63017]
	19(2,18) - 18(3,15)	(0,1,0)	34915.20	(0.20)	[64015]
	7(2, 5) - 8(1, 6)	(0,1,0)	34997.45	(0.20)	[64015]
	21(3,19) - 20(4,16)	(0,0,0)	35044.50	(0.20)	[63017]
	37(8,30) - 38(7,31)	(0,1,0)	35411.20	(0.20)	[64015]
	31(7,24) - 32(6,27)	(0,0,0)	35709.05	(0.20)	[63017]
	46(8,39) - 45(9,38)	(0,0,0)	35888.90	(0.20)	[64015]
	15(4,12) - 16(3,13)	(0,0,0)	36558.90	(0.20)	[63017]
	46(8,38) - 45(9,37)	(0,0,0)	36634.55	(0.20)	[64015]
	16(4,12) - 17(3,15)	(0,1,0)	37975.60	(0.20)	[64015]
	20(2,19) - 19(3,16)	(0,1,0)	38466.90	(0.20)	[64015]
	17(2,15) - 18(1,18)	(0,0,0)	38810.45	(0.20)	[64015]
	36(8,29) - 37(7,30)	(0,0,0)	38846.40	(0.20)	[64015]
	36(8,28) - 37(7,31)	(0,0,0)	39336.20	(0.20)	[64015]
	11(3, 8) - 12(2,11)	(0,1,0)	39379.00	(0.20)	[64015]
	14(2,12) - 13(3,11)	(0,1,0)	39543.80	(0.20)	[64015]
	41(7,35) - 40(8,32)	(0,0,0)	39751.30	(0.20)	[64015]
	19(2,18) - 18(3,15)	(0,0,0)	40552.70	(0.20)	[64015]
	6(2, 4) - 7(1, 7)	(0,0,0)	41584.40	(0.20)	[64015]
	41(7,34) - 40(8,33)	(0,0,0)	41688.40	(0.20)	[64015]
	36(6,31) - 35(7,28)	(0,0,0)	42960.80	(0.20)	[64015]
	20(5,16) - 21(4,17)	(0,0,0)	43889.65	(0.20)	[65016]
	20(2,19) - 19(3,16)	(0,0,0)	44132.70	(0.20)	[65016]
	14(2,12) - 13(3,11)	(0,0,0)	44948.60	(0.20)	[65016]
	9(1, 8) - 8(2, 7)	(0,0,0)	47629.10	(0.20)	[65016]
	5(0, 5) - 4(1, 4)	(0,0,0)	47911.50	(0.20)	[65016]
	1(1, 0) - 1(0, 1)	(0,0,0)	49018.00	(0.20)	[65016]
	22(3,20) - 21(4,17)	(0,0,0)	49460.30	(0.20)	[65016]
	25(6,19) - 26(5,22)	(0,0,0)	51754.90	(0.20)	[65016]
	3(1, 2) - 3(0, 3)	(0,0,0)	52731.31	(0.20)	[65016]
	4(1, 3) - 4(0, 4)	(0,0,0)	55842.49	(0.20)	[65016]
	1(1, 1) - 0(0, 0)	(0,0,0)	65607.34	(0.20)	[65016]
	6(0, 6) - 5(1, 5)	(0,0,0)	68541.75	(0.20)	[65016]
	7(1, 6) - 7(0, 7)	(0,0,0)	71303.86	(0.20)	[65016]
	8(1, 7) - 8(0, 8)	(0,0,0)	78871.39	(0.20)	[65016]
	9(1, 8) - 9(0, 9)	(0,0,0)	87819.13	(0.20)	[65016]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{34}S^{18}O$	9(0, 9) - 8(1, 8)	(0,0,0)	130994.97	(0.20)	[65016]
	16(2,14) - 16(1,15)	(0,0,0)	134836.31	(0.20)	[65016]
	5(2, 3) - 5(1, 4)	(0,0,0)	135407.44	(0.20)	[65016]
	13(1,12) - 13(0,13)	(0,0,0)	138138.96	(0.20)	[65016]
	4(2, 2) - 4(1, 3)	(0,0,0)	138275.10	(0.20)	[65016]
	3(2, 1) - 3(1, 2)	(0,0,0)	140774.79	(0.20)	[65016]
	6(1, 6) - 5(0, 5)	(0,0,0)	142054.37	(0.20)	[65016]
	17(2,15) - 17(1,16)	(0,0,0)	142105.33	(0.20)	[65016]
$^{18}O^{34}S^{18}O$	12(2,10) - 13(1,13)	(0,0,0)	8112.50	(0.20)	[64015]
	28(6,22) - 29(5,25)	(0,0,0)	10888.60	(0.20)	[64015]
	17(4,14) - 18(3,15)	(0,1,0)	11384.2	(0.3)	[64015]
	14(2,12) - 15(1,15)	(0,0,0)	11953.10	(0.20)	[64015]
	11(3, 9) - 12(2,10)	(0,0,0)	12763.20	(0.20)	[63017]
	30(5,25) - 29(6,24)	(0,0,0)	13653.10	(0.20)	[64015]
	41(7,35) - 40(8,32)	(0,0,0)	14170.80	(0.20)	[64015]
	8(1, 7) - 7(2, 6)	(0,1,0)	14777.2	(0.3)	[64015]
	33(7,27) - 34(6,28)	(0,0,0)	15905.0	(0.2)	[63017]
	17(2,16) - 16(3,13)	(0,1,0)	16188.9	(0.3)	[64015]
	10(2, 8) - 11(1,11)	(0,1,0)	16207.1	(0.3)	[64015]
	14(2,12) - 15(1,15)	(0,1,0)	16302.3	(0.3)	[64015]
	8(1, 7) - 7(2, 6)	(0,0,0)	17648.10	(0.20)	[63017]
	11(3, 9) - 12(2,10)	(0,1,0)	17910.7	(0.3)	[64015]
	17(2,16) - 16(3,13)	(0,0,0)	21479.40	(0.20)	[63017]
	38(8,30) - 39(7,33)	(0,0,0)	23148.00	(0.20)	[64015]
	4(0, 4) - 3(1, 3)	(0,1,0)	23551.5	(0.3)	[64015]
	22(5,17) - 23(4,20)	(0,0,0)	24294.25	(0.20)	[63017]
	21(3,19) - 20(4,16)	(0,0,0)	24397.80	(0.20)	[63017]
	8(2, 6) - 9(1, 9)	(0,0,0)	24460.20	(0.20)	[63017]
	12(3, 9) - 13(2,12)	(0,0,0)	24472.80	(0.20)	[63017]
	4(0, 4) - 3(1, 3)	(0,0,0)	24569.70	(0.20)	[63017]
	31(5,27) - 30(6,24)	(0,0,0)	25544.10	(0.20)	[64015]
	5(2, 4) - 6(1, 5)	(0,0,0)	25611.10	(0.20)	[63017]
	27(6,22) - 28(5,23)	(0,0,0)	25832.10	(0.20)	[63017]
	8(2, 6) - 9(1, 9)	(0,1,0)	27972.1	(0.3)	[64015]
	14(2,12) - 13(3,11)	(0,1,0)	28209.0	(0.3)	[64015]
	5(2, 4) - 6(1, 5)	(0,1,0)	28573.4	(0.3)	[64015]
	16(2,14) - 17(1,17)	(0,1,0)	28851.6	(0.3)	[64015]
	12(3, 9) - 13(3,12)	(0,1,0)	29709.1	(0.3)	[64015]
	14(2,12) - 13(3,11)	(0,0,0)	33297.65	(0.20)	[63017]
	32(7,25) - 33(6,28)	(0,0,0)	35145.30	(0.20)	[64015]
	19(2,18) - 18(3,15)	(0,0,0)	35920.50	(0.20)	[63017]
	21(5,17) - 22(4,18)	(0,0,0)	36186.60	(0.20)	[64015]
	37(6,32) - 36(7,29)	(0,0,0)	39152.20	(0.20)	[64015]
	20(3,17) - 19(4,16)	(0,0,0)	41356.30	(0.20)	[64015]
	21(2,20) - 20(3,17)	(0,0,0)	42837.30	(0.20)	[64015]
	6(2, 4) - 7(1, 7)	(0,0,0)	42922.10	(0.20)	[64015]
	4(1, 3) - 4(0, 4)	(0,0,0)	54003.07	(0.20)	[65016]
	10(0,10) - 9(1, 9)	(0,0,0)	141843.78	(0.20)	[65016]
	18(2,16) - 18(1,17)	(0,0,0)	142513.38	(0.20)	[65016]

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{33}S^{18}O$	13(3,10) - 14(2,13)					(0,0,0)	9008.8	(0.2)	[64013]
	13(3,10) - 14(2,13)					(0,0,0)	9011.7	(0.2)	[64013]
	11(3, 9) - 12(2,10)					(0,0,0)	9257.5	(0.2)	[64013]
	11(3, 9) - 12(2,10)					(0,0,0)	9261.5	(0.2)	[64013]
	13(2,11) - 14(1,14)					(0,0,0)	9570.7	(0.2)	[68017]
	13(2,11) - 14(1,14)					(0,0,0)	9572.0	(0.2)	[68017]
	22(5,18) - 23(4,19)					(0,0,0)	9783.1	(0.2)	[64013]
	22(5,18) - 23(4,19)					(0,0,0)	9784.5	(0.2)	[64013]
	35(6,30) - 34(7,27)					(0,0,0)	12003.6	(0.2)	[64013]
	10(2, 8) - 11(1,11)					(0,0,0)	12225.2	(0.2)	[64013]
	10(2, 8) - 11(1,11)					(0,0,0)	12226.7	(0.2)	[64013]
	10(2, 8) - 11(1,11)					(0,0,0)	12236.2	(0.2)	[64013]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{33}S^{18}O$	10(2, 8) - 11(1,11)					(0,0,0)	12237.7	(0.2)	[64013]
	24(4,20) - 23(5,19)					(0,0,0)	12244.25	(0.20)	[64013]
	24(4,20) - 23(5,19)					(0,0,0)	12245.9	(0.2)	[64013]
	1(1, 1) - 2(0, 2)					(0,0,0)	12402.6	(0.2)	[64013]
	1(1, 1) - 2(0, 2)					(0,0,0)	12407.9	(0.2)	[64013]
	1(1, 1) - 2(0, 2)					(0,0,0)	12414.6	(0.2)	[64013]
	38(8,30) - 39(7,33)					(0,0,0)	12947.4	(0.2)	[68017]
	20(3,18) - 19(4,15)					(0,0,0)	14639.4	(0.2)	[64013]
	20(3,18) - 19(4,15)					(0,0,0)	14640.5	(0.2)	[64013]
	13(2,11) - 12(3,10)					(0,0,0)	14838.0	(0.2)	[64013]
	13(2,11) - 12(3,10)					(0,0,0)	14842.2	(0.2)	[64013]
	16(2,15) - 15(3,12)					(0,0,0)	15012.2	(0.2)	[64013]
	16(2,15) - 15(3,12)					(0,0,0)	15016.1	(0.2)	[64013]
	30(5,26) - 29(6,23)					(0,0,0)	16104.4	(0.2)	[64013]
	9(2, 7) - 10(1,10)					(0,0,0)	17357.15	(0.20)	[64013]
	9(2, 7) - 10(1,10)					(0,0,0)	17358.7	(0.2)	[64013]
	9(2, 7) - 10(1,10)					(0,0,0)	17367.3	(0.2)	[64013]
	9(2, 7) - 10(1,10)					(0,0,0)	17368.8	(0.2)	[64013]
	25(4,22) - 24(5,19)					(0,0,0)	17760.3	(0.2)	[64013]
	17(4,13) - 18(3,16)					(0,0,0)	18524.35	(0.20)	[68017]
	27(6,22) - 28(5,23)					(0,0,0)	18618.6	(0.2)	[68017]
	27(6,22) - 28(5,23)					(0,0,0)	18619.5	(0.2)	[68017]
	15(2,13) - 16(1,16)					(0,0,0)	18889.1	(0.2)	[64013]
	15(2,13) - 16(1,16)					(0,0,0)	18890.3	(0.2)	[64013]
	15(2,13) - 16(1,16)					(0,0,0)	18902.6	(0.2)	[64013]
	15(2,13) - 16(1,16)					(0,0,0)	18903.9	(0.2)	[64013]
	22(5,17) - 23(4,20)					(0,0,0)	19111.3	(0.2)	[64013]
	16(4,13) - 17(3,14)					(0,0,0)	21026.6	(0.2)	[64013]
	16(4,13) - 17(3,14)					(0,0,0)	21028.9	(0.2)	[64013]
	8(1, 7) - 7(2, 6)					(0,0,0)	21127.05	(0.20)	[64013]
	8(1, 7) - 7(2, 6)					(0,0,0)	21128.1	(0.2)	[64013]
	8(1, 7) - 7(2, 6)					(0,0,0)	21132.9	(0.2)	[64013]
	8(1, 7) - 7(2, 6)					(0,0,0)	21133.9	(0.2)	[64013]
	27(6,21) - 28(5,24)					(0,0,0)	22516.5	(0.2)	[68017]
	12(3, 9) - 13(2,12)					(0,0,0)	22788.6	(0.2)	[64013]
	12(3, 9) - 13(2,12)					(0,0,0)	22791.1	(0.2)	[64013]
	30(5,25) - 29(6,24)					(0,0,0)	23589.2	(0.2)	[64013]
	30(5,25) - 29(6,24)					(0,0,0)	23590.3	(0.2)	[64013]
	8(2, 6) - 9(1, 9)					(0,0,0)	24417.8	(0.2)	[64013]
	8(2, 6) - 9(1, 9)					(0,0,0)	24419.4	(0.2)	[64013]
	8(2, 6) - 9(1, 9)					(0,0,0)	24427.3	(0.2)	[64013]
	8(2, 6) - 9(1, 9)					(0,0,0)	24428.9	(0.2)	[64013]
	5(2, 4) - 6(1, 5)					(0,0,0)	24795.75	(0.20)	[64013]
	5(2, 4) - 6(1, 5)					(0,0,0)	24801.8	(0.2)	[64013]
	5(2, 4) - 6(1, 5)					(0,0,0)	24803.2	(0.2)	[64013]
	17(2,16) - 16(3,13)					(0,0,0)	24870.5	(0.2)	[64013]
	17(2,16) - 16(3,13)					(0,0,0)	24875.1	(0.2)	[64013]
	19(3,16) - 18(4,15)					(0,0,0)	25562.6	(0.2)	[64013]
	19(3,16) - 18(4,15)					(0,0,0)	25565.4	(0.2)	[64013]
	32(7,26) - 33(6,27)					(0,0,0)	25748.1	(0.2)	[68017]
	32(7,26) - 33(6,27)					(0,0,0)	25748.7	(0.2)	[68017]
	4(0, 4) - 3(1, 3)					(0,0,0)	26782.4	(0.2)	[64013]
	4(0, 4) - 3(1, 3)					(0,0,0)	26785.0	(0.2)	[64013]
	4(0, 4) - 3(1, 3)					(0,0,0)	26787.9	(0.2)	[64013]
	4(0, 4) - 3(1, 3)					(0,0,0)	26790.6	(0.2)	[64013]
	32(7,25) - 33(6,28)					(0,0,0)	27284.2	(0.2)	[68017]
	21(3,19) - 20(4,16)					(0,0,0)	30234.4	(0.2)	[64013]
	21(3,19) - 20(4,16)					(0,0,0)	30235.6	(0.2)	[64013]
	21(5,17) - 22(4,18)					(0,0,0)	31114.9	(0.2)	[68017]
	21(5,17) - 22(4,18)					(0,0,0)	31116.1	(0.2)	[68017]
	36(6,31) - 35(7,28)					(0,0,0)	31754.0	(0.2)	[64013]
	18(2,17) - 17(3,14)					(0,0,0)	33028.3	(0.2)	[64013]
	18(2,17) - 17(3,14)					(0,0,0)	33033.5	(0.2)	[64013]
	7(2, 5) - 8(1, 8)					(0,0,0)	33242.9	(0.2)	[64013]
	7(2, 5) - 8(1, 8)					(0,0,0)	33244.5	(0.2)	[64013]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{33}S^{18}O$	7(2, 5) - 8(1, 8)					(0,0,0)	33251.6	(0.2)	[64013]
	7(2, 5) - 8(1, 8)					(0,0,0)	33253.2	(0.2)	[64013]
	25(4,21) - 24(5,20)					(0,0,0)	35080.5	(0.2)	[64013]
	25(4,21) - 24(5,20)					(0,0,0)	35082.4	(0.2)	[64013]
	31(5,27) - 30(6,24)					(0,0,0)	35365.1	(0.2)	[64013]
	26(4,23) - 25(5,20)					(0,0,0)	35807.4	(0.2)	[64013]
	16(4,12) - 17(3,15)					(0,0,0)	35834.1	(0.2)	[64013]
	36(6,30) - 35(7,29)					(0,0,0)	35903.4	(0.2)	[64013]
	36(6,30) - 35(7,29)					(0,0,0)	35904.2	(0.2)	[64013]
	11(3, 8) - 12(2,11)					(0,0,0)	37508.7	(0.2)	[64013]
	11(3, 8) - 12(2,11)					(0,0,0)	37510.7	(0.2)	[64013]
	26(6,21) - 27(5,22)					(0,0,0)	39051.4	(0.2)	[68017]
	26(6,21) - 27(5,22)					(0,0,0)	39052.2	(0.2)	[68017]
	19(2,18) - 18(3,15)					(0,0,0)	39294.0	(0.2)	[68017]
	19(2,18) - 18(3,15)					(0,0,0)	39300.2	(0.2)	[68017]
	14(2,12) - 13(3,11)					(0,0,0)	39855.2	(0.2)	[68017]
	14(2,12) - 13(3,11)					(0,0,0)	39859.8	(0.2)	[68017]
	26(6,20) - 27(5,23)					(0,0,0)	41804.4	(0.2)	[68017]
	26(6,20) - 27(5,23)					(0,0,0)	41804.9	(0.2)	[68017]
	23(2,22) - 22(3,19)					(0,0,0)	42437.6	(0.2)	[68017]
	23(2,22) - 22(3,19)					(0,0,0)	42438.1	(0.2)	[68017]
	15(4,12) - 16(3,13)					(0,0,0)	42938.8	(0.2)	[68017]
	15(4,12) - 16(3,13)					(0,0,0)	42940.6	(0.2)	[68017]
	6(2, 4) - 7(1, 7)					(0,0,0)	43651.1	(0.2)	[68017]
	6(2, 4) - 7(1, 7)					(0,0,0)	43652.8	(0.2)	[68017]
	6(2, 4) - 7(1, 7)					(0,0,0)	43659.2	(0.2)	[68017]
	6(2, 4) - 7(1, 7)					(0,0,0)	43661.0	(0.2)	[68017]
	9(1, 8) - 8(2, 7)					(0,0,0)	44900.2	(0.2)	[68017]
	9(1, 8) - 8(2, 7)					(0,0,0)	44901.2	(0.2)	[68017]
	9(1, 8) - 8(2, 7)					(0,0,0)	44905.9	(0.2)	[68017]
	9(1, 8) - 8(2, 7)					(0,0,0)	44906.9	(0.2)	[68017]
	22(3,20) - 21(4,17)					(0,0,0)	44970.0	(0.2)	[68017]
	22(3,20) - 21(4,17)					(0,0,0)	44971.6	(0.2)	[68017]
	31(5,26) - 30(6,25)					(0,0,0)	45529.5	(0.2)	[68017]
	31(5,26) - 30(6,25)					(0,0,0)	45530.8	(0.2)	[68017]
	31(7,25) - 32(6,26)					(0,0,0)	45719.1	(0.2)	[68017]
	31(7,25) - 32(6,26)					(0,0,0)	45719.7	(0.2)	[68017]
	31(7,24) - 32(6,27)					(0,0,0)	46795.7	(0.2)	[68017]
	31(7,24) - 32(6,27)					(0,0,0)	46797.6	(0.2)	[68017]
	4(2, 3) - 5(1, 4)					(0,0,0)	46876.2	(0.2)	[68017]
	5(0, 5) - 4(1, 4)					(0,0,0)	47096.8	(0.2)	[68017]
	5(0, 5) - 4(1, 4)					(0,0,0)	47098.6	(0.2)	[68017]
	5(0, 5) - 4(1, 4)					(0,0,0)	47101.8	(0.2)	[68017]
	5(0, 5) - 4(1, 4)					(0,0,0)	47103.8	(0.2)	[68017]
	18(2,16) - 19(1,19)					(0,0,0)	48800.0	(0.2)	[68017]
	1(1, 0) - 1(0, 1)					(0,0,0)	49859.9	(0.2)	[68017]
	1(1, 0) - 1(0, 1)					(0,0,0)	49866.0	(0.2)	[68017]
	1(1, 0) - 1(0, 1)					(0,0,0)	49870.2	(0.2)	[68017]
	20(3,17) - 19(4,16)					(0,0,0)	50407.3	(0.2)	[68017]
	20(3,17) - 19(4,16)					(0,0,0)	50410.2	(0.2)	[68017]
	2(1, 1) - 2(0, 2)					(0,0,0)	51302.5	(0.2)	[68017]
	2(1, 1) - 2(0, 2)					(0,0,0)	51307.1	(0.2)	[68017]
	2(1, 1) - 2(0, 2)					(0,0,0)	51308.85	(0.20)	[68017]
	2(1, 1) - 2(0, 2)					(0,0,0)	51313.3	(0.2)	[68017]
	37(6,32) - 36(7,29)					(0,0,0)	51547.5	(0.2)	[68017]
	36(8,29) - 37(7,30)					(0,0,0)	51755.0	(0.2)	[68017]
	20(5,16) - 21(4,17)					(0,0,0)	51854.8	(0.2)	[68017]
	20(5,16) - 21(4,17)					(0,0,0)	51855.7	(0.2)	[68017]
	36(8,28) - 37(7,31)					(0,0,0)	52160.5	(0.2)	[68017]
	10(3, 7) - 11(2,10)					(0,0,0)	53009.8	(0.2)	[68017]
	10(3, 7) - 11(2,10)					(0,0,0)	53011.4	(0.2)	[68017]
	3(1, 2) - 3(0, 3)					(0,0,0)	53523.1	(0.2)	[68017]
	3(1, 2) - 3(0, 3)					(0,0,0)	53528.8	(0.2)	[68017]
	31(5,28) - 31(6,25)					(0,0,0)	54528.4	(0.2)	[68017]
	5(2, 3) - 6(1, 6)					(0,0,0)	55458.5	(0.2)	[68017]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ – $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{33}S^{18}O$	5(2, 3) – 6(1, 6)					(0,0,0)	55460.4	(0.2)	[68017]
	5(2, 3) – 6(1, 6)					(0,0,0)	55466.1	(0.2)	[68017]
	5(2, 3) – 6(1, 6)					(0,0,0)	55468.0	(0.2)	[68017]
	20(5,15) – 21(4,18)					(0,0,0)	56533.6	(0.2)	[68017]
	4(1, 3) – 4(0, 4)					(0,0,0)	56587.7	(0.2)	[68017]
	4(1, 3) – 4(0, 4)					(0,0,0)	56590.2	(0.2)	[68017]
	4(1, 3) – 4(0, 4)					(0,0,0)	56594.6	(0.2)	[68017]
	4(1, 3) – 4(0, 4)					(0,0,0)	56597.0	(0.2)	[68017]
	37(6,31) – 36(7,30)					(0,0,0)	57197.4	(0.2)	[68017]
	23(3,21) – 22(4,18)					(0,0,0)	58675.0	(0.2)	[68017]
	23(3,21) – 22(4,18)					(0,0,0)	58676.8	(0.2)	[68017]
	26(4,22) – 25(5,21)					(0,0,0)	58838.6	(0.2)	[68017]
	26(4,22) – 25(5,21)					(0,0,0)	58839.7	(0.2)	[68017]
$^{18}O^{33}S^{18}O$	17(4,14) – 18(3,15)					(0,0,0)	10758.8	(0.2)	[68017]
	17(4,14) – 18(3,15)					(0,0,0)	10761.1	(0.2)	[68017]
	18(4,14) – 19(3,17)					(0,0,0)	11422.80	(0.20)	[68017]
	1(1, 1) – 2(0, 2)					(0,0,0)	13230.3	(0.2)	[68017]
	1(1, 1) – 2(0, 2)					(0,0,0)	13237.0	(0.2)	[68017]
	10(2, 8) – 11(1,11)					(0,0,0)	13702.2	(0.2)	[68017]
	8(1, 7) – 7(2, 6)					(0,0,0)	14945.2	(0.2)	[68017]
	8(1, 7) – 7(2, 6)					(0,0,0)	14951.1	(0.2)	[68017]
	31(5,27) – 30(6,24)					(0,0,0)	16239.7	(0.2)	[68017]
	17(2,16) – 16(3,13)					(0,0,0)	18989.8	(0.2)	[68017]
	17(2,16) – 16(3,13)					(0,0,0)	18994.0	(0.2)	[68017]
	21(3,19) – 20(4,16)					(0,0,0)	19408.8	(0.2)	[68017]
	28(6,22) – 29(5,25)					(0,0,0)	20229.1	(0.2)	[68017]
	4(0, 4) – 3(1, 3)					(0,0,0)	23742.0	(0.2)	[68017]
	4(0, 4) – 3(1, 3)					(0,0,0)	23744.7	(0.2)	[68017]
	4(0, 4) – 3(1, 3)					(0,0,0)	23747.7	(0.2)	[68017]
	4(0, 4) – 3(1, 3)					(0,0,0)	23750.2	(0.2)	[68017]
	8(2, 6) – 9(1, 9)					(0,0,0)	26202.0	(0.2)	[68017]
	8(2, 6) – 9(1, 9)					(0,0,0)	26203.6	(0.2)	[68017]
	8(2, 6) – 9(1, 9)					(0,0,0)	26211.3	(0.2)	[68017]
	8(2, 6) – 9(1, 9)					(0,0,0)	26212.9	(0.2)	[68017]
	33(7,27) – 34(6,28)					(0,0,0)	26344.9	(0.2)	[68017]
	12(3, 9) – 13(2,12)					(0,0,0)	28057.7	(0.2)	[68017]
	12(3, 9) – 13(2,12)					(0,0,0)	28059.95	(0.20)	[68017]
	5(2, 4) – 6(1, 5)					(0,0,0)	28241.3	(0.2)	[68017]
	14(2,12) – 13(3,11)					(0,0,0)	28241.3	(0.2)	[68017]
	5(2, 4) – 6(1, 5)					(0,0,0)	28244.0	(0.2)	[68017]
	14(2,12) – 13(3,11)					(0,0,0)	28244.0	(0.2)	[68017]
	5(2, 4) – 6(1, 5)					(0,0,0)	28245.8	(0.2)	[68017]
	14(2,12) – 13(3,11)					(0,0,0)	28245.8	(0.2)	[68017]
	5(2, 4) – 6(1, 5)					(0,0,0)	28248.5	(0.2)	[68017]
	14(2,12) – 13(3,11)					(0,0,0)	28248.5	(0.2)	[68017]
	22(5,17) – 23(4,20)					(0,0,0)	31754.0	(0.2)	[68017]
	20(3,17) – 19(4,16)					(0,0,0)	34108.5	(0.2)	[68017]
	19(2,18) – 18(3,15)					(0,0,0)	34357.2	(0.2)	[68017]
	19(2,18) – 18(3,15)					(0,0,0)	34357.7	(0.2)	[68017]
	19(2,18) – 18(3,15)					(0,0,0)	34362.8	(0.2)	[68017]
	19(2,18) – 18(3,15)					(0,0,0)	34363.2	(0.2)	[68017]
	27(6,22) – 28(5,23)					(0,0,0)	35578.3	(0.2)	[68017]
	27(6,22) – 28(5,23)					(0,0,0)	35579.2	(0.2)	[68017]
	27(4,24) – 26(5,21)					(0,0,0)	37507.9	(0.2)	[68017]
	26(4,22) – 25(5,21)					(0,0,0)	38693.1	(0.2)	[68017]
	26(4,22) – 25(5,21)					(0,0,0)	38695.3	(0.2)	[68017]
	16(4,12) – 17(3,15)					(0,0,0)	44102.8	(0.2)	[68017]
	21(5,17) – 22(4,18)					(0,0,0)	44242.3	(0.2)	[68017]
	21(5,17) – 22(4,18)					(0,0,0)	44243.5	(0.2)	[68017]
	32(5,27) – 31(6,26)					(0,0,0)	44556.75	(0.20)	[68017]
	32(5,27) – 31(6,26)					(0,0,0)	44557.9	(0.2)	[68017]
	6(2, 4) – 7(1, 7)					(0,0,0)	45024.3	(0.2)	[68017]
	6(2, 4) – 7(1, 7)					(0,0,0)	45026.0	(0.2)	[68017]
	6(2, 4) – 7(1, 7)					(0,0,0)	45032.3	(0.2)	[68017]
	6(2, 4) – 7(1, 7)					(0,0,0)	45034.0	(0.2)	[68017]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ – $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{18}O^{33}S^{18}O$	23(3,21) – 22(4,18)					(0,0,0)	47412.5	(0.2)	[68017]
	23(3,21) – 22(4,18)					(0,0,0)	47414.2	(0.2)	[68017]
	2(1, 1) – 2(0, 2)					(0,0,0)	49910.0	(0.2)	[68017]
	2(1, 1) – 2(0, 2)					(0,0,0)	49914.7	(0.2)	[68017]
	2(1, 1) – 2(0, 2)					(0,0,0)	49916.5	(0.2)	[68017]
	2(1, 1) – 2(0, 2)					(0,0,0)	49920.6	(0.2)	[68017]
	15(4,12) – 16(3,13)					(0,0,0)	52194.8	(0.2)	[68017]
	15(4,12) – 16(3,13)					(0,0,0)	52196.8	(0.2)	[68017]
	33(5,29) – 32(6,26)					(0,0,0)	52506.1	(0.2)	[68017]
	10(3, 7) – 11(2,10)					(0,0,0)	57089.5	(0.2)	[68017]
	10(3, 7) – 11(2,10)					(0,0,0)	57090.9	(0.2)	[68017]
$^{16}O^{32}S^{17}O$	33(7,26) – 34(6,29)					(0,0,0)	7994.20	(0.10)	[65017]
	40(7,33) – 39(8,32)					(0,0,0)	8101.25	(0.10)	[65017]
	13(3,10) – 14(2,13)					(0,0,0)	9309.05	(0.10)	[65017]
	11(2, 9) – 12(1,12)					(0,0,0)	9459.80	(0.10)	[65017]
	11(2, 9) – 12(1,12)					(0,0,0)	9460.90	(0.10)	[65017]
	11(2, 9) – 12(1,12)					(0,0,0)	9461.70	(0.10)	[65017]
	13(2,11) – 12(3,10)					(0,1,0)	9464.90	(0.10)	[65017]
	16(2,15) – 15(3,12)					(0,1,0)	9477.40	(0.10)	[65017]
	11(3, 9) – 12(2,10)					(0,0,0)	9562.70	(0.10)	[65017]
	11(3, 9) – 12(2,10)					(0,0,0)	9563.20	(0.10)	[65017]
	18(4,14) – 19(3,17)					(0,1,0)	9876.70	(0.10)	[65017]
	13(2,11) – 14(1,14)					(0,0,0)	9887.35	(0.10)	[65017]
	13(2,11) – 14(1,14)					(0,0,0)	9889.40	(0.10)	[65017]
	22(5,18) – 23(4,19)					(0,0,0)	10132.00	(0.10)	[64018]
	23(5,18) – 24(4,21)					(0,1,0)	11094.70	(0.10)	[65017]
	35(6,30) – 34(7,27)					(0,0,0)	12258.60	(0.10)	[65017]
	24(4,20) – 23(5,19)					(0,0,0)	12535.20	(0.10)	[64018]
	38(8,31) – 39(7,32)					(0,0,0)	12578.80	(0.10)	[64018]
	10(2, 8) – 11(1,11)					(0,0,0)	12614.60	(0.10)	[65017]
	10(2, 8) – 11(1,11)					(0,0,0)	12615.70	(0.10)	[65017]
	10(2, 8) – 11(1,11)					(0,0,0)	12616.45	(0.10)	[65017]
	1(1, 1) – 2(0, 2)		3/2		5/2	(0,0,0)	12777.30	(0.10)	[65017]
	1(1, 1) – 2(0, 2)		3/2		3/2	(0,0,0)	12777.30	(0.10)	[65017]
	1(1, 1) – 2(0, 2)		3/2		1/2	(0,0,0)	12777.30	(0.10)	[65017]
	1(1, 1) – 2(0, 2)		7/2		9/2	(0,0,0)	12777.70	(0.10)	[65017]
	1(1, 1) – 2(0, 2)		5/2		7/2	(0,0,0)	12779.10	(0.10)	[65017]
	1(1, 1) – 2(0, 2)		5/2		5/2	(0,0,0)	12779.10	(0.10)	[65017]
	38(8,30) – 39(7,33)					(0,0,0)	13425.70	(0.10)	[64018]
	14(2,12) – 15(1,15)					(0,0,0)	13544.60	(0.10)	[65017]
	14(2,12) – 15(1,15)					(0,0,0)	13545.80	(0.10)	[65017]
	14(2,12) – 15(1,15)					(0,0,0)	13546.90	(0.10)	[65017]
	26(2,25) – 25(3,22)					(0,1,0)	13876.30	(0.10)	[65017]
	1(1, 1) – 2(0, 2)					(0,1,0)	13942.60	(0.10)	[65017]
	20(3,18) – 19(4,15)					(0,0,0)	15017.30	(0.10)	[64018]
	13(3,10) – 14(2,13)					(0,1,0)	15219.80	(0.10)	[65017]
	13(2,11) – 12(3,10)					(0,0,0)	15239.50	(0.10)	[65017]
	35(6,29) – 34(7,28)					(0,0,0)	15356.30	(0.10)	[64018]
	11(3, 9) – 12(2,10)					(0,1,0)	15364.40	(0.10)	[65017]
	11(3, 9) – 12(2,10)					(0,1,0)	15364.90	(0.10)	[65017]
	16(2,15) – 15(3,12)					(0,0,0)	15414.50	(0.10)	[65017]
	16(2,15) – 15(3,12)					(0,0,0)	15415.20	(0.10)	[65017]
	28(6,22) – 29(5,25)					(0,1,0)	16147.20	(0.10)	[65017]
	30(5,26) – 29(6,23)					(0,0,0)	16494.10	(0.10)	[64018]
	10(2, 8) – 11(1,11)					(0,1,0)	16814.30	(0.10)	[65017]
	9(2, 7) – 10(1,10)		19/2		21/2	(0,0,0)	17894.65	(0.10)	[65017]
	9(2, 7) – 10(1,10)		21/2		23/2	(0,0,0)	17895.00	(0.10)	[65017]
	9(2, 7) – 10(1,10)		17/2		19/2	(0,0,0)	17895.00	(0.10)	[65017]
	9(2, 7) – 10(1,10)		15/2		17/2	(0,0,0)	17895.80	(0.10)	[65017]
	9(2, 7) – 10(1,10)		23/2		25/2	(0,0,0)	17896.35	(0.10)	[65017]
	9(2, 7) – 10(1,10)		13/2		15/2	(0,0,0)	17896.85	(0.10)	[65017]
	19(3,16) – 18(4,15)					(0,1,0)	17956.10	(0.10)	[65017]
	25(4,22) – 24(5,19)					(0,0,0)	18213.70	(0.10)	[64018]
	8(1, 7) – 7(2, 6)					(0,1,0)	18495.90	(0.10)	[65017]
	43(9,35) – 44(8,36)					(0,0,0)	18824.90	(0.10)	[64018]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ – $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{17}O$	17(4,13) – 18(3,16)					(0,0,0)	19112.05	(0.10)	[64018]
	43(9,34) – 44(8,37)					(0,0,0)	19137.20	(0.10)	[64018]
	27(6,22) – 28(5,23)					(0,0,0)	19236.40	(0.10)	[64018]
	15(2,13) – 16(1,16)		31/2		33/2	(0,0,0)	19480.85	(0.10)	[65017]
	15(2,13) – 16(1,16)		33/2		35/2	(0,0,0)	19481.10	(0.10)	[65017]
	15(2,13) – 16(1,16)		29/2		31/2	(0,0,0)	19481.50	(0.10)	[65017]
	15(2,13) – 16(1,16)		27/2		29/2	(0,0,0)	19482.05	(0.10)	[65017]
	15(2,13) – 16(1,16)		35/2		37/2	(0,0,0)	19483.15	(0.10)	[65017]
	15(2,13) – 16(1,16)		25/2		27/2	(0,0,0)	19483.55	(0.10)	[65017]
	17(2,16) – 16(3,13)					(0,1,0)	19608.30	(0.10)	[65017]
	22(5,17) – 23(4,20)					(0,0,0)	19728.50	(0.10)	[64018]
	26(2,25) – 25(3,22)					(0,0,0)	20521.70	(0.10)	[65017]
	22(5,18) – 23(4,19)					(0,1,0)	20758.20	(0.10)	[65017]
	33(7,27) – 34(6,28)					(0,1,0)	20926.70	(0.10)	[65017]
	36(6,30) – 35(7,29)					(0,1,0)	21609.90	(0.10)	[65017]
	16(4,13) – 17(3,14)					(0,0,0)	21688.20	(0.10)	[64018]
	16(4,13) – 17(3,14)					(0,0,0)	21688.60	(0.10)	[64018]
	8(1, 7) – 7(2, 6)					(0,0,0)	21727.60	(0.10)	[65017]
	8(1, 7) – 7(2, 6)					(0,0,0)	21728.15	(0.10)	[65017]
	8(1, 7) – 7(2, 6)					(0,0,0)	21728.55	(0.10)	[65017]
	9(2, 7) – 10(1,10)					(0,1,0)	21968.00	(0.10)	[65017]
	9(2, 7) – 10(1,10)					(0,1,0)	21969.00	(0.10)	[65017]
	9(2, 7) – 10(1,10)					(0,1,0)	21969.50	(0.10)	[65017]
	21(3,19) – 20(4,16)					(0,1,0)	22996.40	(0.10)	[65017]
	33(7,26) – 34(6,29)					(0,1,0)	23066.90	(0.10)	[65017]
	28(3,25) – 29(2,28)					(0,0,0)	23144.80	(0.10)	[65017]
	28(3,25) – 29(2,28)					(0,0,0)	23146.90	(0.10)	[65017]
	27(2,61) – 28(5,24)					(0,0,0)	23245.40	(0.10)	[64018]
	12(3, 9) – 13(2,12)					(0,0,0)	23489.70	(0.10)	[64018]
	31(5,27) – 30(6,24)					(0,1,0)	23563.55	(0.10)	[65017]
	30(5,25) – 29(6,24)					(0,0,0)	24192.00	(0.10)	[64018]
	15(2,13) – 16(1,16)					(0,1,0)	24644.90	(0.10)	[65017]
	15(2,13) – 16(1,16)					(0,1,0)	24646.40	(0.10)	[65017]
	8(2, 6) – 9(1, 9)		17/2		19/2	(0,0,0)	25160.00	(0.10)	[65017]
	8(2, 6) – 9(1, 9)		19/2		21/2	(0,0,0)	25160.30	(0.10)	[65017]
	8(2, 6) – 9(1, 9)		15/2		17/2	(0,0,0)	25160.30	(0.10)	[65017]
	8(2, 6) – 9(1, 9)		13/2		15/2	(0,0,0)	25161.00	(0.10)	[65017]
	8(2, 6) – 9(1, 9)		21/2		23/2	(0,0,0)	25161.60	(0.10)	[65017]
	8(2, 6) – 9(1, 9)		11/2		13/2	(0,0,0)	25162.05	(0.10)	[65017]
	25(4,21) – 24(5,20)					(0,1,0)	25315.30	(0.10)	[65017]
	5(2, 4) – 6(1, 5)		5/2		7/2	(0,0,0)	25541.40	(0.10)	[65017]
	5(2, 4) – 6(1, 5)		15/2		17/2	(0,0,0)	25541.65	(0.10)	[65017]
	5(2, 4) – 6(1, 5)		7/2		9/2	(0,0,0)	25542.15	(0.10)	[65017]
	5(2, 4) – 6(1, 5)		9/2		11/2	(0,0,0)	25542.60	(0.10)	[65017]
	5(2, 4) – 6(1, 5)		13/2		15/2	(0,0,0)	25542.60	(0.10)	[65017]
	5(2, 4) – 6(1, 5)		11/2		13/2	(0,0,0)	25542.85	(0.10)	[65017]
	17(2,16) – 16(3,13)					(0,0,0)	25560.20	(0.10)	[65017]
	17(2,16) – 16(3,13)					(0,0,0)	25560.70	(0.10)	[65017]
	17(2,16) – 16(3,13)					(0,0,0)	25561.00	(0.10)	[65017]
	19(3,16) – 18(4,15)					(0,0,0)	26257.90	(0.10)	[64018]
	19(3,16) – 18(4,15)					(0,0,0)	26258.50	(0.10)	[64018]
	26(4,23) – 25(5,20)					(0,1,0)	26394.80	(0.10)	[65017]
	4(0, 4) – 3(1, 3)					(0,1,0)	26412.70	(0.10)	[65017]
	4(0, 4) – 1(3, 1)					(0,1,0)	26413.60	(0.10)	[65017]
	32(7,26) – 33(6,27)					(0,0,0)	26584.10	(0.10)	[64018]
	17(4,13) – 18(3,16)					(0,1,0)	27247.70	(0.10)	[65017]
	41(7,35) – 40(8,32)					(0,0,0)	27359.30	(0.10)	[64018]
	4(0, 4) – 3(1, 3)					(0,0,0)	27560.40	(0.10)	[65017]
	4(0, 4) – 3(1, 3)					(0,0,0)	27561.30	(0.10)	[65017]
	4(0, 4) – 3(1, 3)					(0,0,0)	27561.70	(0.10)	[65017]
	16(2,14) – 17(1,17)					(0,0,0)	27639.80	(0.10)	[65017]
	16(2,14) – 17(1,17)					(0,0,0)	27640.00	(0.10)	[65017]
	16(2,14) – 17(1,17)					(0,0,0)	27640.50	(0.10)	[65017]
	16(2,14) – 17(1,17)					(0,0,0)	27641.10	(0.10)	[65017]
	18(2,17) – 17(3,14)					(0,1,0)	27986.60	(0.10)	[65017]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	F'	F_1'	F''	F_1''	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{17}O$	18(2,17) - 17(3,14)					(0,1,0)	27987.40	(0.10)	[65017]
	32(7,25) - 33(6,28)					(0,0,0)	28163.20	(0.10)	[64018]
	5(2, 4) - 6(1, 5)					(0,1,0)	28877.60	(0.10)	[65017]
	5(2, 4) - 6(1, 5)					(0,1,0)	28878.70	(0.10)	[65017]
	41(7,34) - 40(8,33)					(0,0,0)	29011.55	(0.10)	[64018]
	8(2, 6) - 9(1, 9)					(0,1,0)	29121.90	(0.10)	[65017]
	12(3, 9) - 13(2,12)					(0,1,0)	29387.30	(0.10)	[65017]
	16(4,13) - 17(3,14)					(0,1,0)	29947.80	(0.10)	[65017]
	22(5,17) - 23(4,20)					(0,1,0)	30184.90	(0.10)	[65017]
	42(7,36) - 41(8,33)					(0,1,0)	30559.20	(0.10)	[65017]
	25(2,24) - 24(3,21)					(0,0,0)	30644.70	(0.10)	[64018]
	25(2,24) - 24(3,21)					(0,0,0)	30645.80	(0.10)	[64018]
	25(2,24) - 24(3,21)					(0,0,0)	30646.50	(0.10)	[64018]
	38(8,30) - 39(7,33)					(0,1,0)	30749.80	(0.10)	[65017]
	21(3,19) - 20(4,16)					(0,0,0)	31066.20	(0.10)	[64018]
	24(2,23) - 23(3,20)					(0,1,0)	32053.80	(0.10)	[65017]
	21(5,17) - 22(4,18)					(0,0,0)	32082.50	(0.10)	[64018]
	27(6,22) - 28(5,23)					(0,1,0)	32128.10	(0.10)	[65017]
	36(6,31) - 35(7,28)					(0,0,0)	32578.80	(0.10)	[64018]
	42(7,35) - 41(8,34)					(0,1,0)	32712.40	(0.10)	[65017]
	37(8,30) - 38(7,31)					(0,0,0)	33055.00	(0.10)	[64018]
	10(3, 8) - 11(2, 9)					(0,0,0)	33400.00	(0.10)	[65017]
	10(3, 8) - 11(2, 9)					(0,0,0)	33400.90	(0.10)	[65017]
	37(8,29) - 38(7,32)					(0,0,0)	33652.20	(0.10)	[64018]
	31(5,26) - 30(6,25)					(0,1,0)	33734.70	(0.10)	[65017]
	18(2,17) - 17(3,14)					(0,0,0)	33955.70	(0.10)	[64018]
	18(2,17) - 17(3,14)					(0,0,0)	33956.50	(0.10)	[64018]
	7(2, 5) - 8(1, 8)		15/2		17/2	(0,0,0)	34241.00	(0.10)	[65017]
	7(2, 5) - 8(1, 8)		17/2		19/2	(0,0,0)	34241.30	(0.10)	[65017]
	7(2, 5) - 8(1, 8)		13/2		15/2	(0,0,0)	34241.30	(0.10)	[65017]
	7(2, 5) - 8(1, 8)		11/2		13/2	(0,0,0)	34241.95	(0.10)	[65017]
	7(2, 5) - 8(1, 8)		19/2		21/2	(0,0,0)	34242.50	(0.10)	[65017]
	7(2, 5) - 8(1, 8)		9/2		11/2	(0,0,0)	34242.90	(0.10)	[65017]
	19(2,18) - 18(3,15)					(0,1,0)	34413.40	(0.10)	[65017]
	14(2,12) - 13(3,11)					(0,1,0)	35251.90	(0.10)	[65017]
	14(2,12) - 13(3,11)					(0,1,0)	35252.70	(0.10)	[65017]
	27(6,21) - 28(5,24)					(0,1,0)	36024.00	(0.10)	[65017]
	25(4,21) - 24(5,20)					(0,0,0)	36033.60	(0.10)	[64018]
	31(5,27) - 30(6,24)					(0,0,0)	36312.40	(0.10)	[64018]
	26(4,23) - 25(5,20)					(0,0,0)	36784.75	(0.10)	[64018]
	36(6,30) - 35(7,29)					(0,0,0)	36843.60	(0.10)	[64018]
	16(4,12) - 17(3,15)					(0,0,0)	36925.40	(0.10)	[64018]
	17(2,15) - 18(1,18)		35/2		37/2	(0,0,0)	37937.90	(0.10)	[65017]
	17(2,15) - 18(1,18)		37/2		39/2	(0,0,0)	37938.20	(0.10)	[65017]
	17(2,15) - 18(1,18)		33/2		35/2	(0,0,0)	37938.70	(0.10)	[65017]
	17(2,15) - 18(1,18)		31/2		33/2	(0,0,0)	37939.20	(0.10)	[65017]
	17(2,15) - 18(1,18)		39/2		41/2	(0,0,0)	37940.50	(0.10)	[65017]
	17(2,15) - 18(1,18)		29/2		31/2	(0,0,0)	37940.85	(0.10)	[65017]
	7(2, 5) - 8(1, 8)					(0,1,0)	38105.30	(0.10)	[65017]
	22(3,20) - 21(4,17)					(0,1,0)	38198.20	(0.10)	[65017]
	11(3, 8) - 12(2,11)					(0,0,0)	38638.10	(0.10)	[64018]
	20(2,19) - 19(3,16)					(0,1,0)	38707.30	(0.10)	[65017]
	21(5,16) - 22(4,19)					(0,0,0)	38943.00	(0.10)	[64018]
	42(9,34) - 43(8,35)					(0,0,0)	39098.30	(0.10)	[65017]
	42(9,33) - 43(8,36)					(0,0,0)	39317.20	(0.10)	[65017]
	26(6,21) - 27(5,22)					(0,0,0)	40260.40	(0.10)	[64018]
	19(2,18) - 18(3,15)					(0,0,0)	40403.30	(0.10)	[64018]
	14(2,12) - 13(3,11)					(0,0,0)	40985.25	(0.10)	[65017]
	14(2,12) - 13(3,11)					(0,0,0)	40986.20	(0.10)	[65017]
	29(3,26) - 30(2,29)					(0,0,0)	41642.70	(0.10)	[65017]
	32(7,26) - 33(6,27)					(0,1,0)	41711.60	(0.10)	[65017]
	21(5,17) - 22(4,18)					(0,1,0)	42671.30	(0.10)	[65017]
	9(1, 8) - 8(2, 7)					(0,1,0)	43027.70	(0.10)	[65017]
	9(1, 8) - 8(2, 7)					(0,1,0)	43028.80	(0.10)	[65017]
	26(6,20) - 27(5,23)					(0,0,0)	43092.00	(0.10)	[64018]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{17}O$	32(5,28) - 31(6,25)					(0,1,0)	43305.50	(0.10)	[65017]
	37(6,31) - 36(7,30)					(0,1,0)	43470.30	(0.10)	[65017]
	20(3,17) - 19(4,16)					(0,1,0)	43509.70	(0.10)	[65017]
	15(4,12) - 16(3,13)					(0,0,0)	44237.60	(0.10)	[65017]
	11(3, 8) - 12(2,11)					(0,1,0)	44522.10	(0.10)	[65017]
	27(4,24) - 26(5,21)					(0,1,0)	44611.0	(0.10)	[65017]
	20(2,19) - 19(3,16)					(0,0,0)	44727.70	(0.10)	[65017]
	20(2,19) - 19(3,16)					(0,0,0)	44728.90	(0.10)	[65017]
	6(2, 4) - 7(1, 7)		13/2		15/2	(0,0,0)	44951.80	(0.10)	[65017]
	6(2, 4) - 7(1, 7)		15/2		17/2	(0,0,0)	44952.05	(0.10)	[65017]
	6(2, 4) - 7(1, 7)		11/2		13/2	(0,0,0)	44952.05	(0.10)	[65017]
	6(2, 4) - 7(1, 7)		9/2		11/2	(0,0,0)	44952.75	(0.10)	[65017]
	6(2, 4) - 7(1, 7)		17/2		19/2	(0,0,0)	44953.20	(0.10)	[65017]
	6(2, 4) - 7(1, 7)		7/2		9/2	(0,0,0)	44953.65	(0.10)	[65017]
	16(4,12) - 17(3,15)					(0,1,0)	45070.50	(0.10)	[65017]
	9(1, 8) - 8(2, 7)					(0,0,0)	46194.30	(0.10)	[65017]
	9(1, 8) - 8(2, 7)					(0,0,0)	46194.90	(0.10)	[65017]
	9(1, 8) - 8(2, 7)					(0,0,0)	46195.30	(0.10)	[65017]
	22(3,20) - 21(4,17)					(0,0,0)	46230.90	(0.10)	[65017]
	22(2,21) - 21(3,18)					(0,0,0)	46436.10	(0.10)	[65017]
	22(2,21) - 21(3,18)					(0,0,0)	46437.40	(0.10)	[65017]
	31(5,26) - 30(6,25)					(0,0,0)	46765.50	(0.10)	[65017]
	21(2,20) - 20(3,17)					(0,0,0)	46775.80	(0.10)	[65017]
	21(2,20) - 20(3,17)					(0,0,0)	46777.00	(0.10)	[65017]
	31(7,25) - 32(6,26)					(0,0,0)	47131.10	(0.10)	[65017]
	5(0, 5) - 4(1, 4)					(0,1,0)	47339.80	(0.10)	[65017]
	5(0, 5) - 4(1, 4)					(0,1,0)	47340.50	(0.10)	[65017]
	31(7,24) - 32(6,27)					(0,0,0)	48238.00	(0.10)	[65017]
	4(2, 3) - 5(1, 4)					(0,0,0)	48264.60	(0.10)	[65017]
	4(2, 3) - 5(1, 4)					(0,0,0)	48265.60	(0.10)	[65017]
	5(0, 5) - 4(1, 4)					(0,0,0)	48467.00	(0.10)	[65017]
	5(0, 5) - 4(1, 4)					(0,0,0)	48467.85	(0.10)	[65017]
	6(2, 4) - 7(1, 7)					(0,1,0)	48729.60	(0.10)	[65017]
	21(5,16) - 22(4,19)					(0,1,0)	49407.80	(0.10)	[65017]
	1(1, 0) - 1(0, 1)					(0,0,0)	51325.55	(0.10)	[65017]
	1(1, 0) - 1(0, 1)					(0,0,0)	51326.35	(0.10)	[65017]
	4(2, 3) - 5(1, 4)					(0,1,0)	51640.60	(0.10)	[65017]
	20(3,17) - 19(4,16)					(0,0,0)	51824.50	(0.10)	[65017]
	20(3,17) - 19(4,16)					(0,0,0)	51825.10	(0.10)	[65017]
	15(4,12) - 16(3,13)					(0,1,0)	52473.50	(0.10)	[65017]
	1(1, 1) - 0(0, 0)					(0,0,0)	68435.93	(0.10)	[65017]
	1(1, 1) - 0(0, 0)					(0,0,0)	68437.65	(0.10)	[65017]
$^{17}O^{32}S^{17}O$	28(6,23) - 29(5,24)					(0,0,0)	8009.1	(0.2)	[68037]
	23(5,18) - 24(4,21)					(0,0,0)	8146.1	(0.2)	[68037]
	20(3,18) - 19(4,15)					(0,0,0)	9331.0	(0.2)	[68037]
	13(2,11) - 12(3,10)					(0,0,0)	9763.0	(0.2)	[68037]
	25(4,22) - 24(5,19)					(0,0,0)	10253.9	(0.2)	[65017]
	16(2,15) - 15(3,12)					(0,0,0)	12142.7	(0.2)	[68037]
	13(3,10) - 14(2,13)					(0,0,0)	12431.7	(0.2)	[68037]
	28(6,22) - 29(5,25)					(0,0,0)	12781.25	(0.20)	[65017]
	30(5,25) - 29(6,24)					(0,0,0)	13088.1	(0.2)	[65017]
	17(4,14) - 18(3,15)					(0,1,0)	13196.4	(0.5)	[68037]
	41(7,35) - 40(8,32)					(0,0,0)	13236.9	(0.2)	[65017]
	1(1, 1) - 2(0, 2)					(0,0,0)	13240.4	(0.2)	[65017]
	1(1, 1) - 2(0, 2)					(0,0,0)	13241.4	(0.2)	[65017]
	1(1, 1) - 2(0, 2)					(0,0,0)	13242.4	(0.2)	[65017]
	1(1, 1) - 2(0, 2)					(0,0,0)	13243.4	(0.2)	[65017]
	10(2, 8) - 11(1,11)					(0,1,0)	13411.5	(0.5)	[68037]
	10(2, 8) - 11(1,11)					(0,0,0)	13412.6	(0.2)	[65017]
	10(2, 8) - 11(1,11)					(0,0,0)	13413.1	(0.2)	[65017]
	10(2, 8) - 11(1,11)					(0,0,0)	13414.3	(0.2)	[65017]
	10(2, 8) - 11(1,11)					(0,0,0)	13415.0	(0.2)	[65017]
	10(2, 8) - 11(1,11)					(0,0,0)	13416.4	(0.2)	[65017]
	11(3, 9) - 12(2,10)					(0,0,0)	14143.3	(0.2)	[65017]
	11(3, 9) - 12(2,10)					(0,0,0)	14143.8	(0.2)	[65017]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{17}O^{32}S^{17}O$	11(3, 9) - 12(2,10)					(0,0,0)	14144.5	(0.2)	[65017]
	18(4,14) - 19(3,17)					(0,1,0)	15013.6	(0.5)	[68037]
	8(1, 7) - 7(2, 6)					(0,1,0)	15188.1	(0.5)	[68037]
	33(7,27) - 34(6,28)					(0,0,0)	17311.0	(0.2)	[65017]
	13(3,10) - 14(2,13)					(0,1,0)	18166.2	(0.5)	[68037]
	23(5,18) - 24(4,21)					(0,1,0)	18277.3	(0.5)	[68037]
	22(5,18) - 23(4,19)					(0,0,0)	18287.1	(0.2)	[68037]
	19(3,16) - 18(4,15)					(0,0,0)	18306.0	(0.2)	[68037]
	26(4,23) - 25(5,20)					(0,1,0)	18315.7	(0.5)	[68037]
	8(1, 7) - 7(2, 6)					(0,0,0)	18324.9	(0.2)	[65017]
	8(1, 7) - 7(2, 6)					(0,0,0)	18325.7	(0.2)	[65017]
	9(2, 7) - 10(1,10)					(0,0,0)	18841.8	(0.2)	[68037]
	9(2, 7) - 10(1,10)					(0,0,0)	18843.3	(0.2)	[68037]
	9(2, 7) - 10(1,10)					(0,0,0)	18845.2	(0.2)	[68037]
	33(7,26) - 34(6,29)					(0,0,0)	19151.95	(0.20)	[68037]
	36(6,31) - 35(7,28)					(0,0,0)	20162.6	(0.2)	[68037]
	28(6,23) - 29(5,24)					(0,1,0)	20524.8	(0.5)	[68037]
	17(2,16) - 16(3,13)					(0,0,0)	22376.3	(0.2)	[65017]
	36(6,30) - 35(7,29)					(0,0,0)	23699.25	(0.20)	[65017]
	17(4,13) - 18(3,16)					(0,0,0)	24117.2	(0.2)	[68037]
	4(0, 4) - 3(1, 3)					(0,1,0)	24787.4	(0.5)	[68037]
	21(3,19) - 20(4,16)					(0,0,0)	25143.1	(0.2)	[65017]
	28(6,22) - 29(5,25)					(0,1,0)	25169.4	(0.5)	[68037]
	18(2,17) - 17(3,14)					(0,1,0)	25185.5	(0.5)	[68037]
	16(2,14) - 17(1,17)					(0,0,0)	25363.7	(0.2)	[65017]
	38(8,31) - 39(7,32)					(0,0,0)	25548.0	(0.2)	[68037]
	31(5,27) - 30(6,24)					(0,0,0)	25780.05	(0.20)	[65017]
	4(0, 4) - 3(1, 3)					(0,0,0)	25899.8	(0.2)	[65017]
	4(0, 4) - 3(1, 3)					(0,0,0)	25900.3	(0.2)	[65017]
	4(0, 4) - 3(1, 3)					(0,0,0)	25900.9	(0.2)	[65017]
	25(4,21) - 24(5,20)					(0,0,0)	25960.2	(0.2)	[68037]
	8(2, 6) - 9(1, 9)					(0,0,0)	26149.4	(0.2)	[65017]
	8(2, 6) - 9(1, 9)					(0,0,0)	26149.8	(0.2)	[65017]
	8(2, 6) - 9(1, 9)					(0,0,0)	26150.1	(0.2)	[65017]
	8(2, 6) - 9(1, 9)					(0,0,0)	26150.6	(0.2)	[65017]
	8(2, 6) - 9(1, 9)					(0,0,0)	26151.4	(0.2)	[65017]
	8(2, 6) - 9(1, 9)					(0,0,0)	26152.7	(0.2)	[65017]
	38(8,30) - 39(7,33)					(0,0,0)	26228.1	(0.2)	[65017]
	12(3, 9) - 13(2,12)					(0,0,0)	26401.95	(0.20)	[65017]
	22(5,17) - 23(4,20)					(0,0,0)	26720.9	(0.2)	[65017]
	5(2, 4) - 6(1, 5)					(0,0,0)	27465.2	(0.2)	[65017]
	5(2, 4) - 6(1, 5)					(0,0,0)	27466.4	(0.2)	[65017]
	16(4,13) - 17(3,14)					(0,0,0)	27715.6	(0.2)	[68037]
	16(4,13) - 17(3,14)					(0,0,0)	27715.8	(0.2)	[68037]
	26(4,23) - 25(5,20)					(0,0,0)	28403.8	(0.2)	[68037]
	22(5,18) - 23(4,19)					(0,1,0)	28572.0	(0.5)	[68037]
	27(6,22) - 28(5,23)					(0,0,0)	28650.6	(0.2)	[65017]
	14(2,12) - 13(3,11)					(0,1,0)	29021.4	(0.5)	[68037]
	37(6,31) - 36(7,30)					(0,1,0)	29943.6	(0.5)	[68037]
	8(2, 6) - 9(1, 9)					(0,1,0)	29985.1	(0.5)	[68037]
	8(2, 6) - 9(1, 9)					(0,1,0)	29987.0	(0.5)	[68037]
	5(2, 4) - 6(1, 5)					(0,1,0)	30702.3	(0.5)	[68037]
	16(2,17) - 17(3,14)					(0,0,0)	30893.9	(0.2)	[68037]
	16(2,17) - 17(3,14)					(0,0,0)	30983.2	(0.2)	[68037]
	19(2,18) - 18(3,15)					(0,1,0)	31956.0	(0.5)	[68037]
	33(7,27) - 34(6,28)					(0,1,0)	31990.4	(0.5)	[68037]
	17(4,13) - 18(3,16)					(0,1,0)	32010.7	(0.5)	[68037]
	27(6,21) - 28(5,24)					(0,0,0)	32067.2	(0.2)	[68037]
	12(3, 9) - 13(2,12)					(0,1,0)	32122.35	(0.50)	[68037]
	22(3,20) - 21(4,17)					(0,1,0)	32350.6	(0.5)	[68037]
	32(5,28) - 31(6,25)					(0,1,0)	32626.3	(0.5)	[68037]
	42(7,36) - 41(8,33)					(0,0,0)	33124.6	(0.2)	[68037]
	43(9,35) - 44(8,36)					(0,0,0)	33283.3	(0.2)	[65017]
	43(9,34) - 44(8,37)					(0,0,0)	33526.6	(0.2)	[65017]
	33(7,26) - 34(6,29)					(0,1,0)	33763.9	(0.5)	[68037]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ – $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{17}O^{32}S^{17}O$	14(2,12) – 13(3,11)					(0,0,0)	34581.0	(0.2)	[65017]
	14(2,12) – 13(3,11)					(0,0,0)	34581.8	(0.2)	[65017]
	31(5,26) – 30(6,25)					(0,0,0)	34720.85	(0.20)	[68037]
	20(3,17) – 19(4,16)					(0,1,0)	34765.5	(0.5)	[68037]
	42(7,35) – 41(8,34)					(0,0,0)	34956.1	(0.2)	[65017]
	7(2, 5) – 8(1, 8)					(0,0,0)	35172.8	(0.2)	[68037]
	7(2, 5) – 8(1, 8)					(0,0,0)	35174.1	(0.2)	[68037]
	16(4,13) – 17(3,14)					(0,1,0)	35713.6	(0.5)	[68037]
	20(2,19) – 19(3,16)					(0,1,0)	36730.3	(0.5)	[68037]
	22(5,17) – 23(4,20)					(0,1,0)	36863.5	(0.5)	[68037]
	10(3, 8) – 11(2, 9)					(0,0,0)	37128.3	(0.2)	[68037]
	32(7,26) – 33(6,27)					(0,0,0)	37382.1	(0.2)	[68037]
	19(2,18) – 18(3,15)					(0,0,0)	37776.9	(0.2)	[65017]
	19(2,18) – 18(3,15)					(0,0,0)	37777.8	(0.2)	[68037]
	32(7,25) – 33(6,28)					(0,0,0)	38687.5	(0.2)	[68037]
	9(1, 8) – 8(2, 7)					(0,1,0)	38951.2	(0.5)	[68037]
	21(5,17) – 22(4,18)					(0,0,0)	39385.2	(0.2)	[68037]
	37(6,32) – 36(7,29)					(0,0,0)	39912.4	(0.2)	[68037]
	22(3,20) – 21(4,17)					(0,0,0)	40158.6	(0.2)	[68037]
	27(6,22) – 28(5,23)					(0,1,0)	41133.4	(0.5)	[68037]
	11(3, 8) – 12(2,11)					(0,0,0)	41267.0	(0.2)	[68037]
	16(4,12) – 17(3,15)					(0,0,0)	41510.8	(0.2)	[65017]
	9(1, 8) – 8(2, 7)					(0,0,0)	42025.8	(0.2)	[68037]
	9(1, 8) – 8(2, 7)					(0,0,0)	42026.7	(0.2)	[68037]
	20(3,17) – 19(4,16)					(0,0,0)	42812.6	(0.2)	[65017]
	23(2,22) – 22(3,19)					(0,0,0)	43732.7	(0.2)	[65017]
	27(6,21) – 28(5,24)					(0,1,0)	44457.7	(0.5)	[68037]
	32(5,28) – 31(6,25)					(0,0,0)	44975.3	(0.2)	[68037]
	5(0, 5) – 4(1, 4)					(0,1,0)	45093.0	(0.5)	[68037]
	5(0, 5) – 4(1, 4)					(0,1,0)	45094.6	(0.5)	[68037]
	5(0, 5) – 4(1, 4)					(0,1,0)	45095.0	(0.5)	[68037]
	21(2,20) – 20(3,17)					(0,0,0)	45245.8	(0.2)	[65017]
	21(2,20) – 20(3,17)					(0,0,0)	45247.2	(0.2)	[65017]
	21(2,20) – 20(3,17)					(0,0,0)	45248.2	(0.2)	[65017]
	37(8,30) – 38(7,31)					(0,0,0)	45321.2	(0.2)	[65017]
	21(5,16) – 22(4,19)					(0,0,0)	45407.9	(0.2)	[68037]
	22(2,21) – 21(3,18)					(0,0,0)	45655.7	(0.2)	[68037]
	22(2,21) – 21(3,18)					(0,0,0)	45657.2	(0.2)	[68037]
	22(2,21) – 21(3,18)					(0,0,0)	45658.4	(0.2)	[68037]
	6(2, 4) – 7(1, 7)					(0,0,0)	45735.25	(0.20)	[65017]
	6(2, 4) – 7(1, 7)					(0,0,0)	45736.2	(0.2)	[65017]
	6(2, 4) – 7(1, 7)					(0,0,0)	45737.9	(0.2)	[65017]
	37(8,29) – 38(7,32)					(0,0,0)	45800.8	(0.2)	[68037]
	5(0, 5) – 4(1, 4)					(0,0,0)	46186.8	(0.2)	[68037]
	5(0, 5) – 4(1, 4)					(0,0,0)	46187.3	(0.2)	[68037]
	5(0, 5) – 4(1, 4)					(0,0,0)	46187.8	(0.2)	[68037]
	27(4,24) – 26(5,21)					(0,0,0)	46214.55	(0.20)	[68037]
	18(2,16) – 19(1,19)					(0,0,0)	46309.0	(0.2)	[68037]
	18(2,16) – 19(1,19)					(0,0,0)	46310.8	(0.2)	[65017]
	23(3,21) – 22(4,18)					(0,1,0)	46447.2	(0.5)	[68037]
	11(3, 8) – 12(2,11)					(0,1,0)	46973.3	(0.5)	[68037]
	26(4,22) – 25(5,21)					(0,0,0)	49324.35	(0.20)	[68037]
	15(4,12) – 16(3,13)					(0,0,0)	49402.8	(0.2)	[68037]
	16(4,12) – 17(3,15)					(0,1,0)	49411.4	(0.5)	[68037]
	4(2, 3) – 5(1, 4)					(0,0,0)	49480.2	(0.2)	[68037]
	4(2, 3) – 5(1, 4)					(0,0,0)	49481.9	(0.2)	[68037]
	21(5,17) – 22(4,18)					(0,1,0)	49638.1	(0.5)	[68037]
	1(1, 0) – 1(0, 1)					(0,0,0)	50656.8	(0.2)	[68037]
	1(1, 0) – 1(0, 1)					(0,0,0)	50657.9	(0.2)	[68037]
	26(6,20) – 27(5,23)					(0,0,0)	51317.2	(0.2)	[65017]
	1(1, 0) – 1(0, 1)					(0,1,0)	51779.25	(0.50)	[68037]
	32(7,26) – 33(6,27)					(0,1,0)	52035.8	(0.5)	[68037]
	2(1, 1) – 2(0, 2)					(0,0,0)	52078.5	(0.2)	[68037]
	43(7,37) – 42(8,34)					(0,0,0)	53108.5	(0.2)	[68037]
	2(1, 1) – 2(0, 2)					(0,1,0)	53216.9	(0.5)	[68037]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{17}O^{32}S^{17}O$	28(4,25) - 27(5,22)					(0,1,0)	53572.4	(0.5)	[68037]
	23(3,21) - 22(4,18)					(0,0,0)	54216.5	(0.2)	[68037]
	3(1, 2) - 3(0, 3)					(0,0,0)	54263.4	(0.2)	[68037]
	3(1, 2) - 3(0, 3)					(0,0,0)	54264.3	(0.2)	[68037]
	3(1, 2) - 3(0, 3)					(0,0,0)	54265.0	(0.2)	[68037]
	3(1, 2) - 3(0, 3)					(0,1,0)	55428.0	(0.5)	[68037]
	32(5,27) - 31(6,25)					(0,0,0)	56980.05	(0.20)	[68037]
	31(7,25) - 32(6,26)					(0,0,0)	57215.1	(0.2)	[68037]
	4(1, 3) - 4(0, 4)					(0,0,0)	57277.1	(0.2)	[68037]
	5(2, 3) - 6(1, 6)					(0,0,0)	57658.25	(0.20)	[68037]
	5(2, 3) - 6(1, 6)					(0,0,0)	57659.2	(0.2)	[68037]
	31(7,24) - 32(6,27)					(0,0,0)	58129.6	(0.2)	[68037]
	15(4,11) - 16(3,14)					(0,0,0)	59214.7	(0.2)	[68037]
$^{16}O^{34}S^{17}O$	18(3,15) - 17(4,14)					(0,1,0)	7893.7	(0.2)	[65017]
	17(4,13) - 18(3,16)					(0,0,0)	7932.9	(0.2)	[65017]
	11(2, 9) - 12(1,12)					(0,0,0)	7950.5	(0.2)	[65017]
	11(2, 9) - 12(1,12)					(0,0,0)	7952.5	(0.2)	[65017]
	16(4,13) - 17(3,14)					(0,0,0)	8018.35	(0.20)	[65017]
	42(9,34) - 43(8,35)					(0,0,0)	8741.0	(0.2)	[65017]
	3(0, 3) - 2(1, 2)					(0,0,0)	8810.8	(0.2)	[65017]
	3(0, 3) - 2(1, 2)					(0,0,0)	8811.6	(0.2)	[65017]
	19(3,17) - 18(4,14)					(0,0,0)	9087.3	(0.2)	[65017]
	15(2,14) - 14(3,11)					(0,0,0)	9887.35	(0.20)	[65017]
	15(2,14) - 14(3,11)					(0,0,0)	9889.4	(0.2)	[65017]
	13(2,11) - 14(1,14)					(0,0,0)	10113.3	(0.2)	[65017]
	10(2, 8) - 11(1,11)					(0,0,0)	10361.0	(0.2)	[65017]
	1(1, 1) - 2(0, 2)					(0,0,0)	11068.05	(0.20)	[65017]
	39(7,33) - 38(8,30)					(0,0,0)	13376.9	(0.2)	[65017]
	24(4,21) - 23(5,18)					(0,0,0)	14458.65	(0.20)	[65017]
	22(5,17) - 23(4,20)					(0,1,0)	14583.2	(0.2)	[65017]
	39(7,32) - 38(8,31)					(0,0,0)	14615.0	(0.2)	[65017]
	14(2,12) - 15(1,15)					(0,0,0)	14731.2	(0.2)	[65017]
	14(2,12) - 15(1,15)					(0,0,0)	14732.5	(0.2)	[65017]
	14(2,12) - 15(1,15)					(0,0,0)	14733.5	(0.2)	[65017]
	9(2, 7) - 10(1,10)		19/2		21/2	(0,0,0)	14991.9	(0.1)	[65017]
	9(2, 7) - 10(1,10)		21/2		23/2	(0,0,0)	14992.2	(0.1)	[65017]
	9(2, 7) - 10(1,10)		17/2		19/2	(0,0,0)	14992.2	(0.1)	[65017]
	9(2, 7) - 10(1,10)		15/2		17/2	(0,0,0)	14992.9	(0.1)	[65017]
	9(2, 7) - 10(1,10)		23/2		25/2	(0,0,0)	14993.6	(0.1)	[65017]
	9(2, 7) - 10(1,10)		13/2		15/2	(0,0,0)	14994.1	(0.1)	[65017]
	34(6,29) - 33(7,26)					(0,0,0)	15110.4	(0.2)	[65017]
	16(2,15) - 15(3,12)					(0,1,0)	15127.6	(0.2)	[65017]
	21(5,17) - 22(4,18)					(0,0,0)	15183.1	(0.2)	[65017]
	17(4,13) - 18(3,16)					(0,1,0)	15810.1	(0.2)	[65017]
	29(5,25) - 28(6,22)					(0,0,0)	15849.8	(0.2)	[65017]
	18(3,15) - 17(4,14)					(0,0,0)	15951.0	(0.2)	[65017]
	18(3,15) - 17(4,14)					(0,0,0)	15951.6	(0.2)	[65017]
	16(4,13) - 17(3,14)					(0,1,0)	16052.5	(0.2)	[65017]
	12(3, 9) - 13(2,12)					(0,0,0)	16277.9	(0.2)	[65017]
	27(6,21) - 28(5,24)					(0,1,0)	16395.0	(0.2)	[65017]
	20(3,18) - 19(4,15)					(0,1,0)	17598.6	(0.2)	[65017]
	34(6,28) - 33(7,27)					(0,0,0)	18168.3	(0.2)	[65017]
	27(3,24) - 28(2,27)					(0,0,0)	18598.9	(0.2)	[65017]
	32(7,25) - 33(6,28)					(0,1,0)	19757.1	(0.2)	[65017]
	13(2,11) - 12(3,10)					(0,1,0)	19881.6	(0.2)	[65017]
	24(4,20) - 23(5,19)					(0,1,0)	20058.7	(0.2)	[65017]
	5(2, 4) - 6(1, 5)		5/2		7/2	(0,0,0)	20102.3	(0.1)	[65017]
	5(2, 4) - 6(1, 5)		7/2		9/2	(0,0,0)	20102.55	(0.10)	[65017]
	5(2, 4) - 6(1, 5)		7/2		9/2	(0,0,0)	20102.95	(0.10)	[65017]
	5(2, 4) - 6(1, 5)		9/2		11/2	(0,0,0)	20103.47	(0.10)	[65017]
	5(2, 4) - 6(1, 5)		13/2		15/2	(0,0,0)	20103.47	(0.10)	[65017]
	5(2, 4) - 6(1, 5)		11/2		13/2	(0,0,0)	20103.67	(0.10)	[65017]
	26(6,21) - 27(5,22)					(0,0,0)	20175.3	(0.2)	[65017]
	16(2,15) - 15(3,12)					(0,0,0)	20869.7	(0.2)	[65017]
	15(2,13) - 16(1,16)		31/2		33/2	(0,0,0)	21667.5	(0.1)	[65017]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ – $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{34}S^{17}O$	15(2,13) – 16(1,16)		33/2		35/2	(0,0,0)	21667.8	(0.1)	[65017]
	15(2,13) – 16(1,16)		29/2		31/2	(0,0,0)	21668.2	(0.1)	[65017]
	15(2,13) – 16(1,16)		27/2		29/2	(0,0,0)	21668.8	(0.1)	[65017]
	15(2,13) – 16(1,16)		35/2		37/2	(0,0,0)	21669.9	(0.1)	[65017]
	15(2,13) – 16(1,16)		25/2		27/2	(0,0,0)	21670.35	(0.10)	[65017]
	8(2, 6) – 9(1, 9)		17/2		19/2	(0,0,0)	21707.55	(0.10)	[65017]
	8(2, 6) – 9(1, 9)		19/2		21/2	(0,0,0)	21707.9	(0.1)	[65017]
	8(2, 6) – 9(1, 9)		15/2		17/2	(0,0,0)	21707.9	(0.1)	[65017]
	8(2, 6) – 9(1, 9)		13/2		15/2	(0,0,0)	21708.6	(0.1)	[65017]
	8(2, 6) – 9(1, 9)		21/2		23/2	(0,0,0)	21709.2	(0.1)	[65017]
	8(2, 6) – 9(1, 9)		11/2		13/2	(0,0,0)	21709.65	(0.10)	[65017]
	12(3, 9) – 13(2,12)					(0,1,0)	21992.0	(0.2)	[65017]
	37(8,30) – 38(7,31)					(0,1,0)	22956.0	(0.2)	[65017]
	25(4,22) – 24(5,19)					(0,1,0)	23007.2	(0.2)	[65017]
	29(5,24) – 28(6,23)					(0,0,0)	23077.3	(0.2)	[65017]
	30(5,26) – 29(6,23)					(0,1,0)	23283.3	(0.2)	[65017]
	5(2, 4) – 6(1, 5)					(0,1,0)	23332.4	(0.2)	[65017]
	5(2, 4) – 6(1, 5)					(0,1,0)	23333.5	(0.2)	[65017]
	21(5,16) – 22(4,19)					(0,0,0)	23553.4	(0.2)	[65017]
	25(2,24) – 24(3,21)					(0,0,0)	23629.1	(0.2)	[65017]
	25(2,24) – 24(3,21)					(0,0,0)	23630.2	(0.2)	[65017]
	25(2,24) – 24(3,21)					(0,0,0)	23631.0	(0.2)	[65017]
	31(7,25) – 32(6,26)					(0,0,0)	23753.8	(0.2)	[65017]
	10(3, 8) – 11(2, 9)					(0,0,0)	23778.4	(0.2)	[65017]
	10(3, 8) – 11(2, 9)					(0,0,0)	23778.9	(0.2)	[65017]
	37(8,29) – 38(7,32)					(0,1,0)	23789.2	(0.2)	[65017]
	26(6,20) – 27(5,23)					(0,0,0)	23849.2	(0.2)	[65017]
	8(1, 7) – 7(2, 6)					(0,1,0)	24177.8	(0.2)	[65017]
	8(1, 7) – 7(2, 6)					(0,1,0)	24178.8	(0.2)	[65017]
	17(2,16) – 16(3,13)					(0,1,0)	24409.8	(0.2)	[65017]
	31(7,24) – 32(6,27)					(0,0,0)	25280.6	(0.2)	[65017]
	20(3,18) – 19(4,15)					(0,0,0)	25426.7	(0.2)	[65017]
	13(2,11) – 12(3,10)					(0,0,0)	25481.1	(0.2)	[65017]
	13(2,11) – 12(3,10)					(0,0,0)	25482.2	(0.2)	[65017]
	21(5,17) – 22(4,18)					(0,1,0)	25488.1	(0.2)	[65017]
	16(4,12) – 17(3,15)					(0,0,0)	25491.6	(0.2)	[65017]
	36(8,29) – 37(7,30)					(0,0,0)	26591.75	(0.20)	[65017]
	36(8,28) – 37(7,31)					(0,0,0)	27202.4	(0.2)	[65017]
	8(1, 7) – 7(2, 6)					(0,0,0)	27303.6	(0.2)	[65017]
	8(1, 7) – 7(2, 6)					(0,0,0)	27304.7	(0.2)	[65017]
	4(0, 4) – 3(1, 3)					(0,1,0)	28138.4	(0.2)	[65017]
	4(0, 4) – 3(1, 3)					(0,0,0)	29252.05	(0.20)	[65017]
	4(0, 4) – 3(1, 3)					(0,0,0)	29252.9	(0.2)	[65017]
	41(9,32) – 42(8,35)					(0,0,0)	29289.8	(0.2)	[65017]
	17(2,16) – 16(3,13)					(0,0,0)	30160.9	(0.2)	[65017]
	17(2,16) – 16(3,13)					(0,0,0)	30161.6	(0.2)	[65017]
	7(2, 5) – 8(1, 8)					(0,0,0)	30336.2	(0.2)	[65017]
	7(2, 5) – 8(1, 8)					(0,0,0)	30337.1	(0.2)	[65017]
	7(2, 5) – 8(1, 8)					(0,0,0)	30337.6	(0.2)	[65017]
	24(4,20) – 23(5,19)					(0,0,0)	30461.0	(0.2)	[65017]
	16(2,14) – 17(1,17)					(0,0,0)	30847.4	(0.2)	[65017]
	16(2,14) – 17(1,17)					(0,0,0)	30848.2	(0.2)	[65017]
	15(4,12) – 16(3,13)					(0,0,0)	30989.5	(0.2)	[65017]
	12(3, 9) – 13(2,12)					(0,0,0)	31057.2	(0.2)	[65017]
	18(2,17) – 17(3,14)					(0,1,0)	31784.7	(0.2)	[65017]
	18(2,17) – 17(3,14)					(0,1,0)	31785.6	(0.2)	[65017]
	26(6,21) – 27(5,22)					(0,1,0)	32683.5	(0.2)	[65017]
	19(3,16) – 18(4,15)					(0,1,0)	32927.0	(0.2)	[65017]
	25(4,22) – 24(5,19)					(0,0,0)	33090.3	(0.2)	[65017]
	24(2,23) – 23(3,20)					(0,0,0)	33096.8	(0.2)	[65017]
	24(2,23) – 23(3,20)					(0,0,0)	33097.7	(0.2)	[65017]
	24(2,23) – 23(3,20)					(0,0,0)	33098.35	(0.20)	[65017]
	21(3,19) – 20(4,16)					(0,1,0)	33132.6	(0.2)	[65017]
	16(4,12) – 17(3,15)					(0,1,0)	33382.2	(0.2)	[65017]
	21(5,16) – 22(4,19)					(0,1,0)	33698.2	(0.2)	[65017]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{34}S^{17}O$	40(7,34) - 39(8,31)					(0,0,0)	33837.1	(0.2)	[65017]
	7(2, 5) - 8(1, 8)					(0,1,0)	34092.8	(0.2)	[65017]
	35(6,30) - 34(7,27)					(0,0,0)	35419.2	(0.2)	[65017]
	40(7,33) - 39(8,32)					(0,0,0)	35571.8	(0.2)	[65017]
	30(5,26) - 29(6,23)					(0,0,0)	35655.2	(0.2)	[65017]
	26(6,20) - 27(5,23)					(0,1,0)	36247.7	(0.2)	[65017]
	11(3, 8) - 12(2,11)					(0,1,0)	36759.8	(0.2)	[65017]
	28(3,25) - 29(2,28)					(0,0,0)	36778.7	(0.2)	[65017]
	20(5,16) - 21(4,17)					(0,0,0)	36891.6	(0.2)	[65017]
	19(2,18) - 18(3,15)					(0,1,0)	37052.8	(0.2)	[65017]
	18(2,17) - 17(3,14)					(0,0,0)	37548.4	(0.2)	[65017]
	18(2,17) - 17(3,14)					(0,0,0)	37549.2	(0.2)	[65017]
	31(7,25) - 32(6,26)					(0,1,0)	38437.2	(0.2)	[65017]
	15(4,12) - 16(3,13)					(0,1,0)	38996.6	(0.2)	[65017]
	35(6,29) - 34(7,28)					(0,0,0)	39668.4	(0.2)	[65017]
	6(2, 4) - 7(1, 7)					(0,0,0)	40683.7	(0.2)	[65017]
	6(2, 4) - 7(1, 7)					(0,0,0)	40684.6	(0.2)	[65017]
	6(2, 4) - 7(1, 7)					(0,0,0)	40684.95	(0.20)	[65017]
	6(2, 4) - 7(1, 7)					(0,0,0)	40685.6	(0.2)	[65017]
	21(3,19) - 20(4,16)					(0,0,0)	40923.5	(0.2)	[65017]
	19(3,16) - 18(4,15)					(0,0,0)	41007.9	(0.2)	[65017]
	25(6,20) - 26(5,21)					(0,0,0)	41106.2	(0.2)	[65017]
	36(6,31) - 35(7,28)					(0,1,0)	41149.6	(0.2)	[65017]
	26(4,23) - 25(5,20)					(0,1,0)	41297.6	(0.2)	[65017]
	17(2,15) - 18(1,18)					(0,0,0)	42172.4	(0.2)	[65017]
	20(5,15) - 21(4,18)					(0,0,0)	42776.5	(0.2)	[65017]
	19(2,18) - 18(3,15)					(0,0,0)	42832.8	(0.2)	[65017]
	19(2,18) - 18(3,15)					(0,0,0)	42833.9	(0.2)	[65017]
	4(2, 3) - 5(1, 4)					(0,0,0)	42883.15	(0.20)	[65017]
	4(2, 3) - 5(1, 4)					(0,0,0)	42884.2	(0.2)	[65017]
	15(4,11) - 16(3,14)					(0,0,0)	43464.35	(0.20)	[65017]
	25(6,19) - 26(5,22)					(0,0,0)	43666.1	(0.2)	[65017]
	30(7,24) - 31(6,25)					(0,0,0)	44276.55	(0.20)	[65017]
	22(2,21) - 21(3,18)					(0,0,0)	44530.2	(0.2)	[65017]
	22(2,21) - 21(3,18)					(0,0,0)	44531.7	(0.2)	[65017]
	30(7,23) - 31(6,26)					(0,0,0)	45334.6	(0.2)	[65017]
	30(5,25) - 29(6,24)					(0,0,0)	45575.0	(0.2)	[65017]
	20(2,19) - 19(3,16)					(0,0,0)	45840.7	(0.2)	[65017]
	20(2,19) - 19(3,16)					(0,0,0)	45841.9	(0.2)	[65017]
	21(2,20) - 20(3,17)					(0,0,0)	46436.1	(0.2)	[65017]
	21(2,20) - 20(3,17)					(0,0,0)	46437.4	(0.2)	[65017]
	10(3, 7) - 11(2,10)					(0,0,0)	46721.4	(0.2)	[65017]
	35(8,28) - 36(7,29)					(0,0,0)	46895.8	(0.2)	[65017]
	9(3, 7) - 10(2, 8)					(0,0,0)	46929.9	(0.2)	[65017]
	9(3, 7) - 10(2, 8)					(0,0,0)	46930.4	(0.2)	[65017]
	1(1, 0) - 1(0, 1)					(0,0,0)	49576.3	(0.2)	[65017]
	1(1, 0) - 1(0, 1)					(0,0,0)	49577.1	(0.2)	[65017]
	5(0, 5) - 4(1, 4)					(0,0,0)	50146.5	(0.2)	[65017]
	5(0, 5) - 4(1, 4)					(0,0,0)	50147.4	(0.2)	[65017]
	26(4,23) - 25(5,20)					(0,0,0)	51341.0	(0.2)	[65017]
	14(2,12) - 13(3,11)					(0,0,0)	51555.4	(0.2)	[65017]
	14(2,12) - 13(3,11)					(0,0,0)	51556.45	(0.20)	[65017]
	9(1, 8) - 8(2, 7)					(0,0,0)	51839.9	(0.2)	[65017]
	9(1, 8) - 8(2, 7)					(0,0,0)	51840.95	(0.20)	[65017]
	5(2, 3) - 6(1, 6)					(0,0,0)	52549.1	(0.2)	[65017]
	5(2, 3) - 6(1, 6)					(0,0,0)	52550.2	(0.2)	[65017]
	1(1, 1) - 0(0, 0)					(0,0,0)	66611.6	(0.2)	[65017]
	1(1, 1) - 0(0, 0)					(0,0,0)	66613.1	(0.2)	[65017]
$^{17}O^{34}S^{17}O$	12(2,10) - 13(1,13)					(0,0,0)	7865.0	(0.2)	[65017]
	12(2,10) - 13(1,13)					(0,0,0)	7867.2	(0.2)	[65017]
	27(6,22) - 28(5,23)					(0,0,0)	8345.0	(0.2)	[65017]
	18(3,15) - 17(4,14)					(0,0,0)	8873.9	(0.2)	[65017]
	22(5,17) - 23(4,20)					(0,0,0)	11378.45	(0.20)	[65017]
	1(1, 1) - 2(0, 2)					(0,0,0)	11528.4	(0.2)	[65017]
	17(4,13) - 18(3,16)					(0,0,0)	12847.9	(0.2)	[68037]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ – $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{17}O^{34}S^{17}O$	14(2,12) – 15(1,15)					(0,0,0)	13652.3	(0.2)	[65017]
	14(2,12) – 15(1,15)					(0,0,0)	13652.9	(0.2)	[65017]
	16(4,13) – 17(3,14)					(0,0,0)	14141.0	(0.2)	[68037]
	32(7,25) – 33(6,28)					(0,0,0)	15655.7	(0.2)	[65017]
	9(2, 7) – 10(1,10)					(0,0,0)	15851.4	(0.2)	[65017]
	9(2, 7) – 10(1,10)					(0,0,0)	15851.9	(0.2)	[65017]
	9(2, 7) – 10(1,10)					(0,0,0)	15852.6	(0.2)	[65017]
	9(2, 7) – 10(1,10)					(0,0,0)	15853.0	(0.2)	[65017]
	9(2, 7) – 10(1,10)					(0,0,0)	15853.8	(0.2)	[65017]
	9(2, 7) – 10(1,10)					(0,0,0)	15854.6	(0.2)	[65017]
	37(8,30) – 38(7,31)					(0,0,0)	18438.6	(0.2)	[65017]
	12(3, 9) – 13(2,12)					(0,0,0)	19103.4	(0.2)	[65017]
	37(8,29) – 38(7,32)					(0,0,0)	19145.0	(0.2)	[65017]
	13(2,11) – 12(3,10)					(0,0,0)	19959.5	(0.2)	[65017]
	40(7,34) – 39(8,31)					(0,0,0)	20346.1	(0.2)	[65017]
	24(4,20) – 23(5,19)					(0,0,0)	21196.7	(0.2)	[65017]
	5(2, 4) – 6(1, 5)					(0,0,0)	22023.3	(0.2)	[65017]
	5(2, 4) – 6(1, 5)					(0,0,0)	22024.5	(0.2)	[65017]
	21(5,17) – 22(4,18)					(0,0,0)	22592.1	(0.2)	[65017]
	8(2, 6) – 9(1, 9)					(0,0,0)	22629.6	(0.2)	[65017]
	8(2, 6) – 9(1, 9)					(0,0,0)	22630.0	(0.2)	[65017]
	8(2, 6) – 9(1, 9)					(0,0,0)	22630.4	(0.2)	[65017]
	8(2, 6) – 9(1, 9)					(0,0,0)	22631.0	(0.2)	[65017]
	8(2, 6) – 9(1, 9)					(0,0,0)	22631.7	(0.2)	[65017]
	8(2, 6) – 9(1, 9)					(0,0,0)	22633.0	(0.2)	[65017]
	35(6,30) – 34(7,27)					(0,0,0)	23637.9	(0.2)	[65017]
	8(1, 7) – 7(2, 6)					(0,0,0)	24904.5	(0.2)	[65017]
	8(1, 7) – 7(2, 6)					(0,0,0)	24904.9	(0.2)	[65017]
	25(4,22) – 24(5,19)					(0,0,0)	25248.3	(0.2)	[65017]
	30(5,26) – 29(6,23)					(0,0,0)	25735.5	(0.2)	[68037]
	17(2,16) – 16(3,13)					(0,0,0)	27208.6	(0.2)	[65017]
	17(2,16) – 16(3,13)					(0,0,0)	27209.5	(0.2)	[65017]
	4(0, 4) – 3(1, 3)					(0,0,0)	27597.2	(0.2)	[65017]
	4(0, 4) – 3(1, 3)					(0,0,0)	27598.2	(0.2)	[65017]
	26(6,21) – 27(5,22)					(0,0,0)	28909.9	(0.2)	[68037]
	21(5,16) – 22(4,19)					(0,0,0)	29969.6	(0.2)	[68037]
	16(4,12) – 17(3,15)					(0,0,0)	30008.25	(0.20)	[65017]
	26(6,20) – 27(5,23)					(0,0,0)	32053.8	(0.2)	[65017]
	19(3,16) – 18(4,15)					(0,0,0)	32909.3	(0.2)	[68037]
	19(3,16) – 18(4,15)					(0,0,0)	32909.7	(0.2)	[68037]
	11(3, 8) – 12(2,11)					(0,0,0)	33620.25	(0.20)	[68037]
	31(7,25) – 32(6,26)					(0,0,0)	33907.35	(0.20)	[65017]
	30(5,25) – 29(6,24)					(0,0,0)	34254.4	(0.2)	[65017]
	31(7,24) – 32(6,27)					(0,0,0)	35175.6	(0.2)	[68037]
	21(3,19) – 20(4,16)					(0,0,0)	35199.5	(0.2)	[65017]
	15(4,12) – 16(3,13)					(0,0,0)	36225.2	(0.2)	[68037]
	36(8,28) – 37(7,31)					(0,0,0)	38724.6	(0.2)	[65017]
	19(2,18) – 18(3,15)					(0,0,0)	40544.3	(0.2)	[65017]
	6(2, 4) – 7(1, 7)					(0,0,0)	41430.5	(0.2)	[65017]
	6(2, 4) – 7(1, 7)					(0,0,0)	41431.4	(0.2)	[65017]
	6(2, 4) – 7(1, 7)					(0,0,0)	41431.9	(0.2)	[65017]
	26(4,23) – 25(5,20)					(0,0,0)	43116.0	(0.2)	[68037]
	20(5,16) – 21(4,17)					(0,0,0)	43476.5	(0.2)	[68037]
	25(4,21) – 24(5,20)					(0,0,0)	44327.6	(0.2)	[68037]
	31(5,27) – 30(6,24)					(0,0,0)	44917.3	(0.2)	[65017]
	14(2,12) – 13(3,11)					(0,0,0)	45102.9	(0.2)	[65017]
	14(2,12) – 13(3,11)					(0,0,0)	45103.6	(0.2)	[65017]
	20(5,15) – 21(4,18)					(0,0,0)	48657.4	(0.2)	[65017]
	10(3, 7) – 11(2,10)					(0,0,0)	48956.5	(0.2)	[65017]
	9(3, 7) – 10(2, 8)					(0,0,0)	49874.3	(0.2)	[65017]
	3(1, 2) – 3(0, 3)					(0,0,0)	52616.7	(0.2)	[68037]
$^{16}O^{33}S^{17}O$	12(2,10) – 13(1,13)					(0,0,0)	8133.9	(0.2)	[68017]
	12(2,10) – 13(1,13)					(0,0,0)	8135.6	(0.2)	[68017]
	11(2, 9) – 12(1,12)					(0,0,0)	8640.1	(0.2)	[68017]
	11(2, 9) – 12(1,12)					(0,0,0)	8641.9	(0.2)	[68017]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{33}S^{17}O$	11(2, 9) - 12(1,12)					(0,0,0)	8643.9	(0.2)	[68017]
	11(2, 9) - 12(1,12)					(0,0,0)	8651.8	(0.2)	[68017]
	11(2, 9) - 12(1,12)					(0,0,0)	8653.3	(0.2)	[68017]
	11(2, 9) - 12(1,12)					(0,0,0)	8655.3	(0.2)	[68017]
	27(6,22) - 28(5,23)					(0,0,0)	8734.75	(0.20)	[68017]
	27(6,22) - 28(5,23)					(0,0,0)	8735.4	(0.2)	[68017]
	18(3,15) - 17(4,14)					(0,0,0)	9054.0	(0.2)	[68017]
	18(3,15) - 17(4,14)					(0,0,0)	9056.6	(0.2)	[68017]
	10(2, 8) - 11(1,11)					(0,0,0)	11417.65	(0.20)	[68017]
	10(2, 8) - 11(1,11)					(0,0,0)	11419.4	(0.2)	[68017]
	10(2, 8) - 11(1,11)					(0,0,0)	11421.5	(0.2)	[68017]
	10(2, 8) - 11(1,11)					(0,0,0)	11428.7	(0.2)	[68017]
	10(2, 8) - 11(1,11)					(0,0,0)	11430.5	(0.2)	[68017]
	22(5,17) - 23(4,20)					(0,0,0)	11832.5	(0.2)	[68017]
	1(1, 1) - 2(0, 2)					(0,0,0)	11888.9	(0.2)	[68017]
	1(1, 1) - 2(0, 2)					(0,0,0)	11894.5	(0.2)	[68017]
	1(1, 1) - 2(0, 2)					(0,0,0)	11901.0	(0.2)	[68017]
	29(5,24) - 28(6,23)					(0,0,0)	12931.2	(0.2)	[68017]
	29(5,24) - 28(6,23)					(0,0,0)	12932.2	(0.2)	[68017]
	27(6,21) - 28(5,24)					(0,0,0)	13312.4	(0.2)	[68017]
	17(4,13) - 18(3,16)					(0,0,0)	13323.0	(0.2)	[68017]
	17(4,13) - 18(6,13)					(0,0,0)	13323.35	(0.20)	[68017]
	14(2,12) - 15(1,15)					(0,0,0)	14096.6	(0.2)	[68017]
	14(2,12) - 15(1,15)					(0,0,0)	14098.1	(0.2)	[68017]
	14(2,12) - 15(1,15)					(0,0,0)	14099.0	(0.2)	[68017]
	14(2,12) - 15(1,15)					(0,0,0)	14101.2	(0.2)	[68017]
	14(2,12) - 15(1,15)					(0,0,0)	14109.9	(0.2)	[68017]
	14(2,12) - 15(1,15)					(0,0,0)	14110.1	(0.2)	[68017]
	14(2,12) - 15(1,15)					(0,0,0)	14111.4	(0.2)	[68017]
	14(2,12) - 15(1,15)					(0,0,0)	14112.5	(0.2)	[68017]
	14(2,12) - 15(1,15)					(0,0,0)	14114.0	(0.2)	[68017]
	32(7,26) - 33(6,27)					(0,0,0)	14425.8	(0.2)	[68017]
	16(4,13) - 17(3,14)					(0,0,0)	14662.4	(0.2)	[68017]
	16(4,13) - 17(3,14)					(0,0,0)	14664.7	(0.2)	[68017]
	32(7,25) - 33(6,28)					(0,0,0)	16284.8	(0.2)	[68017]
	9(2, 7) - 10(1,10)					(0,0,0)	16369.2	(0.2)	[68017]
	9(2, 7) - 10(1,10)					(0,0,0)	16371.0	(0.2)	[68017]
	9(2, 7) - 10(1,10)					(0,0,0)	16379.7	(0.2)	[68017]
	9(2, 7) - 10(1,10)					(0,0,0)	16381.3	(0.2)	[68017]
	9(2, 7) - 10(1,10)					(0,0,0)	16382.9	(0.2)	[68017]
	45(8,37) - 44(9,36)					(0,0,0)	17438.0	(0.2)	[68017]
	16(2,15) - 15(3,12)					(0,0,0)	18274.3	(0.2)	[68017]
	16(2,15) - 15(3,12)					(0,0,0)	18278.3	(0.2)	[68017]
	37(8,30) - 38(7,31)					(0,0,0)	19174.1	(0.2)	[68017]
	37(8,29) - 38(7,32)					(0,0,0)	19900.2	(0.2)	[68017]
	12(3, 9) - 13(2,12)					(0,0,0)	19746.5	(0.2)	[68017]
	12(3, 9) - 13(2,12)					(0,0,0)	19749.0	(0.2)	[68017]
	20(3,18) - 19(4,15)					(0,0,0)	20425.6	(0.2)	[68017]
	20(3,18) - 19(4,15)					(0,0,0)	20426.6	(0.2)	[68017]
	13(2,11) - 12(3,10)					(0,0,0)	20507.0	(0.2)	[68017]
	13(2,11) - 12(3,10)					(0,0,0)	20511.2	(0.2)	[68017]
	15(2,13) - 16(1,16)					(0,0,0)	20548.2	(0.2)	[68017]
	15(2,13) - 16(1,16)					(0,0,0)	20557.3	(0.2)	[68017]
	15(2,13) - 16(1,16)					(0,0,0)	20558.6	(0.2)	[68017]
	15(2,13) - 16(1,16)					(0,0,0)	20559.7	(0.2)	[68017]
	40(7,34) - 39(8,31)					(0,0,0)	20788.4	(0.2)	[68017]
	40(7,34) - 39(8,31)					(0,0,0)	20788.8	(0.2)	[68017]
	24(4,20) - 23(5,19)					(0,0,0)	21730.1	(0.2)	[68017]
	5(2, 4) - 6(1, 5)					(0,0,0)	22732.05	(0.20)	[68017]
	5(2, 4) - 6(1, 5)					(0,0,0)	22732.9	(0.2)	[68017]
	5(2, 4) - 6(1, 5)					(0,0,0)	22733.5	(0.2)	[68017]
	5(2, 4) - 6(1, 5)					(0,0,0)	22733.9	(0.2)	[68017]
	5(2, 4) - 6(1, 5)					(0,0,0)	22734.3	(0.2)	[68017]
	5(2, 4) - 6(1, 5)					(0,0,0)	22738.0	(0.2)	[68017]
	5(2, 4) - 6(1, 5)					(0,0,0)	22738.75	(0.20)	[68017]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ – $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{33}S^{17}O$	5(2, 4) – 6(1, 5)					(0,0,0)	22739.4	(0.2)	[68017]
	5(2, 4) – 6(1, 5)					(0,0,0)	22739.9	(0.2)	[68017]
	5(2, 4) – 6(1, 5)					(0,0,0)	22740.3	(0.2)	[68017]
	8(2, 6) – 9(1, 9)					(0,0,0)	23356.6	(0.2)	[68017]
	8(2, 6) – 9(1, 9)					(0,0,0)	23357.9	(0.2)	[68017]
	8(2, 6) – 9(1, 9)					(0,0,0)	23359.6	(0.2)	[68017]
	8(2, 6) – 9(1, 9)					(0,0,0)	23364.2	(0.2)	[68017]
	8(2, 6) – 9(1, 9)					(0,0,0)	23366.2	(0.2)	[68017]
	8(2, 6) – 9(1, 9)					(0,0,0)	23367.2	(0.2)	[68017]
	8(2, 6) – 9(1, 9)					(0,0,0)	23367.7	(0.2)	[68017]
	8(2, 6) – 9(1, 9)					(0,0,0)	23368.7	(0.2)	[68017]
	8(2, 6) – 9(1, 9)					(0,0,0)	23369.2	(0.2)	[68017]
	21(5,17) – 22(4,18)					(0,0,0)	23395.1	(0.2)	[68017]
	21(5,17) – 22(4,18)					(0,0,0)	23396.4	(0.2)	[68017]
	42(9,34) – 43(8,35)					(0,0,0)	23462.2	(0.2)	[68017]
	42(9,33) – 43(8,36)					(0,0,0)	23737.2	(0.2)	[68017]
	35(6,30) – 34(7,27)					(0,0,0)	24204.3	(0.2)	[68017]
	8(1, 7) – 7(2, 6)					(0,0,0)	24600.3	(0.2)	[68017]
	8(1, 7) – 7(2, 6)					(0,0,0)	24601.35	(0.20)	[68017]
	8(1, 7) – 7(2, 6)					(0,0,0)	24602.5	(0.2)	[68017]
	8(1, 7) – 7(2, 6)					(0,0,0)	24606.25	(0.20)	[68017]
	8(1, 7) – 7(2, 6)					(0,0,0)	24607.2	(0.2)	[68017]
	8(1, 7) – 7(2, 6)					(0,0,0)	24608.4	(0.2)	[68017]
	12(3, 9) – 13(2,12)					(0,1,0)	25550.1	(0.2)	[68037]
	12(3, 9) – 13(2,12)					(0,1,0)	25552.3	(0.2)	[68037]
	25(4,22) – 24(5,19)					(0,0,0)	25916.9	(0.2)	[68017]
	30(5,26) – 29(6,23)					(0,0,0)	26392.0	(0.2)	[68017]
	25(2,24) – 24(3,21)					(0,0,0)	27179.7	(0.2)	[68017]
	17(2,16) – 16(3,13)					(0,0,0)	27990.5	(0.2)	[68017]
	17(2,16) – 16(3,13)					(0,0,0)	27990.95	(0.20)	[68017]
	17(2,16) – 16(3,13)					(0,0,0)	27991.3	(0.2)	[68017]
	17(2,16) – 16(3,13)					(0,0,0)	27991.65	(0.20)	[68017]
	17(2,16) – 16(3,13)					(0,0,0)	27995.1	(0.2)	[68017]
	17(2,16) – 16(3,13)					(0,0,0)	27995.65	(0.20)	[68017]
	17(2,16) – 16(3,13)					(0,0,0)	27996.0	(0.2)	[68017]
	17(2,16) – 16(3,13)					(0,0,0)	27996.4	(0.2)	[68017]
	4(0, 4) – 3(1, 3)					(0,0,0)	28430.4	(0.2)	[68017]
	4(0, 4) – 3(1, 3)					(0,0,0)	28431.0	(0.2)	[68017]
	4(0, 4) – 3(1, 3)					(0,0,0)	28433.0	(0.2)	[68017]
	4(0, 4) – 3(1, 3)					(0,0,0)	28433.5	(0.2)	[68017]
	4(0, 4) – 3(1, 3)					(0,0,0)	28435.9	(0.2)	[68017]
	4(0, 4) – 3(1, 3)					(0,0,0)	28436.6	(0.2)	[68017]
	4(0, 4) – 3(1, 3)					(0,0,0)	28438.6	(0.2)	[68017]
	4(0, 4) – 3(1, 3)					(0,0,0)	28439.1	(0.2)	[68017]
	10(3, 8) – 11(2, 9)					(0,0,0)	28444.35	(0.20)	[68017]
	10(3, 8) – 11(2, 9)					(0,0,0)	28444.9	(0.2)	[68017]
	10(3, 8) – 11(2, 9)					(0,0,0)	28445.5	(0.2)	[68017]
	16(2,14) – 17(1,17)					(0,0,0)	29225.75	(0.20)	[68017]
	16(2,14) – 17(1,17)					(0,0,0)	29227.0	(0.2)	[68017]
	16(2,14) – 17(1,17)					(0,0,0)	29228.2	(0.2)	[68017]
	16(2,14) – 17(1,17)					(0,0,0)	29229.5	(0.2)	[68017]
	26(6,21) – 27(5,22)					(0,0,0)	29926.4	(0.2)	[68017]
	26(6,21) – 27(5,22)					(0,0,0)	29927.3	(0.2)	[68017]
	21(5,16) – 22(4,19)					(0,0,0)	30993.3	(0.2)	[68017]
	16(4,12) – 17(3,15)					(0,0,0)	31010.6	(0.2)	[68017]
	7(2, 5) – 8(1, 8)					(0,0,0)	32208.8	(0.2)	[68017]
	7(2, 5) – 8(1, 8)					(0,0,0)	32209.7	(0.2)	[68017]
	7(2, 5) – 8(1, 8)					(0,0,0)	32210.2	(0.2)	[68017]
	7(2, 5) – 8(1, 8)					(0,0,0)	32210.5	(0.2)	[68017]
	7(2, 5) – 8(1, 8)					(0,0,0)	32210.8	(0.2)	[68017]
	7(2, 5) – 8(1, 8)					(0,0,0)	32211.55	(0.20)	[68017]
	7(2, 5) – 8(1, 8)					(0,0,0)	32211.9	(0.2)	[68017]
	7(2, 5) – 8(1, 8)					(0,0,0)	32212.4	(0.2)	[68017]
	7(2, 5) – 8(1, 8)					(0,0,0)	32217.75	(0.20)	[68017]
	7(2, 5) – 8(1, 8)					(0,0,0)	32218.05	(0.20)	[68017]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{33}S^{17}O$	7(2, 5) - 8(1, 8)					(0,0,0)	32218.7	(0.2)	[68017]
	7(2, 5) - 8(1, 8)					(0,0,0)	32219.25	(0.20)	[68017]
	7(2, 5) - 8(1, 8)					(0,0,0)	32219.65	(0.20)	[68017]
	7(2, 5) - 8(1, 8)					(0,0,0)	32220.4	(0.2)	[68017]
	7(2, 5) - 8(1, 8)					(0,0,0)	32220.75	(0.20)	[68017]
	7(2, 5) - 8(1, 8)					(0,0,0)	32221.35	(0.20)	[68017]
	26(6,20) - 27(5,23)					(0,0,0)	33162.8	(0.2)	[68017]
	19(3,16) - 18(4,15)					(0,0,0)	33824.6	(0.2)	[68017]
	19(3,16) - 18(4,15)					(0,0,0)	33827.6	(0.2)	[68017]
	11(3, 8) - 12(2,11)					(0,0,0)	34710.3	(0.2)	[68017]
	11(3, 8) - 12(2,11)					(0,0,0)	34712.45	(0.20)	[68017]
	31(7,25) - 32(6,26)					(0,0,0)	35094.8	(0.2)	[68017]
	31(7,25) - 32(6,26)					(0,0,0)	35095.4	(0.2)	[68017]
	30(5,25) - 29(6,24)					(0,0,0)	35159.7	(0.2)	[68017]
	30(5,25) - 29(6,24)					(0,0,0)	35161.0	(0.2)	[68017]
	24(2,23) - 23(3,20)					(0,0,0)	35807.4	(0.2)	[68017]
	18(2,17) - 17(3,14)					(0,0,0)	35879.6	(0.2)	[68017]
	18(2,17) - 17(3,14)					(0,0,0)	35885.1	(0.2)	[68017]
	21(3,19) - 20(4,16)					(0,0,0)	36201.35	(0.20)	[68017]
	21(3,19) - 20(4,16)					(0,0,0)	36202.7	(0.2)	[68017]
	31(7,24) - 32(6,27)					(0,0,0)	36400.0	(0.2)	[68017]
	31(7,24) - 32(6,27)					(0,0,0)	36400.7	(0.2)	[68017]
	46(8,39) - 45(9,36)					(0,0,0)	37374.0	(0.2)	[68017]
	15(4,12) - 16(3,13)					(0,0,0)	37423.1	(0.2)	[68017]
	15(4,12) - 16(3,13)					(0,0,0)	37425.0	(0.2)	[68017]
	46(8,38) - 45(9,37)					(0,0,0)	38127.0	(0.2)	[68017]
	36(8,29) - 37(7,30)					(0,0,0)	39567.0	(0.2)	[68017]
	36(8,29) - 37(7,30)					(0,0,0)	39567.4	(0.2)	[68017]
	17(2,15) - 18(1,18)					(0,0,0)	40050.3	(0.2)	[68017]
	17(2,15) - 18(1,18)					(0,0,0)	40051.5	(0.2)	[68017]
	17(2,15) - 18(1,18)					(0,0,0)	40052.7	(0.2)	[68017]
	17(2,15) - 18(1,18)					(0,0,0)	40054.0	(0.2)	[68017]
	17(2,15) - 18(1,18)					(0,0,0)	40064.6	(0.2)	[68017]
	17(2,15) - 18(1,18)					(0,0,0)	40065.5	(0.2)	[68017]
	17(2,15) - 18(1,18)					(0,0,0)	40067.0	(0.2)	[68017]
	17(2,15) - 18(1,18)					(0,0,0)	40068.0	(0.2)	[68017]
	36(8,28) - 37(7,31)					(0,0,0)	40074.2	(0.2)	[68017]
	11(3, 8) - 12(2,11)					(0,1,0)	40503.2	(0.2)	[68037]
	21(2,20) - 20(3,17)					(0,1,0)	40757.4	(0.2)	[68037]
	14(2,12) - 13(3,11)					(0,1,0)	40779.5	(0.2)	[68037]
	14(2,12) - 13(3,11)					(0,1,0)	40783.7	(0.2)	[68037]
	21(5,16) - 22(4,19)					(0,1,0)	41293.9	(0.2)	[68037]
	41(7,35) - 40(8,32)					(0,0,0)	41297.2	(0.2)	[68017]
	41(7,35) - 40(8,32)					(0,0,0)	41297.65	(0.20)	[68017]
	19(2,18) - 18(3,15)					(0,0,0)	41741.3	(0.2)	[68017]
	19(2,18) - 18(3,15)					(0,0,0)	41741.8	(0.2)	[68017]
	19(2,18) - 18(3,15)					(0,0,0)	41742.4	(0.2)	[68017]
	19(2,18) - 18(3,15)					(0,0,0)	41743.0	(0.2)	[68017]
	19(2,18) - 18(3,15)					(0,0,0)	41747.3	(0.2)	[68017]
	19(2,18) - 18(3,15)					(0,0,0)	41748.0	(0.2)	[68017]
	19(2,18) - 18(3,15)					(0,0,0)	41748.5	(0.2)	[68017]
	19(2,18) - 18(3,15)					(0,0,0)	41748.9	(0.2)	[68017]
	6(2, 4) - 7(1, 7)					(0,0,0)	42736.4	(0.2)	[68017]
	6(2, 4) - 7(1, 7)					(0,0,0)	42737.6	(0.2)	[68017]
	6(2, 4) - 7(1, 7)					(0,0,0)	42738.1	(0.2)	[68017]
	6(2, 4) - 7(1, 7)					(0,0,0)	42739.15	(0.20)	[68017]
	6(2, 4) - 7(1, 7)					(0,0,0)	42744.6	(0.2)	[68017]
	6(2, 4) - 7(1, 7)					(0,0,0)	42745.9	(0.2)	[68017]
	6(2, 4) - 7(1, 7)					(0,0,0)	42746.2	(0.2)	[68017]
	6(2, 4) - 7(1, 7)					(0,0,0)	42747.4	(0.2)	[68017]
	41(9,33) - 42(8,34)					(0,0,0)	43686.15	(0.20)	[68017]
	41(9,32) - 42(8,35)					(0,0,0)	43877.3	(0.2)	[68017]
	26(4,23) - 25(5,20)					(0,0,0)	44333.1	(0.2)	[68017]
	36(6,31) - 35(7,28)					(0,0,0)	44546.25	(0.20)	[68017]
	20(5,16) - 21(4,17)					(0,0,0)	44917.9	(0.2)	[68017]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{33}S^{17}O$	20(5,16) - 21(4,17)					(0,0,0)	44919.05	(0.20)	[68017]
	31(5,26) - 30(6,25)					(0,1,0)	45177.2	(0.2)	[68037]
	31(5,26) - 30(6,25)					(0,1,0)	45178.5	(0.2)	[68037]
	20(2,19) - 19(3,16)					(0,0,0)	45400.2	(0.2)	[68017]
	20(2,19) - 19(3,16)					(0,0,0)	45400.8	(0.2)	[68017]
	20(2,19) - 19(3,16)					(0,0,0)	45401.6	(0.2)	[68017]
	20(2,19) - 19(3,16)					(0,0,0)	45402.2	(0.2)	[68017]
	20(2,19) - 19(3,16)					(0,0,0)	45409.4	(0.2)	[68017]
	4(2, 3) - 5(1, 4)					(0,0,0)	45484.1	(0.2)	[68017]
	4(2, 3) - 5(1, 4)					(0,0,0)	45485.1	(0.2)	[68017]
	4(2, 3) - 5(1, 4)					(0,0,0)	45485.95	(0.20)	[68017]
	4(2, 3) - 5(1, 4)					(0,0,0)	45486.9	(0.2)	[68017]
	4(2, 3) - 5(1, 4)					(0,0,0)	45490.5	(0.2)	[68017]
	4(2, 3) - 5(1, 4)					(0,0,0)	45491.4	(0.2)	[68017]
	4(2, 3) - 5(1, 4)					(0,0,0)	45492.3	(0.2)	[68017]
	4(2, 3) - 5(1, 4)					(0,0,0)	45493.1	(0.2)	[68017]
	25(4,21) - 24(5,20)					(0,0,0)	45564.0	(0.2)	[68017]
	25(4,21) - 24(5,20)					(0,0,0)	45565.9	(0.2)	[68017]
	22(2,21) - 21(3,18)					(0,0,0)	45589.5	(0.2)	[68017]
	22(2,21) - 21(3,18)					(0,0,0)	45589.9	(0.2)	[68017]
	26(6,20) - 27(5,23)					(0,1,0)	45746.2	(0.2)	[68037]
	9(1, 8) - 8(2, 7)					(0,1,0)	45991.6	(0.2)	[68037]
	9(1, 8) - 8(2, 7)					(0,1,0)	45992.6	(0.2)	[68037]
	9(1, 8) - 8(2, 7)					(0,1,0)	45993.6	(0.2)	[68037]
	9(1, 8) - 8(2, 7)					(0,1,0)	45997.2	(0.2)	[68037]
	9(1, 8) - 8(2, 7)					(0,1,0)	45998.1	(0.2)	[68037]
	31(5,27) - 30(6,24)					(0,0,0)	46159.9	(0.2)	[68017]
	14(2,12) - 13(3,11)					(0,0,0)	46421.6	(0.2)	[68017]
	14(2,12) - 13(3,11)					(0,0,0)	46426.2	(0.2)	[68017]
	21(2,20) - 20(3,17)					(0,0,0)	46713.7	(0.2)	[68017]
	21(2,20) - 20(3,17)					(0,0,0)	46714.7	(0.2)	[68017]
	21(2,20) - 20(3,17)					(0,0,0)	46715.5	(0.2)	[68017]
	21(2,20) - 20(3,17)					(0,0,0)	46716.0	(0.2)	[68017]
	46(10,36) - 47(9,39)					(0,0,0)	47660.4	(0.2)	[68017]
	15(4,11) - 16(3,14)					(0,0,0)	49079.75	(0.20)	[68017]
	9(1, 8) - 8(2, 7)					(0,0,0)	49103.4	(0.2)	[68017]
	9(1, 8) - 8(2, 7)					(0,0,0)	49104.3	(0.2)	[68017]
	9(1, 8) - 8(2, 7)					(0,0,0)	49109.0	(0.2)	[68017]
	9(1, 8) - 8(2, 7)					(0,0,0)	49109.9	(0.2)	[68017]
	5(0, 5) - 4(1, 4)					(0,0,0)	49331.6	(0.2)	[68017]
	5(0, 5) - 4(1, 4)					(0,0,0)	49333.5	(0.2)	[68017]
	5(0, 5) - 4(1, 4)					(0,0,0)	49336.8	(0.2)	[68017]
	5(0, 5) - 4(1, 4)					(0,0,0)	49338.8	(0.2)	[68017]
	36(6,30) - 35(7,29)					(0,0,0)	49555.6	(0.2)	[68017]
	36(6,30) - 35(7,29)					(0,0,0)	49556.4	(0.2)	[68017]
	20(5,15) - 21(4,18)					(0,0,0)	50254.1	(0.2)	[68017]
	1(1, 0) - 1(0, 1)					(0,0,0)	50418.4	(0.2)	[68017]
	1(1, 0) - 1(0, 1)					(0,0,0)	50424.6	(0.2)	[68017]
	1(1, 0) - 1(0, 1)					(0,0,0)	50429.4	(0.2)	[68017]
	10(3, 7) - 11(2,10)					(0,0,0)	50518.3	(0.2)	[68017]
	10(3, 7) - 11(2,10)					(0,0,0)	50520.0	(0.2)	[68017]
	25(6,20) - 26(5,21)					(0,0,0)	50717.8	(0.2)	[68017]
	25(6,20) - 26(5,21)					(0,0,0)	50718.5	(0.2)	[68017]
	22(3,20) - 21(4,17)					(0,0,0)	51024.0	(0.2)	[68017]
	22(3,20) - 21(4,17)					(0,0,0)	51025.7	(0.2)	[68017]
	9(3, 7) - 10(2, 8)					(0,0,0)	51468.8	(0.2)	[68017]
	9(3, 7) - 10(2, 8)					(0,0,0)	51469.5	(0.2)	[68017]
	2(1, 1) - 2(0, 2)					(0,0,0)	51924.1	(0.2)	[68017]
	2(1, 1) - 2(0, 2)					(0,0,0)	51928.5	(0.2)	[68017]
	2(1, 1) - 2(0, 2)					(0,0,0)	51930.2	(0.2)	[68017]
	2(1, 1) - 2(0, 2)					(0,0,0)	51934.8	(0.2)	[68017]
	25(6,19) - 26(5,22)					(0,0,0)	52970.8	(0.2)	[68017]
	2(1, 1) - 2(0, 2)					(0,1,0)	53079.8	(0.2)	[68037]
	2(1, 1) - 2(0, 2)					(0,1,0)	53086.0	(0.2)	[68037]
	3(1, 2) - 3(0, 3)					(0,0,0)	54243.2	(0.2)	[68017]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{33}S^{17}O$	3(1, 2) - 3(0, 3)					(0,0,0)	54246.3	(0.2)	[68017]
	3(1, 2) - 3(0, 3)					(0,0,0)	54249.5	(0.2)	[68017]
	3(1, 2) - 3(0, 3)					(0,0,0)	54252.6	(0.2)	[68017]
	5(2, 3) - 6(1, 6)					(0,0,0)	54750.3	(0.2)	[68017]
	30(7,24) - 31(6,25)					(0,0,0)	55511.5	(0.2)	[68017]
	30(7,24) - 31(6,25)					(0,0,0)	55512.0	(0.2)	[68017]
	15(4,11) - 16(3,14)					(0,1,0)	57100.4	(0.2)	[68037]
	4(1, 3) - 4(0, 4)					(0,0,0)	57447.1	(0.2)	[68017]
	4(1, 3) - 4(0, 4)					(0,0,0)	57447.95	(0.20)	[68017]
	4(1, 3) - 4(0, 4)					(0,0,0)	57449.4	(0.2)	[68017]
	4(1, 3) - 4(0, 4)					(0,0,0)	57450.2	(0.2)	[68017]
	4(1, 3) - 4(0, 4)					(0,0,0)	57453.7	(0.2)	[68017]
	4(1, 3) - 4(0, 4)					(0,0,0)	57454.7	(0.2)	[68017]
	4(1, 3) - 4(0, 4)					(0,0,0)	57456.1	(0.2)	[68017]
	4(1, 3) - 4(0, 4)					(0,0,0)	57456.9	(0.2)	[68017]
	14(4,11) - 15(3,12)					(0,0,0)	59336.2	(0.2)	[68017]
	14(4,11) - 15(3,12)					(0,0,0)	59337.8	(0.2)	[68017]
$^{17}O^{33}S^{17}O$	40(7,33) - 39(8,32)					(0,0,0)	8475.9	(0.2)	[68017]
	13(3,10) - 14(2,13)					(0,0,0)	8864.7	(0.2)	[68017]
	13(3,10) - 14(2,13)					(0,0,0)	8867.6	(0.2)	[68017]
	11(2, 9) - 12(1,12)					(0,0,0)	9111.8	(0.2)	[68017]
	11(2, 9) - 12(1,12)					(0,0,0)	9113.5	(0.2)	[68017]
	11(2, 9) - 12(1,12)					(0,0,0)	9123.3	(0.2)	[68017]
	22(5,18) - 23(4,19)					(0,0,0)	9443.9	(0.2)	[68017]
	22(5,18) - 23(4,19)					(0,0,0)	9445.4	(0.2)	[68017]
	10(2, 8) - 11(1,11)					(0,0,0)	12160.8	(0.2)	[68017]
	10(2, 8) - 11(1,11)					(0,0,0)	12162.7	(0.2)	[68017]
	10(2, 8) - 11(1,11)					(0,0,0)	12172.3	(0.2)	[68017]
	10(2, 8) - 11(1,11)					(0,0,0)	12173.9	(0.2)	[68017]
	1(1, 1) - 2(0, 2)					(0,0,0)	12350.6	(0.2)	[68017]
	1(1, 1) - 2(0, 2)					(0,0,0)	12355.6	(0.2)	[68017]
	1(1, 1) - 2(0, 2)					(0,0,0)	12362.3	(0.2)	[68017]
	35(6,30) - 34(7,27)					(0,0,0)	12417.6	(0.2)	[68017]
	35(6,30) - 34(7,27)					(0,0,0)	12418.0	(0.2)	[68017]
	38(8,30) - 39(7,33)					(0,0,0)	12429.3	(0.2)	[68017]
	38(8,30) - 39(7,33)					(0,0,0)	12429.7	(0.2)	[68017]
	24(4,20) - 23(5,19)					(0,0,0)	12558.8	(0.2)	[68017]
	24(4,20) - 23(5,19)					(0,0,0)	12560.6	(0.2)	[68017]
	20(3,18) - 19(4,15)					(0,0,0)	14816.5	(0.2)	[68017]
	13(2,11) - 12(3,10)					(0,0,0)	15007.3	(0.2)	[68017]
	13(2,11) - 12(3,10)					(0,0,0)	15011.6	(0.2)	[68017]
	16(2,15) - 15(3,12)					(0,0,0)	15096.5	(0.2)	[68017]
	16(2,15) - 15(3,12)					(0,0,0)	15100.1	(0.2)	[68017]
	35(6,29) - 34(7,28)					(0,0,0)	15444.8	(0.2)	[68017]
	35(6,29) - 34(7,28)					(0,0,0)	15445.4	(0.2)	[68017]
	30(5,26) - 29(6,23)					(0,0,0)	16440.3	(0.2)	[68017]
	9(2, 7) - 10(1,10)					(0,0,0)	17273.25	(0.20)	[68017]
	9(2, 7) - 10(1,10)					(0,0,0)	17274.7	(0.2)	[68017]
	9(2, 7) - 10(1,10)					(0,0,0)	17283.05	(0.20)	[68017]
	25(4,22) - 24(5,19)					(0,0,0)	18014.9	(0.2)	[68017]
	27(6,22) - 28(5,23)					(0,0,0)	18208.8	(0.2)	[68017]
	17(4,13) - 18(3,16)					(0,0,0)	18282.8	(0.2)	[68017]
	22(5,17) - 23(4,20)					(0,0,0)	18792.9	(0.2)	[68017]
	16(4,13) - 17(3,14)					(0,0,0)	20738.0	(0.2)	[68017]
	16(4,13) - 17(3,14)					(0,0,0)	20740.2	(0.2)	[68017]
	8(1, 7) - 7(2, 6)					(0,0,0)	21199.5	(0.2)	[68017]
	8(1, 7) - 7(2, 6)					(0,0,0)	21200.4	(0.2)	[68017]
	8(1, 7) - 7(2, 6)					(0,0,0)	21201.3	(0.2)	[68017]
	8(1, 7) - 7(2, 6)					(0,0,0)	21205.2	(0.2)	[68017]
	8(1, 7) - 7(2, 6)					(0,0,0)	21206.0	(0.2)	[68017]
	8(1, 7) - 7(2, 6)					(0,0,0)	21207.2	(0.2)	[68017]
	46(8,39) - 45(9,36)					(0,0,0)	21614.5	(0.2)	[68017]
	27(6,21) - 28(5,24)					(0,0,0)	22119.9	(0.2)	[68017]
	27(6,21) - 28(5,24)					(0,0,0)	22120.35	(0.20)	[68017]
	12(3, 9) - 13(2,12)					(0,0,0)	22615.0	(0.2)	[68017]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{17}O^{33}S^{17}O$	12(3, 9) - 13(2,12)					(0,0,0)	22617.5	(0.2)	[68017]
	30(5,25) - 29(6,24)					(0,0,0)	23949.4	(0.2)	[68017]
	30(5,25) - 29(6,24)					(0,0,0)	23950.5	(0.2)	[68017]
	8(2, 6) - 9(1, 9)					(0,0,0)	24311.7	(0.2)	[68017]
	8(2, 6) - 9(1, 9)					(0,0,0)	24313.2	(0.2)	[68017]
	8(2, 6) - 9(1, 9)					(0,0,0)	24314.9	(0.2)	[68017]
	8(2, 6) - 9(1, 9)					(0,0,0)	24321.2	(0.2)	[68017]
	8(2, 6) - 9(1, 9)					(0,0,0)	24322.8	(0.2)	[68017]
	8(2, 6) - 9(1, 9)					(0,0,0)	24324.4	(0.2)	[68017]
	5(2, 4) - 6(1, 5)					(0,0,0)	24654.2	(0.2)	[68017]
	5(2, 4) - 6(1, 5)					(0,0,0)	24655.4	(0.2)	[68017]
	5(2, 4) - 6(1, 5)					(0,0,0)	24656.7	(0.2)	[68017]
	5(2, 4) - 6(1, 5)					(0,0,0)	24660.2	(0.2)	[68017]
	5(2, 4) - 6(1, 5)					(0,0,0)	24661.5	(0.2)	[68017]
	5(2, 4) - 6(1, 5)					(0,0,0)	24662.7	(0.2)	[68017]
	17(2,16) - 16(3,13)					(0,0,0)	24924.0	(0.2)	[68017]
	17(2,16) - 16(3,13)					(0,0,0)	24928.6	(0.2)	[68017]
	32(7,26) - 33(7,27)					(0,0,0)	25268.3	(0.2)	[68017]
	19(3,16) - 18(4,15)					(0,0,0)	25798.1	(0.2)	[68017]
	19(3,16) - 18(4,15)					(0,0,0)	25800.95	(0.2)	[68017]
	4(0, 4) - 3(1, 3)					(0,0,0)	26772.8	(0.2)	[68017]
	4(0, 4) - 3(1, 3)					(0,0,0)	26773.5	(0.2)	[68017]
	4(0, 4) - 3(1, 3)					(0,0,0)	26778.4	(0.2)	[68017]
	4(0, 4) - 3(1, 3)					(0,0,0)	26778.8	(0.2)	[68017]
	4(0, 4) - 3(1, 3)					(0,0,0)	26779.2	(0.2)	[68017]
	4(0, 4) - 3(1, 3)					(0,0,0)	26780.95	(0.20)	[68017]
	4(0, 4) - 3(1, 3)					(0,0,0)	26781.7	(0.2)	[68017]
	32(7,25) - 33(6,28)					(0,0,0)	26811.4	(0.2)	[68017]
	41(7,35) - 40(8,32)					(0,0,0)	27159.2	(0.2)	[68017]
	41(7,34) - 40(8,33)					(0,0,0)	28776.8	(0.2)	[68017]
	41(7,34) - 40(8,33)					(0,0,0)	28777.4	(0.2)	[68017]
	21(3,19) - 20(4,16)					(0,0,0)	30377.7	(0.2)	[68017]
	21(3,19) - 20(4,16)					(0,0,0)	30378.9	(0.2)	[68017]
	21(5,17) - 22(4,18)					(0,0,0)	30750.6	(0.2)	[68017]
	21(5,17) - 22(4,18)					(0,0,0)	30751.8	(0.2)	[68017]
	37(8,30) - 38(7,31)					(0,0,0)	31477.1	(0.2)	[68017]
	37(8,29) - 38(7,32)					(0,0,0)	32062.0	(0.2)	[68017]
	36(6,31) - 35(7,28)					(0,0,0)	32138.4	(0.2)	[68017]
	36(6,31) - 35(7,28)					(0,0,0)	32138.9	(0.2)	[68017]
	10(3, 8) - 11(2, 9)					(0,0,0)	32189.1	(0.2)	[68017]
	10(3, 8) - 11(2, 9)					(0,0,0)	32191.55	(0.20)	[68017]
	10(3, 8) - 11(2, 9)					(0,0,0)	32192.1	(0.2)	[68017]
	10(3, 8) - 11(2, 9)					(0,0,0)	32192.6	(0.2)	[68017]
	18(2,17) - 17(3,14)					(0,0,0)	33051.1	(0.2)	[68017]
	18(2,17) - 17(3,14)					(0,0,0)	33056.5	(0.2)	[68017]
	7(2, 5) - 8(1, 8)					(0,0,0)	33116.15	(0.20)	[68017]
	7(2, 5) - 8(1, 8)					(0,0,0)	33117.9	(0.2)	[68017]
	25(4,21) - 24(5,20)					(0,0,0)	35372.7	(0.2)	[68017]
	25(4,21) - 24(5,20)					(0,0,0)	35373.4	(0.2)	[68017]
	16(4,12) - 17(3,15)					(0,0,0)	35561.6	(0.2)	[68017]
	31(5,27) - 30(6,24)					(0,0,0)	35669.2	(0.2)	[68017]
	26(4,23) - 25(5,20)					(0,0,0)	36029.1	(0.2)	[68017]
	36(6,30) - 35(7,29)					(0,0,0)	36306.0	(0.2)	[68017]
	36(6,30) - 35(7,29)					(0,0,0)	36307.0	(0.2)	[68017]
	42(9,34) - 43(8,35)					(0,0,0)	37272.7	(0.2)	[68017]
	11(3, 8) - 12(2,11)					(0,0,0)	37305.8	(0.2)	[68017]
	11(3, 8) - 12(2,11)					(0,0,0)	37308.8	(0.2)	[68017]
	21(5,16) - 22(4,19)					(0,0,0)	37434.4	(0.2)	[68017]
	42(9,33) - 43(8,36)					(0,0,0)	37487.5	(0.2)	[68017]
	26(6,21) - 27(5,22)					(0,0,0)	38615.6	(0.2)	[68017]
	26(6,21) - 27(5,22)					(0,0,0)	38616.5	(0.2)	[68017]
	19(2,18) - 18(3,15)					(0,0,0)	39287.5	(0.2)	[68017]
	19(2,18) - 18(3,15)					(0,0,0)	39294.0	(0.2)	[68017]
	14(2,12) - 13(3,11)					(0,0,0)	39992.4	(0.2)	[68017]
	14(2,12) - 13(3,11)					(0,0,0)	39996.8	(0.2)	[68017]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{17}O^{33}S^{17}O$	26(6,20) - 27(5,23)					(0,0,0)	41378.2	(0.2)	[68017]
	26(6,20) - 27(5,23)					(0,0,0)	41378.7	(0.2)	[68017]
	23(2,22) - 22(3,19)					(0,0,0)	42316.9	(0.2)	[68017]
	15(4,12) - 16(3,13)					(0,0,0)	42623.8	(0.2)	[68017]
	15(4,12) - 16(3,13)					(0,0,0)	42625.6	(0.2)	[68017]
	6(2, 4) - 7(1, 7)					(0,0,0)	43500.8	(0.2)	[68017]
	6(2, 4) - 7(1, 7)					(0,0,0)	43501.3	(0.2)	[68017]
	6(2, 4) - 7(1, 7)					(0,0,0)	43509.45	(0.20)	[68017]
	6(2, 4) - 7(1, 7)					(0,0,0)	43509.9	(0.2)	[68017]
	9(1, 8) - 8(2, 7)					(0,0,0)	44942.8	(0.2)	[68017]
	9(1, 8) - 8(2, 7)					(0,0,0)	44943.7	(0.2)	[68017]
	9(1, 8) - 8(2, 7)					(0,0,0)	44944.6	(0.2)	[68017]
	22(3,20) - 21(4,17)					(0,0,0)	45078.8	(0.2)	[68017]
	22(3,20) - 21(4,17)					(0,0,0)	45080.3	(0.2)	[68017]
	31(7,25) - 32(6,26)					(0,0,0)	45212.5	(0.2)	[68017]
	31(7,25) - 32(6,26)					(0,0,0)	45213.1	(0.2)	[68017]
	31(5,26) - 30(6,25)					(0,0,0)	45866.4	(0.2)	[68017]
	31(5,26) - 30(6,25)					(0,0,0)	45867.8	(0.2)	[68017]
	31(7,24) - 32(6,27)					(0,0,0)	46294.2	(0.2)	[68017]
	31(7,24) - 32(6,27)					(0,0,0)	46294.7	(0.2)	[68017]
	5(0, 5) - 4(1, 4)					(0,0,0)	47056.7	(0.2)	[68017]
	5(0, 5) - 4(1, 4)					(0,0,0)	47058.5	(0.2)	[68017]
	5(0, 5) - 4(1, 4)					(0,0,0)	47061.2	(0.2)	[68017]
	5(0, 5) - 4(1, 4)					(0,0,0)	47061.8	(0.2)	[68017]
	5(0, 5) - 4(1, 4)					(0,0,0)	47063.0	(0.2)	[68017]
	42(7,35) - 41(8,34)					(0,0,0)	49324.35	(0.20)	[68017]
	1(1, 0) - 1(0, 1)					(0,0,0)	49749.3	(0.2)	[68017]
	1(1, 0) - 1(0, 1)					(0,0,0)	49755.7	(0.2)	[68017]
	1(1, 0) - 1(0, 1)					(0,0,0)	49760.8	(0.2)	[68017]
	36(8,29) - 37(7,30)					(0,0,0)	51177.6	(0.2)	[68017]
	2(1, 1) - 2(0, 2)					(0,0,0)	51190.9	(0.2)	[68017]
	2(1, 1) - 2(0, 2)					(0,0,0)	51195.5	(0.2)	[68017]
	2(1, 1) - 2(0, 2)					(0,0,0)	51197.3	(0.2)	[68017]
	2(1, 1) - 2(0, 2)					(0,0,0)	51201.8	(0.2)	[68017]
	21(4,17) - 20(5,16)					(0,0,0)	51465.2	(0.2)	[68017]
	21(4,17) - 20(5,16)					(0,0,0)	51466.3	(0.2)	[68017]
	36(8,28) - 37(7,31)					(0,0,0)	51585.5	(0.2)	[68017]
	37(6,32) - 36(7,29)					(0,0,0)	51904.0	(0.2)	[68017]
	10(3, 7) - 11(2,10)					(0,0,0)	52778.2	(0.2)	[68017]
	10(3, 7) - 11(2,10)					(0,0,0)	52779.8	(0.2)	[68017]
	15(4,11) - 16(3,14)					(0,0,0)	53180.0	(0.2)	[68017]
	3(1, 2) - 3(0, 3)					(0,0,0)	53409.1	(0.2)	[68017]
	3(1, 2) - 3(0, 3)					(0,0,0)	53412.8	(0.2)	[68017]
	3(1, 2) - 3(0, 3)					(0,0,0)	53415.9	(0.2)	[68017]
	27(4,24) - 26(5,21)					(0,0,0)	53657.4	(0.2)	[68017]
	9(3, 7) - 10(2, 8)					(0,0,0)	54398.1	(0.2)	[68017]
	32(5,28) - 31(6,25)					(0,0,0)	54800.0	(0.2)	[68017]
	5(2, 3) - 6(1, 6)					(0,0,0)	55285.1	(0.2)	[68017]
	5(2, 3) - 6(1, 6)					(0,0,0)	55286.0	(0.2)	[68017]
	5(2, 3) - 6(1, 6)					(0,0,0)	55287.0	(0.2)	[68017]
	5(2, 3) - 6(1, 6)					(0,0,0)	55287.9	(0.2)	[68017]
	5(2, 3) - 6(1, 6)					(0,0,0)	55292.6	(0.2)	[68017]
	5(2, 3) - 6(1, 6)					(0,0,0)	55293.7	(0.2)	[68017]
	5(2, 3) - 6(1, 6)					(0,0,0)	55294.7	(0.2)	[68017]
	20(5,15) - 21(4,18)					(0,0,0)	56153.4	(0.2)	[68017]
	20(5,15) - 21(4,18)					(0,0,0)	56154.7	(0.2)	[68017]
	4(1, 3) - 4(0, 4)					(0,0,0)	56470.5	(0.2)	[68017]
	4(1, 3) - 4(0, 4)					(0,0,0)	56473.6	(0.2)	[68017]
	4(1, 3) - 4(0, 4)					(0,0,0)	56476.9	(0.2)	[68017]
	4(1, 3) - 4(0, 4)					(0,0,0)	56478.0	(0.2)	[68017]
	4(1, 3) - 4(0, 4)					(0,0,0)	56480.5	(0.2)	[68017]
	37(6,31) - 36(7,30)					(0,0,0)	57579.6	(0.2)	[68017]
	37(6,31) - 36(7,30)					(0,0,0)	57580.2	(0.2)	[68017]
	26(6,20) - 25(5,21)					(0,0,0)	58665.4	(0.2)	[68017]
	26(6,20) - 25(5,21)					(0,0,0)	58666.1	(0.2)	[68017]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ – $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{17}O^{33}S^{17}O$	23(3,21) – 22(4,18)					(0,0,0)	58747.8	(0.2)	[68017]
	23(3,21) – 22(4,18)					(0,0,0)	58749.7	(0.2)	[68017]
$^{17}O^{32}S^{18}O$	36(6,31) – 35(7,28)					(0,0,0)	8312.4	(0.2)	[65017]
	34(7,28) – 35(6,29)					(0,0,0)	8674.9	(0.2)	[65017]
	16(2,15) – 15(3,12)					(0,0,0)	8942.90	(0.20)	[65017]
	12(2,10) – 13(1,13)					(0,0,0)	8955.3	(0.2)	[65017]
	12(2,10) – 13(1,13)					(0,0,0)	8956.45	(0.20)	[65017]
	12(2,10) – 13(1,13)					(0,0,0)	8957.4	(0.2)	[65017]
	13(2,11) – 14(1,14)					(0,0,0)	9399.2	(0.2)	[65017]
	19(3,16) – 18(4,15)					(0,0,0)	10794.0	(0.2)	[65017]
	34(7,27) – 35(6,30)					(0,0,0)	10803.2	(0.2)	[65017]
	36(6,30) – 35(7,29)					(0,0,0)	11244.3	(0.2)	[65017]
	17(4,14) – 18(3,15)					(0,0,0)	11780.1	(0.2)	[65017]
	14(2,12) – 15(1,15)					(0,0,0)	11955.75	(0.20)	[65017]
	18(4,14) – 19(3,17)					(0,0,0)	12334.3	(0.2)	[65017]
	10(2, 8) – 11(1,11)					(0,0,0)	14247.5	(0.2)	[65017]
	10(2, 8) – 11(1,11)					(0,0,0)	14248.5	(0.2)	[65017]
	10(2, 8) – 11(1,11)					(0,0,0)	14249.4	(0.2)	[65017]
	8(1, 7) – 7(2, 6)					(0,0,0)	15093.9	(0.2)	[65017]
	8(1, 7) – 7(2, 6)					(0,0,0)	15095.0	(0.2)	[65017]
	23(5,18) – 24(4,21)					(0,0,0)	15358.5	(0.2)	[65017]
	13(3,10) – 14(2,13)					(0,0,0)	15485.80	(0.20)	[65017]
	31(5,27) – 30(6,24)					(0,0,0)	15708.2	(0.2)	[65017]
	25(4,21) – 24(5,20)					(0,0,0)	16465.6	(0.2)	[65017]
	15(2,13) – 16(1,16)					(0,0,0)	16612.8	(0.2)	[65017]
	15(2,13) – 16(1,16)					(0,0,0)	16613.5	(0.2)	[65017]
	15(2,13) – 16(1,16)					(0,0,0)	16614.1	(0.2)	[65017]
	15(2,13) – 16(1,16)					(0,0,0)	16615.2	(0.2)	[65017]
	28(6,23) – 29(5,24)					(0,0,0)	17732.7	(0.2)	[65017]
	11(3, 9) – 12(2,10)					(0,0,0)	18522.05	(0.20)	[65017]
	11(3, 9) – 12(2,10)					(0,0,0)	18522.7	(0.2)	[65017]
	42(7,36) – 41(8,33)					(0,0,0)	19045.2	(0.2)	[65017]
	17(2,16) – 16(3,13)					(0,0,0)	19251.8	(0.2)	[65017]
	39(8,31) – 40(7,34)					(0,0,0)	19410.15	(0.20)	[65017]
	21(3,19) – 20(4,16)					(0,0,0)	19422.5	(0.2)	[65017]
	9(2, 7) – 10(1,10)		19/2		21/2	(0,0,0)	19814.8	(0.2)	[65017]
	9(2, 7) – 10(1,10)		21/2		23/2	(0,0,0)	19815.25	(0.20)	[65017]
	9(2, 7) – 10(1,10)		17/2		19/2	(0,0,0)	19815.25	(0.20)	[65017]
	9(2, 7) – 10(1,10)		15/2		17/2	(0,0,0)	19815.85	(0.20)	[65017]
	9(2, 7) – 10(1,10)		23/2		25/2	(0,0,0)	19816.5	(0.2)	[65017]
	9(2, 7) – 10(1,10)		13/2		15/2	(0,0,0)	19816.95	(0.20)	[65017]
	26(4,23) – 25(5,20)					(0,0,0)	20359.6	(0.2)	[65017]
	42(7,35) – 41(8,34)					(0,0,0)	20521.7	(0.2)	[65017]
	13(3,10) – 14(2,13)					(0,1,0)	21063.5	(0.2)	[68037]
	28(6,22) – 29(5,25)					(0,0,0)	21809.3	(0.2)	[65017]
	16(2,14) – 17(1,17)					(0,0,0)	23340.0	(0.2)	[65017]
	16(2,14) – 17(1,17)					(0,0,0)	23342.4	(0.2)	[65017]
	31(5,26) – 30(6,25)					(0,0,0)	23364.2	(0.2)	[65017]
	11(3, 9) – 12(2,10)					(0,1,0)	23988.6	(0.2)	[68037]
	34(7,27) – 35(6,30)					(0,1,0)	25010.0	(0.2)	[68037]
	23(5,18) – 24(4,21)					(0,1,0)	25213.0	(0.2)	[68037]
	29(3,26) – 30(2,29)					(0,0,0)	25717.5	(0.2)	[65017]
	22(5,18) – 23(4,19)					(0,0,0)	26045.7	(0.2)	[65017]
	20(3,17) – 19(4,16)					(0,1,0)	26519.6	(0.2)	[68037]
	26(2,25) – 25(3,22)					(0,0,0)	26675.2	(0.2)	[65017]
	22(3,20) – 21(4,17)					(0,1,0)	26682.3	(0.2)	[68037]
	8(2, 6) – 9(1, 9)					(0,0,0)	27162.1	(0.2)	[65017]
	8(2, 6) – 9(1, 9)					(0,0,0)	27163.1	(0.2)	[65017]
	8(2, 6) – 9(1, 9)					(0,0,0)	27163.6	(0.2)	[65017]
	37(6,32) – 36(7,29)					(0,0,0)	27490.8	(0.2)	[65017]
	27(4,24) – 26(5,21)					(0,1,0)	28031.9	(0.2)	[68037]
	18(2,17) – 17(3,14)					(0,0,0)	28048.3	(0.2)	[65017]
	18(2,17) – 17(3,14)					(0,0,0)	28049.0	(0.2)	[65017]
	33(7,27) – 34(6,28)					(0,0,0)	28316.5	(0.2)	[65017]
	14(2,12) – 13(3,11)					(0,0,0)	28525.75	(0.20)	[65017]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ – $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{17}O^{32}S^{18}O$	14(2,12) – 13(3,11)					(0,0,0)	28526.60	(0.20)	[65017]
	26(4,22) – 25(5,21)					(0,1,0)	28758.6	(0.2)	[68037]
	17(4,13) – 18(3,16)					(0,0,0)	28973.4	(0.2)	[65017]
	12(3, 9) – 13(2,12)					(0,0,0)	29260.15	(0.20)	[65017]
	12(3, 9) – 13(2,12)					(0,0,0)	29260.55	(0.20)	[65017]
	5(2, 4) – 6(1, 5)		5/2		7/2	(0,0,0)	29339.4	(0.2)	[65017]
	5(2, 4) – 6(1, 5)		15/2		17/2	(0,0,0)	29339.65	(0.20)	[65017]
	5(2, 4) – 6(1, 5)		7/2		9/2	(0,0,0)	29340.05	(0.20)	[65017]
	5(2, 4) – 6(1, 5)		9/2		11/2	(0,0,0)	29340.55	(0.20)	[65017]
	5(2, 4) – 6(1, 5)		13/2		15/2	(0,0,0)	29340.55	(0.20)	[65017]
	5(2, 4) – 6(1, 5)		11/2		13/2	(0,0,0)	29340.8	(0.2)	[65017]
	19(2,18) – 18(3,15)					(0,1,0)	29481.7	(0.2)	[68037]
	19(2,18) – 18(3,15)					(0,1,0)	29482.5	(0.2)	[68037]
	33(7,26) – 34(6,29)					(0,0,0)	29841.9	(0.2)	[65017]
	28(6,23) – 29(5,24)					(0,1,0)	29882.0	(0.2)	[68037]
	8(2, 6) – 9(1, 9)					(0,1,0)	30885.2	(0.2)	[68037]
	37(6,31) – 36(7,30)					(0,0,0)	31498.4	(0.2)	[65017]
	17(2,15) – 18(1,18)		35/2		37/2	(0,0,0)	32072.2	(0.2)	[65017]
	17(2,15) – 18(1,18)		33/2		35/2	(0,0,0)	32072.9	(0.2)	[65017]
	17(2,15) – 18(1,18)		31/2		33/2	(0,0,0)	32073.4	(0.2)	[65017]
	17(2,15) – 18(1,18)		39/2		41/2	(0,0,0)	32074.6	(0.2)	[65017]
	17(2,15) – 18(1,18)		29/2		31/2	(0,0,0)	32075.1	(0.2)	[65017]
	22(5,17) – 23(4,20)					(0,0,0)	33467.8	(0.2)	[65017]
	16(4,13) – 17(3,14)					(0,0,0)	33470.8	(0.2)	[65017]
	28(6,22) – 29(5,25)					(0,1,0)	33854.3	(0.2)	[68037]
	22(3,20) – 21(4,17)					(0,0,0)	34290.0	(0.2)	[65017]
	20(3,17) – 19(4,16)					(0,0,0)	34329.9	(0.2)	[65017]
	20(3,17) – 19(4,16)					(0,0,0)	34330.45	(0.20)	[65017]
	32(5,28) – 31(6,25)					(0,0,0)	34414.35	(0.20)	[65017]
	12(3, 9) – 13(2,12)					(0,1,0)	34823.1	(0.2)	[68037]
	9(1, 8) – 8(2, 7)					(0,1,0)	35098.2	(0.2)	[68037]
	19(2,18) – 18(3,15)					(0,0,0)	35152.1	(0.2)	[65017]
	19(2,18) – 18(3,15)					(0,0,0)	35153.1	(0.2)	[65017]
	7(2, 5) – 8(1, 8)					(0,0,0)	36133.0	(0.2)	[65017]
	7(2, 5) – 8(1, 8)					(0,0,0)	36134.0	(0.2)	[65017]
	7(2, 5) – 8(1, 8)					(0,0,0)	36134.6	(0.2)	[65017]
	17(4,13) – 18(3,16)					(0,1,0)	36652.0	(0.2)	[68037]
	27(6,22) – 28(5,23)					(0,0,0)	37637.1	(0.2)	[65017]
	27(4,24) – 26(5,21)					(0,0,0)	37822.4	(0.2)	[65017]
	9(1, 8) – 8(2, 7)					(0,0,0)	38091.9	(0.2)	[65017]
	9(1, 8) – 8(2, 7)					(0,0,0)	38093.0	(0.2)	[65017]
	38(8,30) – 39(7,33)					(0,0,0)	38485.4	(0.2)	[65017]
	26(4,22) – 25(5,21)					(0,0,0)	38851.3	(0.2)	[65017]
	7(2, 5) – 8(1, 8)					(0,1,0)	39766.2	(0.2)	[68037]
	20(2,19) – 19(3,16)					(0,0,0)	40393.6	(0.2)	[65017]
	23(3,21) – 22(4,18)					(0,1,0)	40716.6	(0.2)	[68037]
	10(3, 8) – 11(2, 9)					(0,0,0)	40720.80	(0.20)	[65017]
	16(4,13) – 17(3,14)					(0,1,0)	41236.6	(0.2)	[68037]
	22(5,17) – 23(4,20)					(0,1,0)	43331.5	(0.2)	[68037]
	23(2,22) – 22(3,19)					(0,0,0)	43607.45	(0.20)	[65017]
	21(2,20) – 20(3,17)					(0,0,0)	43625.0	(0.2)	[65017]
	21(2,20) – 20(3,17)					(0,0,0)	43626.2	(0.2)	[65017]
	11(3, 8) – 12(2,11)					(0,0,0)	43863.20	(0.20)	[65017]
	5(0, 5) – 4(1, 4)					(0,0,0)	44061.6	(0.2)	[65017]
	5(0, 5) – 4(1, 4)					(0,0,0)	44062.4	(0.2)	[65017]
	32(5,27) – 31(6,26)					(0,0,0)	44708.6	(0.2)	[65017]
	22(2,21) – 21(3,18)					(0,0,0)	44723.2	(0.2)	[65017]
	28(4,25) – 27(5,22)					(0,1,0)	45148.9	(0.2)	[68037]
	16(4,12) – 17(3,15)					(0,0,0)	45977.5	(0.2)	[65017]
	21(5,17) – 22(4,18)					(0,0,0)	46372.1	(0.2)	[65017]
	6(2, 4) – 7(1, 7)					(0,0,0)	46560.3	(0.2)	[65017]
	6(2, 4) – 7(1, 7)					(0,0,0)	46561.6	(0.2)	[65017]
	38(6,33) – 37(7,30)					(0,0,0)	46713.3	(0.2)	[65017]
	32(7,26) – 33(6,27)					(0,0,0)	46757.8	(0.2)	[65017]
	21(5,16) – 22(4,19)					(0,0,0)	51666.0	(0.2)	[65017]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{17}O^{32}S^{18}O$	38(6,32) - 37(7,31)					(0,0,0)	52127.6	(0.2)	[65017]
$^{17}O^{34}S^{18}O$	13(3,10) - 14(2,13)					(0,0,0)	8528.9	(0.2)	[65017]
	11(3, 9) - 12(2,10)					(0,0,0)	8693.8	(0.2)	[65017]
	11(2, 9) - 12(1,12)					(0,0,0)	8820.7	(0.2)	[65017]
	22(5,18) - 23(4,19)					(0,0,0)	8984.9	(0.2)	[65017]
	10(2, 8) - 11(1,11)					(0,0,0)	11780.2	(0.2)	[65017]
	38(8,30) - 39(7,33)					(0,0,0)	11780.2	(0.2)	[65017]
	1(1, 1) - 2(0, 2)					(0,0,0)	11988.9	(0.2)	[65017]
	35(6,30) - 34(7,27)					(0,0,0)	12336.6	(0.2)	[65017]
	24(4,20) - 23(5,19)					(0,0,0)	12406.8	(0.2)	[65017]
	14(2,12) - 15(1,15)					(0,0,0)	12732.5	(0.2)	[65017]
	14(2,12) - 15(1,15)					(0,0,0)	12734.5	(0.2)	[65017]
	20(3,18) - 19(4,15)					(0,0,0)	14528.3	(0.2)	[65017]
	13(2,11) - 12(3,10)					(0,0,0)	14698.5	(0.2)	[65017]
	16(2,15) - 15(3,12)					(0,0,0)	14751.4	(0.2)	[65017]
	16(2,15) - 15(3,12)					(0,0,0)	14752.1	(0.2)	[65017]
	35(6,29) - 34(7,28)					(0,0,0)	15289.5	(0.2)	[65017]
	30(5,26) - 29(6,23)					(0,0,0)	16201.2	(0.2)	[65017]
	9(2, 7) - 10(1,10)					(0,0,0)	16743.1	(0.2)	[65017]
	9(2, 7) - 10(1,10)					(0,0,0)	16744.0	(0.2)	[65017]
	9(2, 7) - 10(1,10)					(0,0,0)	16744.8	(0.2)	[65017]
	27(6,22) - 28(5,23)					(0,0,0)	17467.8	(0.2)	[65017]
	17(4,13) - 18(3,16)					(0,0,0)	17635.25	(0.20)	[65017]
	25(4,22) - 24(5,19)					(0,0,0)	17684.6	(0.2)	[65017]
	22(5,17) - 23(4,20)					(0,0,0)	18087.4	(0.2)	[65017]
	15(2,13) - 16(1,16)					(0,0,0)	18352.2	(0.2)	[65017]
	16(4,13) - 17(3,14)					(0,0,0)	20003.6	(0.2)	[65017]
	8(1, 7) - 7(2, 6)					(0,0,0)	20666.8	(0.2)	[65017]
	8(1, 7) - 7(2, 6)					(0,0,0)	20667.8	(0.2)	[65017]
	27(6,21) - 28(5,24)					(0,0,0)	21279.0	(0.2)	[65017]
	12(3, 9) - 13(2,12)					(0,0,0)	21888.8	(0.2)	[65017]
	30(5,25) - 29(6,24)					(0,0,0)	23519.7	(0.2)	[65017]
	8(2, 6) - 9(1, 9)					(0,0,0)	23581.2	(0.2)	[65017]
	8(2, 6) - 9(1, 9)					(0,0,0)	23582.8	(0.2)	[65017]
	5(2, 4) - 6(1, 5)		19/2		21/2	(0,0,0)	23901.95	(0.20)	[65017]
	5(2, 4) - 6(1, 5)					(0,0,0)	23903.0	(0.2)	[65017]
	32(7,26) - 33(6,27)					(0,0,0)	24294.1	(0.2)	[65017]
	17(2,16) - 16(3,13)					(0,0,0)	24297.0	(0.2)	[65017]
	17(2,16) - 16(3,13)					(0,0,0)	24297.5	(0.2)	[65017]
	19(3,16) - 18(4,15)					(0,0,0)	25235.3	(0.2)	[65017]
	32(7,25) - 33(6,28)					(0,0,0)	25799.05	(0.20)	[65017]
	4(0, 4) - 3(1, 3)					(0,0,0)	26041.5	(0.2)	[65017]
	4(0, 4) - 3(1, 3)					(0,0,0)	26042.4	(0.2)	[65017]
	21(3,19) - 20(4,16)					(0,0,0)	29648.1	(0.2)	[65017]
	21(5,17) - 22(4,18)					(0,0,0)	29697.4	(0.2)	[65017]
	37(8,30) - 38(7,31)					(0,0,0)	30294.4	(0.2)	[65017]
	37(8,29) - 38(7,32)					(0,0,0)	30865.1	(0.2)	[65017]
	10(3, 8) - 11(2, 9)					(0,0,0)	31177.5	(0.2)	[65017]
	36(6,31) - 35(7,28)					(0,0,0)	31507.45	(0.20)	[65017]
	7(2, 5) - 8(1, 8)		15/2		17/2	(0,0,0)	32133.4	(0.2)	[65017]
	7(2, 5) - 8(1, 8)		17/2		19/2	(0,0,0)	32133.7	(0.2)	[65017]
	7(2, 5) - 8(1, 8)		13/2		15/2	(0,0,0)	32133.7	(0.2)	[65017]
	7(2, 5) - 8(1, 8)		11/2		13/2	(0,0,0)	32134.4	(0.2)	[65017]
	7(2, 5) - 8(1, 8)		19/2		21/2	(0,0,0)	32134.8	(0.2)	[65017]
	7(2, 5) - 8(1, 8)		9/2		11/2	(0,0,0)	32135.3	(0.2)	[65017]
	16(4,12) - 17(3,15)					(0,0,0)	34426.0	(0.2)	[65017]
	25(4,21) - 24(5,20)					(0,0,0)	34585.4	(0.2)	[65017]
	31(5,27) - 30(6,24)					(0,0,0)	34891.4	(0.2)	[65017]
	26(4,23) - 25(5,20)					(0,0,0)	35190.7	(0.2)	[65017]
	11(3, 8) - 12(2,11)					(0,0,0)	36163.0	(0.2)	[65017]
	21(5,16) - 22(4,19)					(0,0,0)	36204.7	(0.2)	[65017]
	26(6,21) - 27(5,22)					(0,0,0)	37305.8	(0.2)	[65017]
	19(2,18) - 18(3,15)					(0,0,0)	38240.4	(0.2)	[65017]
	14(2,12) - 13(3,11)					(0,0,0)	38982.4	(0.2)	[65017]
	26(6,20) - 27(5,23)					(0,0,0)	39997.8	(0.2)	[65017]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ – $J''(K''_-,K''_+)$	F'	F_1'	F''	F_1''	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{17}O^{34}S^{18}O$	23(2,22) – 22(3,19)					(0,0,0)	41133.5	(0.2)	[65017]
	15(4,12) – 16(3,13)					(0,0,0)	41276.9	(0.2)	[65017]
	6(2, 4) – 7(1, 7)					(0,0,0)	42224.2	(0.2)	[65017]
	20(2,19) – 19(3,16)					(0,0,0)	42282.5	(0.2)	[65017]
	20(2,19) – 19(3,16)					(0,0,0)	42283.6	(0.2)	[65017]
	9(1, 8) – 8(2, 7)					(0,0,0)	43735.7	(0.2)	[65017]
	9(1, 8) – 8(2, 7)					(0,0,0)	43736.6	(0.2)	[65017]
	22(2,21) – 21(3,18)					(0,0,0)	43815.6	(0.2)	[65017]
	22(3,20) – 21(4,17)					(0,0,0)	43930.6	(0.2)	[65017]
	21(2,20) – 21(3,17)					(0,0,0)	44175.4	(0.2)	[65017]
	21(2,20) – 21(3,17)					(0,0,0)	44177.3	(0.2)	[65017]
	31(7,24) – 32(6,27)					(0,0,0)	44738.2	(0.2)	[65017]
	31(5,26) – 30(6,25)					(0,0,0)	44829.6	(0.2)	[65017]
	4(2, 3) – 5(1, 4)					(0,0,0)	45326.5	(0.2)	[65017]
	4(2, 3) – 5(1, 4)					(0,0,0)	45327.45	(0.20)	[65017]
	5(0, 5) – 4(1, 4)					(0,0,0)	45752.1	(0.2)	[65017]
	5(0, 5) – 4(1, 4)					(0,0,0)	45752.9	(0.2)	[65017]
	18(2,16) – 19(1,19)					(0,0,0)	47448.4	(0.2)	[65017]
	18(2,16) – 19(1,19)					(0,0,0)	47449.6	(0.2)	[65017]
	1(1, 0) – 1(0, 1)					(0,0,0)	48332.2	(0.2)	[65017]
	2(1, 1) – 2(0, 2)					(0,0,0)	49731.8	(0.2)	[65017]
	2(1, 1) – 2(0, 2)					(0,0,0)	49732.4	(0.2)	[65017]
	20(5,15) – 21(4,17)					(0,0,0)	49832.5	(0.2)	[65017]
	36(8,28) – 37(7,31)					(0,0,0)	49845.6	(0.2)	[65017]
	15(4,11) – 16(3,14)					(0,0,0)	51547.4	(0.2)	[65017]
	3(1, 2) – 3(0, 3)					(0,0,0)	51887.5	(0.2)	[65017]
	9(3, 7) – 10(2, 8)					(0,0,0)	52762.4	(0.2)	[65017]
$^{17}O^{33}S^{17}O$	20(3,18) – 19(4,15)					(0,0,0)	9386.0	(0.2)	[68017]
	11(2, 9) – 12(1,12)					(0,0,0)	9642.8	(0.2)	[68017]
	11(2, 9) – 12(1,12)					(0,0,0)	9652.5	(0.2)	[68017]
	13(2,11) – 11(3,10)					(0,0,0)	9776.1	(0.2)	[68017]
	13(2,11) – 11(3,10)					(0,0,0)	9780.1	(0.2)	[68017]
	25(4,22) – 25(4,19)					(0,0,0)	10408.5	(0.2)	[68017]
	28(6,22) – 29(5,25)					(0,0,0)	11861.6	(0.2)	[68017]
	13(3,10) – 14(2,13)					(0,0,0)	11869.3	(0.2)	[68017]
	13(3,10) – 14(2,13)					(0,0,0)	11872.2	(0.2)	[68017]
	16(2,15) – 15(3,12)					(0,0,0)	11981.5	(0.2)	[68017]
	16(2,15) – 15(3,12)					(0,0,0)	11985.2	(0.2)	[68017]
	14(2,12) – 15(1,15)					(0,0,0)	12296.0	(0.2)	[68017]
	14(2,12) – 15(1,15)					(0,0,0)	12298.4	(0.2)	[68017]
	14(2,12) – 15(1,15)					(0,0,0)	12299.8	(0.2)	[68017]
	14(2,12) – 15(1,15)					(0,0,0)	12309.3	(0.2)	[68017]
	14(2,12) – 15(1,15)					(0,0,0)	12310.4	(0.2)	[68017]
	14(2,12) – 15(1,15)					(0,0,0)	12311.5	(0.2)	[68017]
	14(2,12) – 15(1,15)					(0,0,0)	12312.9	(0.2)	[68017]
	1(1, 1) – 2(0, 2)					(0,0,0)	12816.7	(0.2)	[68017]
	10(2, 8) – 11(1,11)					(0,0,0)	12941.4	(0.2)	[68017]
	10(2, 8) – 11(1,11)					(0,0,0)	12942.6	(0.2)	[68017]
	10(2, 8) – 11(1,11)					(0,0,0)	12947.3	(0.2)	[68017]
	10(2, 8) – 11(1,11)					(0,0,0)	12951.7	(0.2)	[68017]
	10(2, 8) – 11(1,11)					(0,0,0)	12953.3	(0.2)	[68017]
	30(5,25) – 29(6,24)					(0,0,0)	13328.9	(0.2)	[68017]
	30(5,25) – 29(6,24)					(0,0,0)	13329.8	(0.2)	[68017]
	11(3, 9) – 12(2,10)					(0,0,0)	13461.7	(0.2)	[68017]
	11(3, 9) – 12(2,10)					(0,0,0)	13465.3	(0.2)	[68017]
	33(7,27) – 34(6,28)					(0,0,0)	16139.1	(0.2)	[68017]
	22(5,18) – 23(4,19)					(0,0,0)	17279.5	(0.2)	[68017]
	22(5,18) – 23(4,19)					(0,0,0)	17280.8	(0.2)	[68017]
	33(7,26) – 34(6,29)					(0,0,0)	17945.2	(0.2)	[68017]
	8(1, 7) – 7(2, 6)					(0,0,0)	17965.0	(0.2)	[68017]
	8(1, 7) – 7(2, 6)					(0,0,0)	17966.4	(0.2)	[68017]
	8(1, 7) – 7(2, 6)					(0,0,0)	17970.5	(0.2)	[68017]
	8(1, 7) – 7(2, 6)					(0,0,0)	17971.9	(0.2)	[68017]
	19(3,16) – 18(4,15)					(0,0,0)	18204.2	(0.2)	[68017]
	19(3,16) – 18(4,15)					(0,0,0)	18206.9	(0.2)	[68017]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{17}O^{33}S^{17}O$	9(2, 7) - 10(1,10)					(0,0,0)	18208.8	(0.2)	[68017]
	36(6,31) - 35(7,28)					(0,0,0)	20275.8	(0.2)	[68017]
	36(6,31) - 35(7,28)					(0,0,0)	20276.2	(0.2)	[68017]
	17(2,16) - 16(3,13)					(0,0,0)	21907.3	(0.2)	[68017]
	17(2,16) - 16(3,13)					(0,0,0)	21911.6	(0.2)	[68017]
	17(4,13) - 18(3,16)					(0,0,0)	23104.85	(0.20)	[68017]
	36(6,30) - 35(7,29)					(0,0,0)	23746.0	(0.2)	[68017]
	38(8,31) - 39(7,32)					(0,0,0)	24051.8	(0.2)	[68017]
	38(8,30) - 39(7,33)					(0,0,0)	24720.5	(0.2)	[68017]
	21(3,19) - 20(4,16)					(0,0,0)	24741.6	(0.2)	[68017]
	21(3,19) - 20(4,16)					(0,0,0)	24742.7	(0.2)	[68017]
	4(0, 4) - 3(1, 3)					(0,0,0)	25216.4	(0.2)	[68017]
	4(0, 4) - 3(1, 3)					(0,0,0)	25219.1	(0.2)	[68017]
	4(0, 4) - 3(1, 3)					(0,0,0)	25221.8	(0.2)	[68017]
	4(0, 4) - 3(1, 3)					(0,0,0)	25222.6	(0.2)	[68017]
	4(0, 4) - 3(1, 3)					(0,0,0)	25224.6	(0.2)	[68017]
	8(2, 6) - 9(1, 9)					(0,0,0)	25293.0	(0.2)	[68017]
	8(2, 6) - 9(1, 9)					(0,0,0)	25294.6	(0.2)	[68017]
	8(2, 6) - 9(1, 9)					(0,0,0)	25296.2	(0.2)	[68017]
	8(2, 6) - 9(1, 9)					(0,0,0)	25302.5	(0.2)	[68017]
	8(2, 6) - 9(1, 9)					(0,0,0)	25304.1	(0.2)	[68017]
	12(3, 9) - 13(2,12)					(0,0,0)	25436.3	(0.2)	[68017]
	12(3, 9) - 13(2,12)					(0,0,0)	25438.6	(0.2)	[68017]
	22(5,17) - 23(4,20)					(0,0,0)	25521.3	(0.2)	[68017]
	31(5,27) - 30(6,24)					(0,0,0)	25618.4	(0.2)	[68017]
	25(4,21) - 24(5,20)					(0,0,0)	25753.6	(0.2)	[68017]
	25(4,21) - 24(5,20)					(0,0,0)	25755.3	(0.2)	[68017]
	5(2, 4) - 6(1, 5)					(0,0,0)	26531.0	(0.2)	[68017]
	5(2, 4) - 6(1, 5)					(0,0,0)	26531.9	(0.2)	[68017]
	5(2, 4) - 6(1, 5)					(0,0,0)	26533.1	(0.2)	[68017]
	5(2, 4) - 6(1, 5)					(0,0,0)	26536.8	(0.2)	[68017]
	5(2, 4) - 6(1, 5)					(0,0,0)	26537.7	(0.2)	[68017]
	5(2, 4) - 6(1, 5)					(0,0,0)	26539.1	(0.2)	[68017]
	16(4,13) - 17(3,14)					(0,0,0)	26547.0	(0.2)	[68017]
	16(4,13) - 17(3,14)					(0,0,0)	26549.1	(0.2)	[68017]
	27(6,22) - 28(5,23)					(0,0,0)	27262.0	(0.2)	[68017]
	27(6,22) - 28(5,23)					(0,0,0)	27262.9	(0.2)	[68017]
	26(4,23) - 25(5,20)					(0,0,0)	28042.3	(0.2)	[68017]
	18(2,17) - 17(3,14)					(0,0,0)	30249.4	(0.2)	[68017]
	18(2,17) - 17(3,14)					(0,0,0)	30254.4	(0.2)	[68017]
	27(6,21) - 28(5,24)					(0,0,0)	30607.4	(0.2)	[68017]
	43(9,34) - 44(8,37)					(0,0,0)	31716.5	(0.2)	[68017]
	43(9,34) - 44(8,37)					(0,0,0)	31716.95	(0.20)	[68017]
	42(7,36) - 41(8,33)					(0,0,0)	32992.1	(0.2)	[68017]
	42(7,36) - 41(8,33)					(0,0,0)	32992.5	(0.2)	[68017]
	14(2,12) - 13(3,11)					(0,0,0)	33903.2	(0.2)	[68017]
	14(2,12) - 13(3,11)					(0,0,0)	33907.4	(0.2)	[68017]
	17(2,15) - 18(1,18)					(0,0,0)	33922.9	(0.2)	[68017]
	17(2,15) - 18(1,18)					(0,0,0)	33923.9	(0.2)	[68017]
	17(2,15) - 18(1,18)					(0,0,0)	33925.0	(0.2)	[68017]
	17(2,15) - 18(1,18)					(0,0,0)	33937.0	(0.2)	[68017]
	17(2,15) - 18(1,18)					(0,0,0)	33938.1	(0.2)	[68017]
	17(2,15) - 18(1,18)					(0,0,0)	33939.2	(0.2)	[68017]
	7(2, 5) - 8(1, 8)					(0,0,0)	34052.6	(0.2)	[68017]
	7(2, 5) - 8(1, 8)					(0,0,0)	34053.6	(0.2)	[68017]
	7(2, 5) - 8(1, 8)					(0,0,0)	34054.0	(0.2)	[68017]
	7(2, 5) - 8(1, 8)					(0,0,0)	34054.4	(0.2)	[68017]
	7(2, 5) - 8(1, 8)					(0,0,0)	34055.2	(0.2)	[68017]
	7(2, 5) - 8(1, 8)					(0,0,0)	34055.6	(0.2)	[68017]
	7(2, 5) - 8(1, 8)					(0,0,0)	34061.5	(0.2)	[68017]
	7(2, 5) - 8(1, 8)					(0,0,0)	34062.3	(0.2)	[68017]
	7(2, 5) - 8(1, 8)					(0,0,0)	34062.8	(0.2)	[68017]
	7(2, 5) - 8(1, 8)					(0,0,0)	34063.2	(0.2)	[68017]
	7(2, 5) - 8(1, 8)					(0,0,0)	34064.0	(0.2)	[68017]
	7(2, 5) - 8(1, 8)					(0,0,0)	34064.3	(0.2)	[68017]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ – $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{17}O^{33}S^{17}O$	31(5,26) – 30(6,25)					(0,0,0)	34371.0	(0.2)	[68017]
	31(5,26) – 30(6,25)					(0,0,0)	34372.2	(0.2)	[68017]
	42(7,35) – 41(8,34)					(0,0,0)	34793.0	(0.2)	[68017]
	42(7,35) – 41(8,34)					(0,0,0)	34793.6	(0.2)	[68017]
	32(7,26) – 33(7,27)					(0,0,0)	35656.7	(0.2)	[68017]
	32(7,26) – 33(7,27)					(0,0,0)	35657.25	(0.20)	[68017]
	19(2,18) – 18(3,15)					(0,0,0)	36824.0	(0.2)	[68017]
	19(2,18) – 18(3,15)					(0,0,0)	36830.5	(0.2)	[68017]
	32(7,25) – 33(6,28)					(0,0,0)	36937.6	(0.2)	[68017]
	21(5,17) – 22(4,18)					(0,0,0)	37796.1	(0.2)	[68017]
	21(5,17) – 22(4,18)					(0,0,0)	37797.2	(0.2)	[68017]
	22(3,20) – 21(4,17)					(0,0,0)	39319.7	(0.2)	[68017]
	22(3,20) – 21(4,17)					(0,0,0)	39321.3	(0.2)	[68017]
	37(6,32) – 36(7,29)					(0,0,0)	39476.1	(0.2)	[68017]
	11(3, 8) – 12(2,11)					(0,0,0)	39875.1	(0.2)	[68017]
	11(3, 8) – 12(2,11)					(0,0,0)	39877.0	(0.2)	[68017]
	16(4,12) – 17(3,15)					(0,0,0)	40004.0	(0.2)	[68017]
	9(1, 8) – 8(2, 7)					(0,0,0)	40999.8	(0.2)	[68017]
	9(1, 8) – 8(2, 7)					(0,0,0)	41000.8	(0.2)	[68017]
	9(1, 8) – 8(2, 7)					(0,0,0)	41005.4	(0.2)	[68017]
	9(1, 8) – 8(2, 7)					(0,0,0)	41006.5	(0.2)	[68017]
	20(2,19) – 19(3,16)					(0,0,0)	41463.5	(0.2)	[68017]
	20(2,19) – 19(3,16)					(0,0,0)	41469.8	(0.2)	[68017]
	20(3,17) – 19(4,16)					(0,0,0)	42037.6	(0.2)	[68017]
	20(3,17) – 19(4,16)					(0,0,0)	42040.6	(0.2)	[68017]
	37(8,30) – 38(7,31)					(0,0,0)	43277.85	(0.20)	[68017]
	37(8,30) – 38(7,31)					(0,0,0)	43278.35	(0.20)	[68017]
	21(5,16) – 22(4,19)					(0,0,0)	43681.7	(0.2)	[68017]
	21(2,20) – 20(3,17)					(0,0,0)	44019.5	(0.2)	[68017]
	21(2,20) – 20(3,17)					(0,0,0)	44026.5	(0.2)	[68017]
	37(6,31) – 36(7,30)					(0,0,0)	44206.5	(0.2)	[68017]
	37(6,31) – 36(7,30)					(0,0,0)	44207.35	(0.20)	[68017]
	32(5,28) – 31(6,25)					(0,0,0)	44273.9	(0.2)	[68017]
	6(2, 4) – 7(1, 7)					(0,0,0)	44310.2	(0.2)	[68017]
	6(2, 4) – 7(1, 7)					(0,0,0)	44318.4	(0.2)	[68017]
	6(2, 4) – 7(1, 7)					(0,0,0)	44319.4	(0.2)	[68017]
	5(0, 5) – 4(1, 4)					(0,0,0)	44931.9	(0.2)	[68017]
	5(0, 5) – 4(1, 4)					(0,0,0)	44933.8	(0.2)	[68017]
	5(0, 5) – 4(1, 4)					(0,0,0)	44937.1	(0.2)	[68017]
	5(0, 5) – 4(1, 4)					(0,0,0)	44938.0	(0.2)	[68017]
	5(0, 5) – 4(1, 4)					(0,0,0)	44939.0	(0.2)	[68017]
	18(2,16) – 19(1,19)					(0,0,0)	45093.2	(0.2)	[68017]
	27(4,24) – 26(5,21)					(0,0,0)	45344.9	(0.2)	[68017]
	26(6,21) – 27(5,22)					(0,0,0)	46958.3	(0.2)	[68017]
	26(6,21) – 27(5,22)					(0,0,0)	46959.0	(0.2)	[68017]
	15(4,12) – 16(3,13)					(0,0,0)	47634.5	(0.2)	[68017]
	15(4,12) – 16(3,13)					(0,0,0)	47636.4	(0.2)	[68017]
	4(2, 3) – 5(1, 4)					(0,0,0)	47927.6	(0.2)	[68017]
	4(2, 3) – 5(1, 4)					(0,0,0)	47928.5	(0.2)	[68017]
	4(2, 3) – 5(1, 4)					(0,0,0)	47929.5	(0.2)	[68017]
	4(2, 3) – 5(1, 4)					(0,0,0)	47930.1	(0.2)	[68017]
	4(2, 3) – 5(1, 4)					(0,0,0)	47934.3	(0.2)	[68017]
	4(2, 3) – 5(1, 4)					(0,0,0)	47935.2	(0.2)	[68017]
	4(2, 3) – 5(1, 4)					(0,0,0)	47936.0	(0.2)	[68017]
	26(6,20) – 27(5,23)					(0,0,0)	49318.95	(0.20)	[68017]
	42(9,34) – 43(8,35)					(0,0,0)	50536.5	(0.2)	[68017]
	2(1, 1) – 2(0, 2)					(0,0,0)	50556.2	(0.2)	[68017]
	2(1, 1) – 2(0, 2)					(0,0,0)	50560.8	(0.2)	[68017]
	2(1, 1) – 2(0, 2)					(0,0,0)	50562.7	(0.2)	[68017]
	2(1, 1) – 2(0, 2)					(0,0,0)	50567.3	(0.2)	[68017]
	3(1, 2) – 3(0, 3)					(0,0,0)	52681.5	(0.2)	[68017]
	3(1, 2) – 3(0, 3)					(0,0,0)	52684.7	(0.2)	[68017]
	3(1, 2) – 3(0, 3)					(0,0,0)	52687.9	(0.2)	[68017]
	3(1, 2) – 3(0, 3)					(0,0,0)	52691.2	(0.2)	[68017]
	23(3,21) – 22(4,18)					(0,0,0)	52963.7	(0.2)	[68017]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{17}O^{33}S^{17}O$	23(3,21) - 22(4,18)					(0,0,0)	52965.6	(0.2)	[68017]
	31(7,25) - 32(6,26)					(0,0,0)	54941.8	(0.2)	[68017]
	10(3, 7) - 11(2,10)					(0,0,0)	55038.2	(0.2)	[68017]
	10(3, 7) - 11(2,10)					(0,0,0)	55039.8	(0.2)	[68017]
	31(7,24) - 32(6,27)					(0,0,0)	55838.7	(0.2)	[68017]
	5(2, 3) - 6(1, 6)					(0,0,0)	55891.5	(0.2)	[68017]
	5(2, 3) - 6(1, 6)					(0,0,0)	55899.0	(0.2)	[68017]
	5(2, 3) - 6(1, 6)					(0,0,0)	55900.0	(0.2)	[68017]
	32(5,27) - 31(6,26)					(0,0,0)	56025.6	(0.2)	[68017]
	32(5,27) - 31(6,26)					(0,0,0)	56026.9	(0.2)	[68017]
	15(4,11) - 16(3,14)					(0,0,0)	57206.2	(0.2)	[68017]
	9(3, 7) - 10(2, 8)					(0,0,0)	57269.6	(0.2)	[68017]
	9(3, 7) - 10(2, 8)					(0,0,0)	57272.3	(0.2)	[68017]
	15(2,13) - 14(3,12)					(0,0,0)	58876.75	(0.20)	[68017]
	15(2,13) - 14(3,12)					(0,0,0)	58882.2	(0.2)	[68017]

*Calculated transition frequency.

Table 52. Rotational and centrifugal distortion constants for $^{80}SeO_2$ and $^{78}SeO_2$ in the ground vibrational state.

Watson's Determinable Parameters	$^{80}SeO_2$ Value[a] (MHz)	$^{78}SeO_2$ Value[a] (MHz)
A"	28 826.381(92)	29 037.626(105)
B"	8 676.6008(284)	8 676.4604(382)
C"	6 651.8491(266)	6 663.0034(323)
τ_1	0.11101(2149)	0.17091(3596)
τ_2	0.008619(4323)	0.02037(744)
τ_3[b]	0.10(6)	-0.05(10)
τ_{aaaa}	-2.2166(133)	-2.2107(217)
τ_{bbbb}	-0.047283(2327)	-0.041080(3764)
τ_{cccc}	$-0.9664(1244)\times10^{-2}$	$-0.578(178)\times10^{-2}$
Std. dev.	0.244	0.265
No. lines fit	26	23
μ_b (D)	2.62(5)[c]	
Derived Parameters (assuming planarity conditions)		
A'	28 826.373(92)	29 037.620(105)
B'	8 676.603(27)	8 676.469(35)
C'	6 651.910(28)	6 663.086(32)
τ'_{bbcc}	-0.0166(17)	-0.0121(31)
τ'_{ccaa}	$0.49(48)\times10^{-2}$	0.018(11)
τ'_{aabb}	0.123(15)	0.165(23)
$\tau_{aabb}(1)$	0.2106(69)	0.229(17)
$\tau_{aabb}(2)$	0.2088(79)	0.2365(90)
$\tau_{aabb}(3)$	0.2088(79)	0.2365(90)
$\tau_{abab}(1)$	-0.0440(44)	-0.0322(54)
$\tau_{abab}(2)$	-0.0424(71)	-0.038(13)
$\tau_{abab}(3)$	-0.0421(79)	-0.039(16)
$\Delta\tau$	$-0.12(37)\times10^{-3}$	$0.45(93)\times10^{-3}$

[a] The uncertainties quoted are one standard deviation as estimated by the least squares fit. The number of significant figures quoted are necessary to reproduce the calculated transition frequencies within their standard deviations.

[b] Strictly speaking, τ_3 is not a determinable parameter, but is calculated from τ_1, τ_2, τ_{aaaa} and τ_{bbbb} using the planarity conditions.

[c] Reference [72044].

Table 52.1. Rotational constants for SeO_2 [70035].

Isotopic Species	Vib. State v_1 v_2 v_3	A (MHz)	B(MHz)	C MHz)
$^{82}Se^{16}O_2$	0 0 0	28 624.76	8 676.47	6 640.98
$^{80}Se^{16}O_2$ [a]	1 0 0	28 763.70(72)	8 640.26(18)	6 623.25(27)
	0 1 0	29 261.86(57)	8 677.27(18)	6 638.58(12)
	0 2 0	29 712.50(80)	8 677.63(40)	6 625.06(40)
	0 0 1	28 651.43(80)	8 649.49(30)	6 631.49(30)
$^{78}Se^{16}O_2$ [a]	1 0 0	28 975.47	8 640.09	6 634.24
	0 1 0	29 477.03	8 677.11	6 649.60
	0 0 1	28 858.47	8 649.33	6 642.26
$^{77}Se^{16}O_2$	0 0 0	29 146.70	8 676.38	6 668.68
$^{76}Se^{16}O_2$	0 0 0	29 260.12	8 676.42	6 674.17

[a] See Table 52 for the ground state constants for these species.

TABLE 52.2. The microwave spectrum of SeO_2

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{82}SeO_2$	2(0, 2) - 1(1, 1)	(0,0,0)	10538.97	(0.30)	[70035]
	2(1, 1) - 2(0, 2)	(0,0,0)	24166.92	(0.30)	[70035]
	3(0, 3) - 2(1, 2)	(0,0,1)	27300.98	(0.30)	[70035]
	3(1, 2) - 3(0, 3)	(0,0,1)	27542.46	(0.30)	[70035]
	4(1, 3) - 4(0, 4)	(0,0,0)	32899.76	(0.30)	[70035]
$^{80}SeO_2$	8(4, 4) - 9(3, 7)	(0,0,0)	8415.48	(0.30)	[70035]
	2(0, 2) - 1(1, 1)	(0,1,0)	9902.89	(0.30)	[70035]
	2(0, 2) - 1(1, 1)	(0,0,0)	10362.29	(0.30)	[70035]
	18(6,12) - 17(7,11)	(0,0,0)	10813.95	(0.30)	[70035]
	13(6, 8) - 14(5, 9)	(0,0,0)	11514.72	(0.30)	[70035]
	13(4,10) - 12(5, 7)	(0,0,0)	14360.68	(0.30)	[70035]
	10(2, 8) - 11(1,11)	(0,0,0)	16193.20	(0.30)	[70035]
	10(3, 7) - 9(4, 6)	(0,0,0)	16545.56	(0.30)	[70035]
	9(2, 8) - 8(3, 5)	(0,1,0)	17342.54	(0.30)	[70035]
	10(5, 5) - 11(4, 8)	(0,0,0)	17922.40	(0.30)	[70035]
	9(2, 8) - 8(3, 5)	(0,0,0)	19564.22	(0.30)	[70035]
	7(4, 4) - 8(3, 5)	(0,0,0)	20958.70	(0.30)	[70035]
	11(3, 9) - 10(4, 7)	(0,0,0)	20999.34	(0.30)	[70035]
	1(1, 0) - 1(0, 1)	(0,0,1)	22019.48	(0.30)	[70035]
	15(7, 9) - 16(6,10)	(0,0,0)	23088.56	(0.30)	[70035]
	16(5,11) - 15(6,10)	(0,0,0)	23627.00	(0.30)	[70035]
	2(2, 0) - 3(1, 3)	(0,0,0)	23799.92	(0.30)	[70035]
	7(4, 4) - 8(3, 5)	(0,1,0)	24197.50	(0.30)	[70035]
	2(1, 1) - 2(0, 2)	(1,0,0)	24301.26	(0.30)	[70035]
	2(1, 1) - 2(0, 2)	(0,0,0)	24343.86	(0.30)	[70035]
	2(1, 1) - 2(0, 2)	(0,1,0)	24806.06	(0.30)	[70035]
	2(2, 0) - 3(1, 3)	(0,1,0)	25204.14	(0.30)	[70035]
	3(0, 3) - 2(1, 2)	(0,0,1)	27137.98	(0.30)	[70035]
	19(6,14) - 18(7,11)	(0,0,0)	27158.82	(0.30)	[70035]
	3(1, 2) - 3(0, 3)	(0,0,1)	27691.36	(0.30)	[70035]
	12(6, 6) - 13(5, 9)	(0,0,0)	28671.70	(0.30)	[70035]
	4(3, 1) - 5(2, 4)	(0,0,0)	29975.32	(0.30)	[70035]
	4(3, 1) - 5(2, 4)	(1,0,0)	30143.88	(0.30)	[70035]
	11(2,10) - 10(3, 7)	(0,1,0)	30752.92	(0.30)	[70035]
	4(3, 1) - 5(2, 4)	(0,1,0)	32240.54	(0.30)	[70035]
	8(2, 6) - 7(3, 5)	(0,1,0)	32498.68	(0.30)	[70035]
	11(2,10) - 10(3, 7)	(0,0,0)	32869.36	(0.30)	[70035]
	4(1, 3) - 4(0, 4)	(1,0,0)	32929.74	(0.30)	[70035]
	4(1, 3) - 4(0, 4)	(0,0,0)	33008.52	(0.30)	[70035]
	9(5, 5) - 10(4, 6)	(0,0,0)	33362.80	(0.30)	[70035]
	22(7,15) - 21(8,14)	(0,0,0)	33499.00	(0.30)	[70035]
	4(1, 3) - 4(0, 4)	(0,1,0)	33510.82	(0.30)	[70035]
	13(2,12) - 12(3, 9)	(0,0,0)	33591.88	(0.30)	[70035]

TABLE 52.2. The microwave spectrum of SeO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ – $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{80}SeO_2$	9(5, 5) – 10(4, 6)	(1,0,0)	33766.24	(0.30)	[70035]
	17(8,10) – 18(7,11)	(0,0,0)	34276.06	(0.30)	[70035]
	8(2, 6) – 7(3, 5)	(1,0,0)	34365.88	(0.30)	[70035]
	8(2, 6) – 7(3, 5)	(0,0,0)	34827.08	(0.30)	[70035]
	1(1, 1) – 0(0, 0)	(1,0,0)	35386.42	(0.30)	[70035]
	1(1, 1) – 0(0, 0)	(0,0,0)	35477.84	(0.30)	[70035]
	1(1, 1) – 0(0, 0)	(0,1,0)	35899.18	(0.30)	[70035]
$^{78}SeO_2$	16(7, 9) – 17(6,12)	(0,0,0)	9252.78	(0.30)	[70035]
	2(0, 2) – 1(1, 1)	(0,1,0)	9712.72	(0.30)	[70035]
	8(4, 4) – 9(3, 7)	(0,0,0)	9756.00	(0.30)	[70035]
	2(0, 2) – 1(1, 1)	(0,0,0)	10176.23	(0.30)	[70035]
	13(4,10) – 12(5, 7)	(0,0,0)	12601.50	(0.30)	[70035]
	13(6, 8) – 14(5, 9)	(0,0,0)	13769.86	(0.30)	[70035]
	10(3, 7) – 9(4, 6)	(0,0,0)	14933.84	(0.30)	[70035]
	9(2, 8) – 8(3, 5)	(0,0,0)	18910.96	(0.30)	[70035]
	10(5, 5) – 11(4, 8)	(0,0,0)	19710.38	(0.30)	[70035]
	11(3, 9) – 10(4, 6)	(0,0,0)	19768.52	(0.30)	[70035]
	16(5,11) – 15(6,10)	(0,0,0)	21254.32	(0.30)	[70035]
	1(1, 0) – 1(0, 1)	(0,0,1)	22215.74	(0.30)	[70035]
	7(4, 4) – 8(3, 5)	(0,0,0)	22420.70	(0.30)	[70035]
	2(1, 1) – 2(0, 2)	(1,0,0)	24488.04	(0.30)	[70035]
	19(6,14) – 18(7,11)	(0,0,0)	24498.72	(0.30)	[70035]
	2(1, 1) – 2(0, 2)	(0,0,0)	24530.00	(0.30)	[70035]
	2(1, 1) – 2(0, 2)	(0,1,0)	24995.80	(0.30)	[70035]
	15(7, 9) – 16(6,10)	(0,0,0)	25716.20	(0.30)	[70035]
	3(1, 2) – 3(0, 3)	(0,0,1)	27847.86	(0.30)	[70035]
	3(0, 3) – 2(1, 2)	(0,0,1)	29966.08	(0.30)	[70035]
	12(6, 6) – 13(5, 9)	(0,0,0)	30875.34	(0.30)	[70035]
	4(3, 1) – 5(2, 4)	(0,0,0)	30930.80	(0.30)	[70035]
	20(9,11) – 21(8,14)	(0,0,0)	32246.60	(0.30)	[70035]
	11(2,10) – 10(3, 7)	(0,0,0)	32609.30	(0.30)	[70035]
	4(1, 3) – 4(0, 4)	(1,0,0)	33046.88	(0.30)	[70035]
	4(1, 3) – 4(0, 4)	(0,0,0)	33124.30	(0.30)	[70035]
	8(2, 6) – 7(3, 5)	(0,0,0)	33630.14	(0.30)	[70035]
	4(1, 3) – 4(0, 4)	(0,1,0)	33630.86	(0.30)	[70035]
	13(2,12) – 12(3, 9)	(0,0,0)	33912.36	(0.30)	[70035]
	9(5, 5) – 10(4, 6)	(0,0,0)	35187.34	(0.30)	[70035]
	1(1, 1) – 0(0, 0)	(1,0,0)	35609.16	(0.30)	[70035]
	1(1, 1) – 0(0, 0)	(0,0,0)	35699.82	(0.30)	[70035]
$^{77}SeO_2$	2(0, 2) – 1(1, 1)	(0,0,0)	10097.26	(0.30)	[70035]
	2(1, 1) – 2(0, 2)	(0,0,0)	24625.80	(0.30)	[70035]
	3(0, 3) – 2(1, 2)	(0,0,1)	26876.26	(0.30)	[70035]
	3(1, 2) – 3(0, 3)	(0,0,1)	27929.40	(0.30)	[70035]
	4(1, 3) – 4(0, 4)	(0,0,0)	33184.58	(0.30)	[70035]
$^{76}SeO_2$	2(0, 2) – 1(1, 1)	(0,0,0)	9979.71	(0.30)	[70035]
	1(1, 0) – 1(0, 1)	(0,0,1)	22465.54	(0.30)	[70035]
	2(1, 1) – 2(0, 2)	(0,0,0)	24725.78	(0.30)	[70035]
	4(1, 3) – 4(0, 4)	(0,0,0)	33247.40	(0.30)	[70035]

Table 53. Rotational and centrifugal distortion constants for $^{16}O_3$, $^{16}O^{18}O^{16}O$ and $^{16}O^{16}O^{18}O$ [76000].

Watson's Determinable Parameters	$^{16}O_3$ Value[a] (MHz)	$^{16}O^{18}O^{16}O$ Value[a] (MHz)	$^{16}O^{16}O^{18}O$ Value[a] (MHz)
A"	106 536.259(6)	98 646.71473(273)	104 573.1895(24)
B"	13 349.02873(100)	13 352.52852(54)	12 591.32208(44)
C"	11 834.53118(90)	11 731.94624(49)	11 212.65200(42)
τ_1	0.0580530(2314)	-0.0030321(1126)	0.0815267(812)
τ_2	-0.02874625(2927)	-0.03267022(1513)	-0.02383237(1013)
τ_3[b]	4.471(1)	3.8373(5)	4.3062(4)
τ_{aaaa}	-25.21339(125)	-21.59149(66)	-24.27298(50)
τ_{bbbb}	-0.07121405(1350)	-0.07118773(691)	-0.06334543(471)
τ_{cccc}	-0.0377270(103)	-0.03621058(595)	-0.03425890(470)
H_J	$0.1001(261)\times10^{-7}$	$0.1088(124)\times10^{-7}$	$0.9030(916)\times10^{-8}$
H_{JK}	$-0.2176(1027)\times10^{-6}$	$-0.1227(869)\times10^{-6}$	$-0.1506(619)\times10^{-6}$
H_{KJ}	$-0.55393(720)\times10^{-4}$	$-0.46879(408)\times10^{-4}$	$-0.50900(385)\times10^{-4}$
H_K	0.0011741(101)	$0.93268(418)\times10^{-3}$	0.0011095(41)
h_J[c]	$0.1063(85)\times10^{-7}$	$0.1127(66)\times10^{-7}$	$0.9107(592)\times10^{-8}$
h_{JK}	$0.262(110)\times10^{-6}$	$0.196(90)\times10^{-6}$	$0.207(87)\times10^{-6}$
h_K	$0.6816(546)\times10^{-4}$	$0.6137(539)\times10^{-4}$	$0.6132(492)\times10^{-4}$
Std. dev.	0.056	0.028	0.035
No. lines fit	117	93	180
Derived Parameters (Assuming planarity conditions)			
A'	106 536.234(6)	98 646.6909(27)	104 573.1673(24)
B'	13 349.0901(10)	13 352.5730(5)	12 591.3846(4)
C'	11 834.5235(9)	11 731.9241(5)	11 212.6524(4)
τ'_{bbcc}	-0.049199(11)	-0.0477592(60)	-0.0444102(41)
τ'_{ccaa}	0.122657(81)	0.088995(53)	0.125122(40)
τ'_{aabb}	-0.01541(19)	-0.044268(91)	0.000815(69)
$\tau_{aabb}(1)$	0.5585(1)	0.51726(7)	0.51546(5)
$\tau_{aabb}(2)$	0.5378(2)	0.49786(15)	0.49713(16)
$\tau_{aabb}(3)$	0.5378(2)	0.49786(15)	0.49713(16)
$\tau_{abab}(1)$	-0.28694(10)	-0.28076(5)	-0.25732(4)
$\tau_{abab}(2)$	-0.26831(21)	-0.26339(13)	-0.24074(14)
$\tau_{abab}(3)$	-0.26623(23)	-0.26131(15)	-0.23894(15)
$\Delta\tau$	$-0.4124(46)\times10^{-3}$	$-0.4358(33)\times10^{-3}$	$-0.3437(27)\times10^{-3}$

[a] The uncertainties quoted are one standard deviation as estimated by the least squares fit. The number of significant figures quoted are necessary to reproduce the calculated transition frequencies within their standard deviations.

[b] Strictly speaking, τ_3 is not a determinable parameter, but is calculated from τ_1, τ_2, τ_{aaaa} and τ_{bbbb} using the planarity conditions.

[c] Watson uses $2h_J$ for this parameter.

Table 53.1. Rotational and centrifugal distortion constants for $^{18}O^{16}O^{18}O$, $^{16}O^{18}O^{18}O$, and $^{18}O_3$ [76000].

Watson's Determinable Parameters	$^{18}O^{16}O^{18}O$ Value[a] (MHz)	$^{16}O^{18}O^{18}O$ Value[a] (MHz)	$^{18}O_3$ Value[a] (MHz)
A"	102 579.249(4)	96 684.94345(285)	94 689.3483(36)
B"	11 865.29029(71)	12 593.15886(54)	11 868.46370(63)
C"	10 612.00496(64)	11 115.84796(51)	10 522.87786(64)
τ_1	0.102117(136)	0.0232046(899)	0.0460185(875)
τ_2	-0.0194586(167)	-0.02735534(1171)	-0.0226809(113)
τ_3[b]	4.139(8)	3.6828(5)	3.5287(4)
τ_{aaaa}	-23.34556(98)	-20.72275(47)	-19.86888(72)
τ_{bbbb}	-0.05622077(802)	-0.06328626(558)	-0.05619313(509)
τ_{cccc}	-0.03101973(641)	-0.03286321(514)	-0.0297610(57)
H_J	$0.7463(1271)\times10^{-8}$	$0.6106(846)\times10^{-8}$	$0.5235(774)\times10^{-8}$
H_{JK}	$-0.1758(482)\times10^{-6}$	$-0.2335(808)\times10^{-6}$	$-0.588(544)\times10^{-7}$
H_{KJ}	$-0.45781(417)\times10^{-4}$	$-0.41848(394)\times10^{-4}$	$-0.39020(370)\times10^{-4}$
H_K	$0.10258(89)\times10^{-2}$	$0.86660(337)\times10^{-3}$	$0.81633(558)\times10^{-3}$
h_J[c]	$0.7357(373)\times10^{-8}$	$0.8671(613)\times10^{-8}$	$0.9156(648)\times10^{-8}$
h_{JK}	$0.241(49)\times10^{-6}$	$0.168(82)\times10^{-6}$	$-0.433(740)\times10^{-7}$
h_K	$0.5262(346)\times10^{-4}$	$0.5382(522)\times10^{-4}$	$0.5495(366)\times10^{-4}$
Std. dev.	0.038	0.040	0.041
No. lines fit	97	180	103
Derived Parameters (assuming planarity conditions)			
A'	102 579.229(40)	96 684.922(3)	94 689.329(4)
B'	11 865.3536(7)	12 593.2054(5)	11 868.5117(6)
C'	10 612.0127(6)	11 115.8345(5)	10 522.8723(6)
τ'_{bbcc}	-0.039969(7)	-0.043111(5)	-0.038839(4)
τ'_{ccaa}	0.12666(7)	0.09315(5)	0.09601(6)
τ'_{aabb}	0.01543(12)	-0.02683(8)	-0.01115(7)
$\tau_{aabb}(1)$	0.47575(9)	0.47672(6)	0.43920(7)
$\tau_{aabb}(2)$	0.45939(17)	0.45948(15)	0.42437(21)
$\tau_{aabb}(3)$	0.45939(17)	0.45948(15)	0.42437(21)
$\tau_{abab}(1)$	-0.23015(8)	-0.25177(5)	-0.22517(6)
$\tau_{abab}(2)$	-0.21531(15)	-0.23629(13)	-0.21181(19)
$\tau_{abab}(3)$	-0.21375(17)	-0.23449(14)	-0.21031(21)
$\Delta\tau$	$-0.288(3)\times10^{-3}$	$-0.365(3)\times10^{-3}$	$-0.296(4)\times10^{-3}$

[a] The uncertainties quoted are one standard deviation as estimated by the least squares fit. The number of significant figures quoted are necessary to reproduce the calculated transition frequencies within their standard deviations.

[b] Strictly speaking, τ_3 is not a determinable parameter, but is calculated from τ_1, τ_2, τ_{aaaa} and τ_{bbbb} using the planarity conditions.

[c] Watson uses $2h_J$ for this parameter.

Table 53.2. Rotational and centrifugal distortion constants for $^{16}O_3$ in the ν_1=1, ν_2=1 and ν_3=1 vibrational states.

Watson's Determinable Parameters	Value for the (1,0,0) State (MHz) [70048]	Value for the (0,1,0) State (MHz) [76000][a]	Value for the (0,0,1) State (MHz) [70048]	Value for the (0,2,0) State (MHz) [70048]
A"	106 625.59(280)	108 137.69(29)	104 943.79(440)	109 795.91(300)
B"	13 272.68(50)	13 311.1264(368)	13 229.59(70)	13 272.88(60)
C"	11 764.82(30)[c]	11 765.1942(336)	11 726.05(50)[c]	11 694.26(60)
τ_1		0.03530(1702)		
τ_2		-0.030631(2017)		
τ_3[b]		4.48(6)		
τ_{aaaa}		-27.598(107)		
τ_{bbbb}		-0.071546(680)		
τ_{cccc}		-0.038352(530)		
Std. dev.		0.252		
No. Lines fit		17		
Derived Parameters (assuming planarity conditions)				
A'		108 137.66(29)		
B'		13 311.196(36)		
C'		11 765.166(34)		
τ'_{bbcc}		-0.04889(64)		
τ'_{ccaa}		0.1399(47)		
τ'_{aabb}		-0.0556(117)		
$\tau_{aabb}(1)$		0.6190(76)		
$\tau_{aabb}(2)$		0.5530(60)		
$\tau_{aabb}(3)$		0.5530(60)		
$\tau_{abab}(1)$		-0.3373(21)		
$\tau_{abab}(2)$		-0.2777(39)		
$\tau_{abab}(3)$		-0.2708(41)		
$\Delta\tau$		$-0.133(4)\times10^{-2}$		

[a] The uncertainties quoted are one standard deviation as estimated by the least squares fit. The number of significant figures quoted are necessary to reproduce the calculated transition frequencies within their standard deviations.

[b] Strictly speaking, τ_3 is not a determinable parameter, but is calculated from τ_2, τ_3, τ_{aaaa} and τ_{bbbb} using the planarity conditions.

[c] This is the unperturbed rotational constant C.

Table 53.3. Molecular Zeeman constants and electric dipole moment of $^{16}O_3$.

Parameters	Value	Reference
Zeeman constants:		
g_{aa} (μ_N)	-2.968(35)	[69027][a]
g_{bb} (μ_N)	-0.228(7)	[69027][a]
g_{cc} (μ_N)	-0.081(61)	[69027][a]
$2\chi_{aa}-\chi_{bb}-\chi_{cc}$ (erg/G^2·mole)	98.0(56)×10^{-6}	[69027]
$2\chi_{bb}-\chi_{aa}-\chi_{cc}$ (erg/G^2·mole)	-17.4(44)×10^{-6}	[69027]
Electric dipole moment:		
μ_b (D)	0.5324(24)	[71026]

[a] The g-factors determined by Weiffenbach [58003] are: g_{aa} = -2.9889(87)μ_N, g_{bb} = -0.2207(42)μ_N and g_{cc} = -0.0891(51)μ_N.

TABLE 53.4. The microwave spectrum of O_3

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{16}O^{16}O$	31(5,27) - 32(4,28)	(0,0,0)	789.675	(*0.02)	[76000]
	33(4,30) - 32(5,27)	(0,0,0)	1087.774	(*0.02)	[76000]
	4(0, 4) - 3(1, 3)	(0,1,0)	9077.22	(0.10)	[70048]
	21(2,20) - 20(3,17)	(0,0,0)	9201.	(0.50)	[53009]
	18(2,16) - 19(1,19)	(1,0,0)	9669.57	(0.10)	[70048]
	10(1, 9) - 9(2, 8)	(0,0,0)	10226.	(0.50)	[53009]
	16(2,14) - 17(1,17)	(1,0,0)	10272.31	(0.10)	[70048]
	4(0, 4) - 3(1, 3)	(1,0,0)	10518.32	(0.10)	[70048]
	35(2,34) - 34(3,31)	(0,0,0)	10613.461	(*0.12)	[76000]
	17(2,15) - 16(3,14)	(0,0,1)	10705.73	(0.10)	[70048]
	4(0, 4) - 3(1, 3)	(0,0,0)	11072.64	(0.10)	[69027]
	19(3,16) - 20(2,19)	(0,0,1)	12593.91	(0.10)	[70048]
	40(5,35) - 39(6,34)	(0,0,0)	14821.435	(*0.06)	[76000]
	23(4,20) - 24(3,21)	(0,0,0)	14866.	(0.50)	[53009]
	2(1, 2) - 3(0, 3)	(0,0,1)	15664.57	(0.10)	[70048]
	27(3,25) - 26(4,22)	(0,0,0)	16163.	(0.50)	[53009]
	8(2, 7) - 9(1, 8)	(0,0,1)	18672.97	(0.10)	[70048]
	14(2,12) - 15(1,15)	(1,0,0)	19215.88	(0.10)	[70048]
	18(3,15) - 19(2,18)	(1,0,0)	20309.34	(0.10)	[70048]
	23(2,22) - 22(3,19)	(0,1,0)	23551.06	(0.10)	[70048]
	18(3,15) - 19(2,18)	(0,0,0)	23859.66	(0.03)	[73042]
	38(6,32) - 39(5,35)	(0,0,0)	25511.	(0.50)	[53009]
	16(2,14) - 17(1,17)	(0,0,0)	25650.95	(0.03)	[73042]
	36(3,33) - 37(2,36)	(0,0,0)	27458.131	(*0.24)	[76000]
	41(5,37) - 40(6,34)	(0,0,0)	27862.	(0.50)	[53009]
	23(4,20) - 24(3,21)	(0,1,0)	27947.60	(0.10)	[70048]
	18(2,16) - 17(3,15)	(0,1,0)	28915.14	(0.10)	[70048]
	24(4,20) - 25(3,23)	(0,0,0)	28960.51	(0.03)	[73042]
	18(2,16) - 17(3,15)	(1,0,0)	29143.30	(0.10)	[70048]
	15(3,13) - 16(2,14)	(0,0,0)	30051.77	(0.03)	[73042]
	14(2,12) - 15(1,15)	(0,0,0)	30181.23	(0.03)	[73042]
	18(2,16) - 19(1,19)	(0,0,0)	30524.03	(0.03)	[73042]
	18(3,15) - 19(2,18)	(0,1,0)	34916.30	(0.10)	[70048]

TABLE 53.4. The microwave spectrum of O_3—Continued

Isotopic species	$J'(K'_-,K'_+)$ – $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{16}O^{16}O$	23(2,22) – 22(3,19)	(0,0,0)	36021.95	(0.03)	[73042]
	16(2,14) – 17(1,17)	(0,1,0)	36141.41	(0.10)	[70048]
	12(2,10) – 13(1,13)	(1,0,0)	36254.79	(0.10)	[70048]
	15(3,13) – 16(2,14)	(1,0,0)	36281.44	(0.10)	[70048]
	18(2,16) – 17(3,15)	(0,0,0)	37832.40	(0.03)	[73042]
	26(3,23) – 25(4,22)	(0,1,0)	39094.99	(0.10)	[70048]
	5(0, 5) – 4(1, 4)	(0,0,1)	39099.20	(0.10)	[70048]
	15(3,13) – 16(2,14)	(0,1,0)	39149.83	(0.10)	[70048]
	33(2,32) – 32(3,29)	(0,0,0)	39438.134	(*0.06)	[76000]
	14(2,12) – 15(1,15)	(0,1,0)	39459.16	(0.10)	[70048]
	15(2,13) – 16(1,16)	(0,0,1)	40733.37	(0.10)	[70048]
	25(2,24) – 24(3,21)	(0,1,0)	41922.10	(0.10)	[70048]
	18(2,16) – 19(1,19)	(0,1,0)	42427.79	(0.10)	[70048]
	1(1, 1) – 2(0, 2)	(0,0,0)	42832.62	(0.07)	[53010]
	1(1, 1) – 2(0, 2)	(1,0,0)	43059.90	(0.10)	[70048]
	24(4,20) – 25(3,23)	(0,1,0)	43190.84	(0.10)	[70048]
	12(2,10) – 13(1,13)	(0,0,0)	43653.31	(0.03)	[73042]
	37(6,32) – 38(5,33)	(0,0,0)	43853.59	(0.03)	[73042]
	1(1, 1) – 2(0, 2)	(0,1,0)	44686.09	(0.10)	[70048]
	20(2,18) – 21(1,21)	(0,0,0)	44871.161	(*0.03)	[76000]
	17(3,14) – 18(2,17)	(0,0,1)	45321.90	(0.10)	[70048]
	13(2,11) – 14(1,14)	(0,0,1)	45388.19	(0.10)	[70048]
	17(2,15) – 18(1,18)	(0,0,1)	45989.89	(0.10)	[70048]
	1(1, 1) – 2(0, 2)	(0,2,0)	46600.95	(0.10)	[70048]
	11(1,10) – 10(2, 9)	(0,0,1)	46688.20	(0.10)	[70048]
	16(2,14) – 17(1,17)	(0,2,0)	46977.39	(0.10)	[70048]
	15(3,13) – 16(2,14)	(0,2,0)	48532.16	(0.10)	[70048]
	14(2,12) – 15(1,15)	(0,2,0)	49041.20	(0.10)	[70048]
	30(5,25) – 31(4,28)	(0,0,0)	50034.93	(0.03)	[73042]
	35(4,32) – 34(5,29)	(0,0,0)	51053.04	(0.03)	[73042]
	12(2,10) – 13(1,13)	(0,1,0)	51913.43	(0.10)	[70048]
	26(3,23) – 25(4,22)	(0,0,0)	51975.70	(0.03)	[73042]
	7(2, 6) – 8(1, 7)	(0,0,0)	53688.18	(0.03)	[73042]
	18(2,16) – 19(1,19)	(0,2,0)	54725.88	(0.10)	[70048]
	25(2,24) – 24(3,21)	(0,0,0)	55354.47	(0.03)	[73042]
	14(3,12) – 15(2,13)	(0,0,1)	56313.97	(0.10)	[70048]
	7(2, 6) – 8(1, 7)	(1,0,0)	56322.72	(0.10)	[70048]
	29(3,27) – 28(4,24)	(0,0,0)	58093.93	(0.03)	[73042]
	20(2,18) – 21(1,21)	(0,1,0)	58385.94	(0.10)	[70048]
	31(2,30) – 30(3,27)	(0,0,0)	58411.075	(*0.04)	[76000]
	7(2, 6) – 8(1, 7)	(0,1,0)	58950.75	(0.10)	[70048]
	11(2, 9) – 12(1,12)	(0,0,1)	59371.52	(0.10)	[70048]
	16(3,13) – 17(2,16)	(1,0,0)	60127.35	(0.10)	[70048]
	12(2,10) – 13(1,13)	(0,2,0)	60443.42	(0.10)	[70048]
	10(2, 8) – 11(1,11)	(1,0,0)	60569.36	(0.10)	[70048]
	19(2,17) – 20(1,20)	(0,0,1)	61286.66	(0.10)	[70048]
	29(5,25) – 30(4,26)	(0,0,0)	61347.44	(0.03)	[73042]
	16(3,13) – 17(2,16)	(0,0,0)	61926.73	(0.03)	[73042]
	34(4,30) – 33(5,29)	(0,0,0)	63078.74	(0.03)	[73042]
	6(0, 6) – 5(1, 5)	(0,2,0)	63115.23	(0.10)	[70048]
	7(2, 6) – 8(1, 7)	(0,2,0)	64381.95	(0.10)	[70048]
	10(2, 8) – 11(1,11)	(0,0,0)	65236.13	(0.03)	[73042]
	6(0, 6) – 5(1, 5)	(0,1,0)	65267.04	(0.10)	[70048]
	27(2,26) – 26(3,23)	(0,0,0)	66058.52	(0.03)	[73042]
	12(1,11) – 11(2,10)	(0,2,0)	66210.09	(0.10)	[70048]
	6(0, 6) – 5(1, 5)	(1,0,0)	66333.14	(0.10)	[70048]
	29(2,28) – 28(3,25)	(0,0,0)	67249.68	(0.03)	[73042]
	6(0, 6) – 5(1, 5)	(0,0,0)	67356.24	(0.03)	[73042]
	22(2,20) – 23(1,23)	(0,0,0)	68421.947	(*0.03)	[76000]

TABLE 53.4. The microwave spectrum of O_3—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{16}O^{16}O$	38(3,35) - 39(2,38)	(0,0,0)	73919.463	(*0.44)	[76000]
	42(5,37) - 41(6,36)	(0,0,0)	75849.631	(*0.10)	[76000]
	22(4,18) - 23(3,21)	(0,0,0)	76393.55	(0.03)	[73042]
	12(1,11) - 11(2,10)	(0,0,0)	76533.72	(0.03)	[73042]
	21(4,18) - 22(3,19)	(0,0,0)	77602.46	(0.03)	[73042]
	36(6,30) - 37(5,33)	(0,0,0)	78992.54	(0.03)	[73042]
	8(2, 6) - 9(1, 9)	(0,0,0)	93844.35	(0.05)	[71026]
	13(3,11) - 14(2,12)	(0,0,0)	93955.05	(0.05)	[71026]
	31(3,29) - 30(4,26)	(0,0,0)	95796.40	(0.05)	[71026]
	2(1, 1) - 2(0, 2)	(0,0,0)	96228.34	(0.05)	[71026]
	37(4,34) - 36(5,31)	(0,0,0)	99247.171	(*0.03)	[76000]
	24(2,22) - 25(1,25)	(0,0,0)	100637.311	(*0.04)	[76000]
	35(6,30) - 36(5,31)	(0,0,0)	100691.378	(*0.03)	[76000]
	4(1, 3) - 4(0, 4)	(0,0,0)	101736.87	(0.05)	[71026]
	28(5,23) - 29(4,26)	(0,0,0)	101835.42	(0.05)	[71026]
	14(3,11) - 15(2,14)	(0,0,0)	103878.39	(0.05)	[71026]
	20(2,18) - 19(3,17)	(0,0,0)	109559.33	(0.05)	[71026]
	6(1, 5) - 6(0, 6)	(0,0,0)	110836.04	(0.05)	[71026]
	5(2, 4) - 6(1, 5)	(0,0,0)	114979.20	(0.05)	[71026]
	1(1, 1) - 0(0, 0)	(0,0,0)	118364.50	(0.06)	[73042]
	27(5,23) - 28(4,24)	(0,0,0)	119277.62	(0.06)	[73042]
	28(3,25) - 27(4,24)	(0,0,0)	123349.09	(0.06)	[73042]
	8(1, 7) - 8(0, 8)	(0,0,0)	124087.38	(0.06)	[73042]
	8(0, 8) - 7(1, 7)	(0,0,0)	125389.44	(0.06)	[73042]
	20(4,16) - 21(3,19)	(0,0,0)	125413.25	(0.06)	[73042]
	40(3,37) - 41(2,40)	(0,0,0)	127715.362	(*0.76)	[76000]
	33(3,31) - 32(4,28)	(0,0,0)	128094.82	(0.10)	[71026]
	6(2, 4) - 7(1, 7)	(0,0,0)	128313.85	(0.10)	[71026]
	36(4,32) - 35(5,31)	(0,0,0)	130954.82	(0.06)	[73042]
	34(6,28) - 35(5,31)	(0,0,0)	132385.01	(0.06)	[73042]
	41(7,35) - 42(6,36)	(0,0,0)	136337.307	(*0.10)	[76000]
	19(4,16) - 20(3,17)	(0,0,0)	136860.24	(0.10)	[71026]
	26(2,24) - 27(1,27)	(0,0,0)	140767.27	(0.06)	[73042]
	10(1, 9) - 10(0,10)	(0,0,0)	142175.04	(0.06)	[73042]
	39(4,36) - 38(5,33)	(0,0,0)	144910.67	(0.06)	[73042]
	14(1,13) - 13(2,12)	(0,0,0)	144919.36	(0.06)	[73042]
	12(3, 9) - 13(2,12)	(0,0,0)	148744.87	(0.06)	[73042]
	35(3,33) - 34(4,30)	(0,0,0)	153724.19	(0.10)	[71026]
	26(5,21) - 27(4,24)	(0,0,0)	153953.19	(0.06)	[73042]
	11(3, 9) - 12(2,10)	(0,0,0)	154046.44	(0.06)	[73042]
	33(6,28) - 34(5,29)	(0,0,0)	156106.81	(0.06)	[73042]
	40(7,33) - 41(6,36)	(0,0,0)	164769.973	(*0.10)	[76000]
	3(1, 3) - 2(0, 2)	(0,0,0)	164951.82	(0.30)	[71026]
	12(1,11) - 12(0,12)	(0,0,0)	165784.45	(0.30)	[71026]
	4(2, 2) - 5(1, 5)	(0,0,0)	167572.71	(0.30)	[71026]
	37(3,35) - 36(4,32)	(0,0,0)	171412.53	(0.10)	[73042]
	3(2, 2) - 4(1, 3)	(0,0,0)	173485.54	(0.10)	[73042]
	25(5,21) - 26(4,22)	(0,0,0)	175186.39	(0.10)	[73042]
	18(4,14) - 19(3,17)	(0,0,0)	175445.70	(0.10)	[73042]
	41(3,39) - 40(4,36)	(0,0,0)	178576.991	(*0.12)	[76000]
	39(3,37) - 38(4,34)	(0,0,0)	180001.29	(0.10)	[73042]
	10(0,10) - 9(1, 9)	(0,0,0)	184377.82	(0.10)	[73042]
	22(2,20) - 21(3,19)	(0,0,0)	184748.72	(0.10)	[73042]
	32(6,26) - 33(5,29)	(0,0,0)	185556.83	(0.10)	[73042]
	41(4,38) - 40(5,33)	(0,0,0)	187132.48	(0.10)	[73042]
	28(2,26) - 29(1,29)	(0,0,0)	187884.766	(*0.11)	[76000]
	39(7,33) - 40(6,34)	(0,0,0)	190572.635	(*0.10)	[76000]
	17(4,14) - 18(3,15)	(0,0,0)	193351.30	(0.50)	[71026]
	14(1,13) - 14(0,14)	(0,0,0)	195430.51	(0.50)	[71026]

TABLE 53.4. The microwave spectrum of O_3—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{16}O^{16}O$	10(3, 7) - 11(2,10)	(0,0,0)	195721.19	(0.50)	[71026]
	30(3,27) - 29(4,26)	(0,0,0)	199384.288	(*0.03)	[76000]
	38(4,34) - 37(5,33)	(0,0,0)	203453.154	(*0.07)	[76000]
	24(5,19) - 25(4,22)	(0,0,0)	206132.092	(*0.02)	[76000]
	5(1, 5) - 4(0, 4)	(0,0,0)	208642.44	(0.50)	[71026]
	31(6,26) - 32(5,27)	(0,0,0)	210423.10	(0.50)	[71026]
	2(2, 0) - 3(1, 3)	(0,0,0)	210762.330	(*0.01)	[76000]
	9(3, 7) - 10(2, 8)	(0,0,0)	210803.80	(0.50)	[71026]
	16(1,15) - 15(2,14)	(0,0,0)	214955.668	(*0.02)	[76000]
	38(7,31) - 39(6,34)	(0,0,0)	218118.775	(*0.10)	[76000]
	16(4,12) - 17(3,15)	(0,0,0)	226054.092	(*0.01)	[76000]
	23(5,19) - 24(4,20)	(0,0,0)	229575.008	(*0.02)	[76000]
	16(1,15) - 16(0,16)	(0,0,0)	231281.505	(*0.02)	[76000]
	16(2,14) - 16(1,15)	(0,0,0)	235709.84	(0.10)	[73042]
	14(2,12) - 14(1,13)	(0,0,0)	237146.135	(*0.02)	[76000]
	30(6,24) - 31(5,27)	(0,0,0)	238431.986	(*0.03)	[76000]
	18(2,16) - 18(1,17)	(0,0,0)	239093.26	(0.10)	[73042]
	30(2,28) - 31(1,31)	(0,0,0)	240904.117	(*0.22)	[76000]
	12(2,10) - 12(1,11)	(0,0,0)	242318.687	(*0.02)	[76000]
	12(0,12) - 11(1,11)	(0,0,0)	243453.70	(0.50)	[71026]
	37(7,31) - 38(6,32)	(0,0,0)	244145.861	(*0.10)	[76000]
	8(3, 5) - 9(2, 8)	(0,0,0)	244158.04	(0.50)	[71026]
	15(4,12) - 16(3,13)	(0,0,0)	247761.77	(0.12)	[73042]
	20(2,18) - 20(1,19)	(0,0,0)	248183.38	(0.12)	[73042]
	7(1, 7) - 6(0, 6)	(0,0,0)	249788.60	(0.12)	[73042]
	10(2, 8) - 10(1, 9)	(0,0,0)	249961.96	(0.12)	[73042]
	22(5,17) - 23(4,20)	(0,0,0)	258202.05	(0.12)	[73042]
	8(2, 6) - 8(1, 7)	(0,0,0)	258716.18	(0.12)	[73042]
	24(2,22) - 23(3,21)	(0,0,0)	262857.85	(0.12)	[73042]
	22(2,20) - 22(1,21)	(0,0,0)	263692.60	(0.12)	[73042]
	29(6,24) - 30(5,25)	(0,0,0)	263886.160	(*0.03)	[76000]
	7(3, 5) - 8(2, 6)	(0,0,0)	264925.914	(*0.01)	[76000]
	6(2, 4) - 6(1, 5)	(0,0,0)	267266.57	(0.12)	[73042]
	36(7,29) - 37(6,32)	(0,0,0)	271092.004	(*0.11)	[76000]
	18(1,17) - 18(0,18)	(0,0,0)	273050.90	(0.12)	[73042]
	4(2, 2) - 4(1, 3)	(0,0,0)	274478.38	(0.12)	[73042]
	14(4,10) - 15(3,13)	(0,0,0)	276923.54	(0.12)	[73042]
	2(2, 0) - 2(1, 1)	(0,0,0)	279485.90	(0.50)	[71026]
	32(3,29) - 31(4,28)	(0,0,0)	279892.46	(0.12)	[73042]
	40(4,36) - 39(5,35)	(0,0,0)	280994.648	(*0.14)	[76000]
	21(5,17) - 22(4,18)	(0,0,0)	282837.20	(0.12)	[73042]
	18(1,17) - 17(2,16)	(0,0,0)	286087.69	(0.12)	[73042]
	24(2,22) - 24(1,23)	(0,0,0)	286156.53	(0.12)	[73042]
	3(2, 2) - 3(1, 3)	(0,0,0)	286294.75	(0.12)	[73042]
	9(1, 9) - 8(0, 8)	(0,0,0)	288959.14	(0.12)	[73042]
	28(6,22) - 29(5,25)	(0,0,0)	290975.12	(0.12)	[73042]
	5(2, 4) - 5(1, 5)	(0,0,0)	293171.27	(0.12)	[73042]
	6(3, 3) - 7(2, 6)	(0,0,0)	293548.23	(0.12)	[73042]
	35(7,29) - 36(6,30)	(0,0,0)	297173.047	(*0.12)	[76000]
	32(2,30) - 33(1,33)	(0,0,0)	298600.699	(*0.42)	[76000]
	13(4,10) - 14(3,11)	(0,0,0)	300685.15	(0.12)	[73042]
	14(0,14) - 13(1,13)	(0,0,0)	301813.00	(0.12)	[73042]
	7(2, 6) - 7(1, 7)	(0,0,0)	303164.92	(0.12)	[73042]
	20(5,15) - 21(4,18)	(0,0,0)	310063.56	(0.12)	[73042]
	26(2,24) - 26(1,25)	(0,0,0)	315875.12	(0.12)	[73042]
	9(2, 8) - 9(1, 9)	(0,0,0)	316327.25	(0.12)	[73042]
	27(6,22) - 28(5,23)	(0,0,0)	316681.699	(*0.05)	[76000]
	5(3, 3) - 6(2, 4)	(0,0,0)	317195.06	(0.12)	[73042]
	20(1,19) - 20(0,20)	(0,0,0)	319996.54	(0.12)	[73042]

TABLE 53.4. The microwave spectrum of O_3—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{16}O^{16}O$	34(7,27) - 35(6,30)	(0,0,0)	323703.949	(*0.13)	[76000]
	11(1,11) - 10(0,10)	(0,0,0)	326900.965	(*0.02)	[76000]
	12(4, 8) - 13(3,11)	(0,0,0)	327844.594	(*0.02)	[76000]
	41(8,34) - 42(7,35)	(0,0,0)	329787.355	(*0.32)	[76000]
	11(2,10) - 11(1,11)	(0,0,0)	332704.536	(*0.01)	[76000]
	2(2, 0) - 1(1, 1)	(0,0,0)	332881.728	(*0.02)	[76000]
	19(5,15) - 20(4,16)	(0,0,0)	335271.293	(*0.03)	[76000]
	26(6,20) - 27(5,23)	(0,0,0)	343180.727	(*0.05)	[76000]
	26(2,24) - 25(3,23)	(0,0,0)	343237.393	(*0.03)	[76000]
	4(3, 1) - 5(2, 4)	(0,0,0)	343505.668	(*0.02)	[76000]
	33(7,27) - 34(6,28)	(0,0,0)	349744.242	(*0.14)	[76000]
	13(2,12) - 13(1,13)	(0,0,0)	352323.98	(0.15)	[73042]
	11(4, 8) - 12(3, 9)	(0,0,0)	352592.934	(*0.03)	[76000]
	28(2,26) - 28(1,27)	(0,0,0)	352815.152	(*0.05)	[76000]
	3(2, 2) - 2(1, 1)	(0,0,0)	355018.03	(0.15)	[73042]
	40(8,32) - 41(7,35)	(0,0,0)	356087.648	(*0.33)	[76000]
	20(1,19) - 19(2,18)	(0,0,0)	357629.83	(0.15)	[73042]
	30(3,27) - 30(2,28)	(0,0,0)	358199.728	(*0.13)	[76000]
	16(0,16) - 15(1,15)	(0,0,0)	358853.35	(0.15)	[73042]
	34(2,32) - 35(1,35)	(0,0,0)	359649.332	(*0.71)	[76000]
	28(3,25) - 28(2,26)	(0,0,0)	359649.576	(*0.09)	[76000]
	18(5,13) - 19(4,16)	(0,0,0)	361669.410	(*0.04)	[76000]
	32(3,29) - 32(2,30)	(0,0,0)	363469.162	(*0.18)	[76000]
	42(4,38) - 41(5,37)	(0,0,0)	363714.341	(*0.25)	[76000]
	34(3,31) - 33(4,30)	(0,0,0)	364403.658	(*0.06)	[76000]
	13(1,13) - 12(0,12)	(0,0,0)	364449.88	(0.15)	[73042]
	26(3,23) - 26(2,24)	(0,0,0)	366776.879	(*0.06)	[76000]
	3(3, 1) - 4(2, 2)	(0,0,0)	368332.199	(*0.02)	[76000]
	25(6,20) - 26(5,21)	(0,0,0)	368949.332	(*0.06)	[76000]
	22(1,21) - 22(0,22)	(0,0,0)	371022.83	(0.15)	[73042]
	15(2,14) - 15(1,15)	(0,0,0)	375179.26	(0.15)	[73042]
	32(7,25) - 33(6,28)	(0,0,0)	375978.312	(*0.15)	[76000]
	34(3,31) - 34(2,32)	(0,0,0)	376238.179	(*0.25)	[76000]
	24(3,21) - 24(2,22)	(0,0,0)	378281.16	(0.15)	[73042]
	10(4, 6) - 11(3, 9)	(0,0,0)	378694.914	(*0.03)	[76000]
	39(8,32) - 40(7,33)	(0,0,0)	382190.762	(*0.35)	[76000]
	17(5,13) - 18(4,14)	(0,0,0)	387098.492	(*0.04)	[76000]
	4(2, 2) - 3(1, 3)	(0,0,0)	387287.632	(*0.02)	[76000]
	22(3,19) - 22(2,20)	(0,0,0)	392653.969	(*0.03)	[76000]
	24(6,18) - 25(5,21)	(0,0,0)	395063.152	(*0.07)	[76000]
	30(2,28) - 30(1,29)	(0,0,0)	396529.345	(*0.08)	[76000]
	36(3,33) - 36(2,34)	(0,0,0)	397027.490	(*0.34)	[76000]
$^{16}O^{18}O^{16}O$	33(2,32) - 32(3,29)	(0,0,0)	3832.957	(*0.07)	[76000]
	19(2,18) - 18(3,15)	(0,0,0)	4653.785	(*0.01)	[76000]
	37(5,33) - 36(6,30)	(0,0,0)	6967.065	(*0.03)	[76000]
	35(6,30) - 36(5,31)	(0,0,0)	10010.626	(*0.02)	[76000]
	16(2,14) - 15(3,13)	(0,0,0)	14868.760	(*0.01)	[76000]
	30(4,26) - 29(5,25)	(0,0,0)	16355.878	(*0.01)	[76000]
	21(4,18) - 22(3,19)	(0,0,0)	16669.913	(*0.01)	[76000]
	31(4,28) - 30(5,25)	(0,0,0)	17658.044	(*0.02)	[76000]
$^{16}O^{18}O^{16}O$	4(0, 4) - 3(1, 3)	(0,0,0)	18768.04	(0.03)	[73042]
	25(3,23) - 24(4,20)	(0,0,0)	19100.52	(0.03)	[73042]
	14(2,12) - 15(1,15)	(0,0,0)	22206.00	(0.03)	[73042]
	16(2,14) - 17(1,17)	(0,0,0)	23422.38	(0.03)	[73042]
	22(4,18) - 23(3,21)	(0,0,0)	26040.267	(*0.01)	[76000]
	7(2, 6) - 8(1, 7)	(0,0,0)	29227.72	(0.03)	[73042]
	16(3,13) - 17(2,16)	(0,0,0)	29889.31	(0.03)	[73042]
	12(2,10) - 13(1,13)	(0,0,0)	30914.15	(0.03)	[73042]
	21(2,20) - 20(3,17)	(0,0,0)	32839.83	(0.03)	[73042]

TABLE 53.4. The microwave spectrum of O_3—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{18}O^{16}O$	28(5,23) - 29(4,26)	(0,0,0)	33190.15	(0.03)	[73042]
	18(2,16) - 19(1,19)	(0,0,0)	34814.88	(0.03)	[73042]
	31(2,30) - 30(3,27)	(0,0,0)	34969.17	(0.03)	[73042]
	1(1, 1) - 2(0, 2)	(0,0,0)	35143.15	(0.03)	[73042]
	10(1, 9) - 9(2, 8)	(0,0,0)	35280.14	(0.03)	[73042]
	34(3,31) - 35(2,34)	(0,0,0)	36989.452	(*0.15)	[76000]
	27(5,23) - 28(4,24)	(0,0,0)	44622.78	(0.03)	[73042]
	34(6,28) - 35(5,31)	(0,0,0)	46446.623	(*0.02)	[76000]
	10(2, 8) - 11(1,11)	(0,0,0)	48806.89	(0.03)	[73042]
	24(3,21) - 23(4,20)	(0,0,0)	49691.03	(0.03)	[73042]
	38(5,33) - 37(6,32)	(0,0,0)	49733.33	(0.03)	[73042]
	13(3,11) - 14(2,12)	(0,0,0)	51208.78	(0.03)	[73042]
	23(2,22) - 22(3,19)	(0,0,0)	53212.64	(0.03)	[73042]
	29(2,28) - 28(3,25)	(0,0,0)	55634.305	(*0.02)	[76000]
	20(2,18) - 21(1,21)	(0,0,0)	56182.31	(0.03)	[73042]
	39(5,35) - 38(6,32)	(0,0,0)	60136.58	(0.03)	[73042]
	27(3,25) - 26(4,22)	(0,0,0)	60818.26	(0.03)	[73042]
	25(2,24) - 24(3,21)	(0,0,0)	64424.11	(0.03)	[73042]
	27(2,26) - 26(3,23)	(0,0,0)	65427.81	(0.03)	[73042]
	33(4,30) - 32(5,27)	(0,0,0)	67120.592	(*0.02)	[76000]
	33(6,28) - 34(5,29)	(0,0,0)	67506.39	(0.03)	[73042]
	14(3,11) - 15(2,14)	(0,0,0)	69391.17	(0.03)	[73042]
	20(4,16) - 21(3,19)	(0,0,0)	73587.94	(0.03)	[73042]
	8(2, 6) - 9(1, 9)	(0,0,0)	74743.44	(0.03)	[73042]
	6(0, 6) - 5(1, 5)	(0,0,0)	75111.23	(0.03)	[73042]
	19(4,16) - 20(3,17)	(0,0,0)	78675.23	(0.03)	[73042]
	32(4,28) - 31(5,27)	(0,0,0)	81081.616	(*0.01)	[76000]
	26(5,21) - 27(4,24)	(0,0,0)	84833.826	(*0.01)	[76000]
	18(2,16) - 17(3,15)	(0,0,0)	85145.710	(*0.01)	[76000]
	36(3,33) - 37(2,36)	(0,0,0)	86418.325	(*0.29)	[76000]
	22(2,20) - 23(1,23)	(0,0,0)	86964.488	(*0.03)	[76000]
	2(1, 1) - 2(0, 2)	(0,0,0)	88552.928	(*2E-3)	[76000]
	5(2, 4) - 6(1, 5)	(0,0,0)	91010.005	(*0.01)	[76000]
	4(1, 3) - 4(0, 4)	(0,0,0)	94483.879	(*3E-3)	[76000]
	29(3,27) - 28(4,24)	(0,0,0)	97900.229	(*0.01)	[76000]
	32(6,26) - 33(5,29)	(0,0,0)	99828.589	(*0.02)	[76000]
	12(1,11) - 11(2,10)	(0,0,0)	102211.875	(*0.01)	[76000]
	25(5,21) - 26(4,22)	(0,0,0)	102658.587	(*0.01)	[76000]
	6(1, 5) - 6(0, 6)	(0,0,0)	104355.394	(*3E-3)	[76000]
	6(2, 4) - 7(1, 7)	(0,0,0)	107388.463	(*0.01)	[76000]
	1(1, 1) - 0(0, 0)	(0,0,0)	110373.253	(*3E-3)	[76000]
	12(3, 9) - 13(2,12)	(0,0,0)	112613.445	(*0.01)	[76000]
	11(3, 9) - 12(2,10)	(0,0,0)	113055.087	(*0.01)	[76000]
	35(4,32) - 34(5,29)	(0,0,0)	114434.155	(*0.02)	[76000]
	8(1, 7) - 8(0, 8)	(0,0,0)	118855.71	(0.06)	[73042]
	26(3,23) - 25(4,22)	(0,0,0)	120914.48	(0.06)	[73042]
	18(4,14) - 19(3,17)	(0,0,0)	122724.05	(0.06)	[73042]
	31(6,26) - 32(5,27)	(0,0,0)	123290.44	(0.06)	[73042]
	24(2,22) - 25(1,25)	(0,0,0)	126325.362	(*0.06)	[76000]
	31(3,29) - 30(4,26)	(0,0,0)	128963.504	(*0.01)	[76000]
	8(0, 8) - 7(1, 7)	(0,0,0)	133109.68	(0.06)	[73042]
	24(5,19) - 25(4,22)	(0,0,0)	136837.07	(0.06)	[73042]
	17(4,14) - 18(3,15)	(0,0,0)	137072.54	(0.06)	[73042]
	10(1, 9) - 10(0,10)	(0,0,0)	138792.54	(0.06)	[73042]
	37(7,31) - 38(6,32)	(0,0,0)	142052.957	(*0.05)	[76000]
	4(2, 2) - 5(1, 5)	(0,0,0)	145452.66	(0.06)	[73042]
	3(2, 2) - 4(1, 3)	(0,0,0)	149857.12	(0.06)	[73042]
	34(4,30) - 33(5,29)	(0,0,0)	150350.94	(0.06)	[73042]
	33(3,31) - 32(4,28)	(0,0,0)	152524.73	(0.06)	[73042]
	30(6,24) - 31(5,27)	(0,0,0)	152998.48	(0.06)	[73042]

TABLE 53.4. The microwave spectrum of O_3—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{18}O^{16}O$	3(1, 3) - 2(0, 2)	(0,0,0)	156498.76	(0.06)	[73042]
	23(5,19) - 24(4,20)	(0,0,0)	158468.62	(0.06)	[73042]
	10(3, 7) - 11(2,10)	(0,0,0)	158518.73	(0.06)	[73042]
	37(4,34) - 36(5,31)	(0,0,0)	158647.74	(0.10)	[73042]
	20(2,18) - 19(3,17)	(0,0,0)	159255.79	(0.06)	[73042]
	12(1,11) - 12(0,12)	(0,0,0)	164906.240	(*0.01)	[76000]
	35(3,33) - 34(4,30)	(0,0,0)	167123.487	(*0.04)	[76000]
	36(7,29) - 37(6,32)	(0,0,0)	169914.471	(*0.05)	[76000]
	9(3, 7) - 10(2, 8)	(0,0,0)	171033.525	(*0.01)	[76000]
	14(1,13) - 13(2,12)	(0,0,0)	171144.20	(0.10)	[73042]
	37(3,35) - 36(4,32)	(0,0,0)	171492.418	(*0.08)	[76000]
	16(4,12) - 17(3,15)	(0,0,0)	172815.47	(0.10)	[73042]
	26(2,24) - 27(1,27)	(0,0,0)	173203.326	(*0.12)	[76000]
	29(6,24) - 30(5,25)	(0,0,0)	177776.87	(0.10)	[73042]
	2(2, 0) - 3(1, 3)	(0,0,0)	187878.937	(*0.01)	[76000]
	22(5,17) - 23(4,20)	(0,0,0)	188896.264	(*0.01)	[76000]
	10(0,10) - 9(1, 9)	(0,0,0)	191806.075	(*0.01)	[76000]
	15(4,12) - 16(3,13)	(0,0,0)	192688.170	(*0.01)	[76000]
	35(7,29) - 36(6,30)	(0,0,0)	195895.082	(*0.05)	[76000]
	28(3,25) - 27(4,24)	(0,0,0)	197141.715	(*0.01)	[76000]
	14(1,13) - 14(0,14)	(0,0,0)	197628.163	(*0.01)	[76000]
	5(1, 5) - 4(0, 4)	(0,0,0)	199549.105	(*0.01)	[76000]
	28(6,22) - 29(5,25)	(0,0,0)	205850.895	(*0.01)	[76000]
	8(3, 5) - 9(2, 8)	(0,0,0)	206272.312	(*0.01)	[76000]
	21(5,17) - 22(4,18)	(0,0,0)	212639.535	(*0.01)	[76000]
	14(2,12) - 14(1,13)	(0,0,0)	216065.439	(*0.01)	[76000]
	16(2,14) - 16(1,15)	(0,0,0)	217506.707	(*0.01)	[76000]
	12(2,10) - 12(1,11)	(0,0,0)	219325.601	(*0.01)	[76000]
	34(7,27) - 35(6,30)	(0,0,0)	223004.732	(*0.05)	[76000]
	14(4,10) - 15(3,13)	(0,0,0)	223396.67	(0.10)	[73042]
	18(2,16) - 18(1,17)	(0,0,0)	224761.85	(0.10)	[73042]
	36(4,32) - 35(5,31)	(0,0,0)	224812.925	(*0.04)	[76000]
	7(3, 5) - 8(2, 6)	(0,0,0)	225850.65	(0.10)	[73042]
	10(2, 8) - 10(1, 9)	(0,0,0)	225929.91	(0.10)	[73042]
	28(2,26) - 29(1,29)	(0,0,0)	226336.891	(*0.21)	[76000]
	27(6,22) - 28(5,23)	(0,0,0)	231276.598	(*0.01)	[76000]
	8(2, 6) - 8(1, 7)	(0,0,0)	234339.98	(0.10)	[73042]
	22(2,20) - 21(3,19)	(0,0,0)	236604.12	(0.10)	[73042]
	16(1,15) - 16(0,16)	(0,0,0)	236876.391	(*0.01)	[76000]
	20(2,18) - 20(1,19)	(0,0,0)	238716.14	(0.10)	[73042]
	7(1, 7) - 6(0, 6)	(0,0,0)	239965.03	(0.10)	[73042]
	20(5,15) - 21(4,18)	(0,0,0)	240817.090	(*0.01)	[76000]
	16(1,15) - 15(2,14)	(0,0,0)	241503.447	(*0.01)	[76000]
	6(2, 4) - 6(1, 5)	(0,0,0)	242998.119	(*0.01)	[76000]
	13(4,10) - 14(3,11)	(0,0,0)	246291.053	(*0.01)	[76000]
	33(7,27) - 34(6,28)	(0,0,0)	249077.445	(*0.05)	[76000]
	12(0,12) - 11(1,11)	(0,0,0)	250206.89	(0.12)	[73042]
	4(2, 2) - 4(1, 3)	(0,0,0)	250517.887	(*0.01)	[76000]
	6(3, 3) - 7(2, 6)	(0,0,0)	255224.211	(*0.01)	[76000]
	2(2, 0) - 2(1, 1)	(0,0,0)	255824.79	(0.12)	[73042]
	26(6,20) - 27(5,23)	(0,0,0)	258336.50	(0.12)	[73042]
	22(2,20) - 22(1,21)	(0,0,0)	260039.687	(*0.01)	[76000]
	3(2, 2) - 3(1, 3)	(0,0,0)	263109.06	(0.12)	[73042]
	19(5,15) - 20(4,16)	(0,0,0)	265623.40	(0.12)	[73042]
	5(2, 4) - 5(1, 5)	(0,0,0)	270476.67	(0.12)	[73042]
	12(4, 8) - 13(3,11)	(0,0,0)	274148.46	(0.12)	[73042]
	32(7,25) - 33(6,28)	(0,0,0)	275682.230	(*0.06)	[76000]
	30(3,27) - 29(4,26)	(0,0,0)	278115.74	(0.12)	[73042]
	5(3, 3) - 6(2, 4)	(0,0,0)	278392.09	(0.12)	[73042]
	9(1, 9) - 8(0, 8)	(0,0,0)	278452.26	(0.12)	[73042]
	7(2, 6) - 7(1, 7)	(0,0,0)	281193.14	(0.12)	[73042]

TABLE 53.4. The microwave spectrum of O_3—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{18}O^{16}O$	18(1,17) - 18(0,18)	(0,0,0)	281985.70	(0.12)	[73042]
	25(6,20) - 26(5,21)	(0,0,0)	284018.78	(0.12)	[73042]
	30(2,28) - 31(1,31)	(0,0,0)	284292.113	(*0.36)	[76000]
	24(2,22) - 24(1,23)	(0,0,0)	289124.26	(0.12)	[73042]
	18(5,13) - 19(4,16)	(0,0,0)	292491.570	(*0.01)	[76000]
	9(2, 8) - 9(1, 9)	(0,0,0)	295318.60	(0.12)	[73042]
	11(4, 8) - 12(3, 9)	(0,0,0)	298517.30	(0.12)	[73042]
	31(7,25) - 32(6,26)	(0,0,0)	301718.469	(*0.06)	[76000]
	38(4,34) - 37(5,33)	(0,0,0)	304822.564	(*0.07)	[76000]
	4(3, 1) - 5(2, 4)	(0,0,0)	304885.91	(0.15)	[73042]
	14(0,14) - 13(1,13)	(0,0,0)	307474.97	(0.12)	[73042]
	2(2, 0) - 1(1, 1)	(0,0,0)	309234.66	(0.12)	[73042]
	24(6,18) - 25(5,21)	(0,0,0)	310445.24	(0.12)	[73042]
	18(1,17) - 17(2,16)	(0,0,0)	312551.34	(0.12)	[73042]
	11(2,10) - 11(1,11)	(0,0,0)	312901.24	(0.12)	[73042]
	11(1,11) - 10(0,10)	(0,0,0)	315915.54	(0.12)	[73042]
	24(2,22) - 23(3,21)	(0,0,0)	316451.64	(0.12)	[73042]
	17(5,13) - 18(4,14)	(0,0,0)	317754.43	(0.12)	[73042]
	37(8,30) - 38(7,31)	(0,0,0)	318847.520	(*0.16)	[76000]
	10(4, 6) - 11(3, 9)	(0,0,0)	324874.840	(*0.01)	[76000]
	26(2,24) - 26(1,25)	(0,0,0)	325956.62	(0.15)	[73042]
	30(7,23) - 31(6,26)	(0,0,0)	327972.012	(*0.06)	[76000]
	28(3,25) - 28(2,26)	(0,0,0)	328529.48	(0.15)	[73042]
	26(3,23) - 26(2,24)	(0,0,0)	329277.56	(0.15)	[73042]
	3(3, 1) - 4(2, 2)	(0,0,0)	329526.012	(*0.01)	[76000]
	3(2, 2) - 2(1, 1)	(0,0,0)	331054.92	(0.15)	[73042]
	20(1,19) - 20(0,20)	(0,0,0)	331796.44	(0.15)	[73042]
	13(2,12) - 13(1,13)	(0,0,0)	333958.97	(0.15)	[73042]
	30(3,27) - 30(2,28)	(0,0,0)	335135.613	(*0.03)	[76000]
	23(6,18) - 24(5,19)	(0,0,0)	336172.219	(*0.02)	[76000]
	24(3,21) - 24(2,22)	(0,0,0)	336200.407	(*0.02)	[76000]
	16(5,11) - 17(4,14)	(0,0,0)	343876.004	(*0.01)	[76000]
	36(8,28) - 37(7,31)	(0,0,0)	345026.828	(*0.17)	[76000]
	32(2,30) - 33(1,33)	(0,0,0)	345518.910	(*0.58)	[76000]
	22(3,19) - 22(2,20)	(0,0,0)	347795.408	(*0.02)	[76000]
	9(4, 6) - 10(3, 7)	(0,0,0)	349849.184	(*0.01)	[76000]
	32(3,29) - 32(2,30)	(0,0,0)	349949.903	(*0.05)	[76000]
	13(1,13) - 12(0,12)	(0,0,0)	353317.71	(0.15)	[73042]
	29(7,23) - 30(6,24)	(0,0,0)	353909.258	(*0.07)	[76000]
	15(2,14) - 15(1,15)	(0,0,0)	358459.90	(0.15)	[73042]
	22(6,16) - 23(5,19)	(0,0,0)	362193.910	(*0.03)	[76000]
	20(3,17) - 20(2,18)	(0,0,0)	362304.487	(*0.02)	[76000]
	16(0,16) - 15(1,15)	(0,0,0)	363086.94	(0.15)	[73042]
	32(3,29) - 31(4,28)	(0,0,0)	363238.863	(*0.03)	[76000]
	4(2, 2) - 3(1, 3)	(0,0,0)	363769.82	(0.15)	[73042]
	15(5,11) - 16(4,12)	(0,0,0)	369273.930	(*0.02)	[76000]
	28(2,26) - 28(1,27)	(0,0,0)	370006.907	(*0.02)	[76000]
	35(8,28) - 36(7,29)	(0,0,0)	371043.914	(*0.17)	[76000]
	34(3,31) - 34(2,32)	(0,0,0)	373495.715	(*0.08)	[76000]
	8(4, 4) - 9(3, 7)	(0,0,0)	375477.758	(*0.01)	[76000]
	5(2, 4) - 4(1, 3)	(0,0,0)	375541.92	(0.15)	[73042]
	18(3,15) - 18(2,16)	(0,0,0)	377873.599	(*0.02)	[76000]
	28(7,21) - 29(6,24)	(0,0,0)	379907.410	(*0.07)	[76000]
	20(1,19) - 19(2,18)	(0,0,0)	383403.661	(*0.01)	[76000]
	22(1,21) - 22(0,22)	(0,0,0)	384855.631	(*0.03)	[76000]
	17(2,16) - 17(1,17)	(0,0,0)	386309.164	(*0.01)	[76000]
	21(6,16) - 22(5,17)	(0,0,0)	387862.184	(*0.03)	[76000]
	15(1,15) - 14(0,14)	(0,0,0)	391487.627	(*0.01)	[76000]
	16(3,13) - 16(2,14)	(0,0,0)	392776.087	(*0.02)	[76000]
	14(5, 9) - 15(4,12)	(0,0,0)	394971.203	(*0.02)	[76000]
	34(8,26) - 35(7,29)	(0,0,0)	397036.957	(*0.18)	[76000]
	26(2,24) - 25(3,23)	(0,0,0)	397956.006	(*0.01)	[76000]
$^{16}O^{16}O^{18}O$	36(3,33) - 37(2,36)	(0,0,0)	1210.574	(*0.25)	[76000]
	9(2, 8) - 10(1, 9)	(0,0,0)	3244.218	(*0.01)	[76000]
	20(3,17) - 21(2,20)	(0,0,0)	5070.838	(*0.01)	[76000]

TABLE 53.4. The microwave spectrum of O_3—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{16}O^{18}O$	40(6,35) - 41(5,36)	(0,0,0)	6455.915	(*0.02)	[76000]
	4(0, 4) - 3(1, 3)	(0,0,0)	6462.134	(*2E-3)	[76000]
	42(5,38) - 41(6,35)	(0,0,0)	7182.892	(*0.03)	[76000]
	26(4,22) - 27(3,25)	(0,0,0)	9225.728	(*0.01)	[76000]
	22(2,21) - 21(3,18)	(0,0,0)	9642.352	(*0.01)	[76000]
	33(5,28) - 34(4,31)	(0,0,0)	9823.307	(*0.01)	[76000]
	28(3,26) - 27(4,23)	(0,0,0)	11812.912	(*0.01)	[76000]
	18(2,16) - 17(3,15)	(0,0,0)	11826.468	(*0.01)	[76000]
	32(5,28) - 33(4,29)	(0,0,0)	12321.427	(*0.01)	[76000]
	35(4,32) - 34(5,29)	(0,0,0)	14042.633	(*0.01)	[76000]
	36(2,35) - 35(3,32)	(0,0,0)	14871.764	(*0.18)	[76000]
	26(3,23) - 25(4,22)	(0,0,0)	15084.688	(*0.01)	[76000]
	24(4,21) - 25(3,22)	(0,0,0)	15969.149	(*0.01)	[76000]
	34(4,30) - 33(5,29)	(0,0,0)	17147.114	(*0.01)	[76000]
	40(6,34) - 41(5,37)	(0,0,0)	18026.365	(*0.02)	[76000]
	2(1, 2) - 3(0, 3)	(0,0,0)	19263.50	(0.03)	[73042]
	37(3,34) - 38(2,37)	(0,0,0)	19347.855	(*0.33)	[76000]
	16(3,14) - 17(2,15)	(0,0,0)	20076.27	(0.03)	[73042]
	19(3,16) - 20(2,19)	(0,0,0)	21085.82	(0.03)	[73042]
	42(5,37) - 41(6,36)	(0,0,0)	21683.699	(*0.03)	[76000]
	23(2,22) - 22(3,19)	(0,0,0)	22916.17	(0.03)	[73042]
	17(2,15) - 18(1,18)	(0,0,0)	26388.441	(*0.01)	[76000]
	16(2,14) - 17(1,17)	(0,0,0)	26689.83	(0.03)	[73042]
	11(1,10) - 10(2, 9)	(0,0,0)	27607.88	(0.03)	[73042]
	18(2,16) - 19(1,19)	(0,0,0)	28239.164	(*0.01)	[76000]
	35(2,34) - 34(3,31)	(0,0,0)	28816.672	(*0.13)	[76000]
	15(2,13) - 16(1,16)	(0,0,0)	29111.14	(0.03)	[73042]
	25(4,21) - 26(3,24)	(0,0,0)	30877.75	(0.03)	[73042]
	29(3,27) - 28(4,24)	(0,0,0)	32138.23	(0.03)	[73042]
	19(2,17) - 20(1,20)	(0,0,0)	32253.42	(0.03)	[73042]
	43(5,39) - 42(6,36)	(0,0,0)	32326.576	(*0.03)	[76000]
	5(0, 5) - 4(1, 4)	(0,0,0)	32743.19	(0.03)	[73042]
	8(2, 7) - 9(1, 8)	(0,0,0)	33537.19	(0.03)	[73042]
	14(2,12) - 15(1,15)	(0,0,0)	33598.92	(0.03)	[73042]
	32(5,27) - 33(4,30)	(0,0,0)	33930.781	(*0.01)	[76000]
	39(6,34) - 40(5,35)	(0,0,0)	34103.100	(*0.02)	[76000]
	24(2,23) - 23(3,20)	(0,0,0)	34612.00	(0.03)	[73042]
	36(4,33) - 35(5,30)	(0,0,0)	37606.632	(*0.01)	[76000]
	18(3,15) - 19(2,18)	(0,0,0)	38268.50	(0.03)	[73042]
	20(2,18) - 21(1,21)	(0,0,0)	38423.30	(0.03)	[73042]
	38(3,35) - 39(2,38)	(0,0,0)	39445.405	(*0.44)	[76000]
	13(2,11) - 14(1,14)	(0,0,0)	40078.97	(0.03)	[73042]
	34(2,33) - 33(3,30)	(0,0,0)	40555.457	(*0.09)	[76000]
	31(5,27) - 32(4,28)	(0,0,0)	41063.997	(*0.01)	[76000]
	39(6,33) - 40(5,36)	(0,0,0)	43271.063	(*0.02)	[76000]
	1(1, 1) - 2(0, 2)	(0,0,0)	44383.45	(0.03)	[73042]
	25(2,24) - 24(3,21)	(0,0,0)	44593.96	(0.03)	[73042]
	19(2,17) - 18(3,16)	(0,0,0)	44626.17	(0.03)	[73042]
	23(4,20) - 24(3,21)	(0,0,0)	46086.69	(0.03)	[73042]
	21(2,19) - 22(1,22)	(0,0,0)	46723.20	(0.03)	[73042]
	27(3,24) - 26(4,23)	(0,0,0)	47129.29	(0.03)	[73042]
	35(4,31) - 34(5,30)	(0,0,0)	47419.02	(0.03)	[73042]
	12(2,10) - 13(1,13)	(0,0,0)	48458.39	(0.03)	[73042]
	33(2,32) - 32(3,29)	(0,0,0)	50035.051	(*0.06)	[76000]
	43(5,38) - 42(6,37)	(0,0,0)	50376.737	(*0.04)	[76000]
	15(3,13) - 16(2,14)	(0,0,0)	51069.52	(0.03)	[73042]
	30(3,28) - 29(4,25)	(0,0,0)	51641.84	(0.03)	[73042]
	26(2,25) - 25(3,22)	(0,0,0)	52731.82	(0.03)	[73042]
	24(4,20) - 25(3,23)	(0,0,0)	53051.59	(0.03)	[73042]
	17(3,14) - 18(2,17)	(0,0,0)	56490.449	(*0.01)	[76000]
	22(2,20) - 23(1,23)	(0,0,0)	57112.189	(*0.02)	[76000]
	32(2,31) - 31(3,28)	(0,0,0)	57219.926	(*0.03)	[76000]
	31(5,26) - 32(4,29)	(0,0,0)	58226.29	(0.03)	[73042]
	11(2, 9) - 12(1,12)	(0,0,0)	58628.49	(0.03)	[73042]
	27(2,26) - 26(3,23)	(0,0,0)	58905.53	(0.03)	[73042]

TABLE 53.4. The microwave spectrum of O_3—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{16}O^{18}O$	12(1,11) - 11(2,10)	(0,0,0)	58989.60	(0.03)	[73042]
	6(0, 6) - 5(1, 5)	(0,0,0)	59518.16	(0.03)	[73042]
	37(4,34) - 36(5,31)	(0,0,0)	60801.03	(0.03)	[73042]
	38(6,33) - 39(5,34)	(0,0,0)	61313.47	(0.03)	[73042]
	39(3,36) - 40(2,39)	(0,0,0)	61397.725	(*0.57)	[76000]
	31(2,30) - 30(3,27)	(0,0,0)	62093.95	(0.03)	[73042]
	28(2,27) - 27(3,24)	(0,0,0)	63008.18	(0.03)	[73042]
	7(2, 6) - 8(1, 7)	(0,0,0)	63245.94	(0.03)	[73042]
	30(2,29) - 29(3,26)	(0,0,0)	64661.90	(0.03)	[73042]
	29(2,28) - 28(3,25)	(0,0,0)	64950.33	(0.03)	[73042]
	38(6,32) - 39(5,35)	(0,0,0)	68525.650	(*0.02)	[76000]
	30(5,26) - 31(4,27)	(0,0,0)	69156.36	(0.03)	[73042]
	23(2,21) - 24(1,24)	(0,0,0)	69535.47	(0.03)	[73042]
	31(3,29) - 30(4,26)	(0,0,0)	70207.56	(0.03)	[73042]
	10(2, 8) - 11(1,11)	(0,0,0)	70469.08	(0.03)	[73042]
	22(4,19) - 23(3,20)	(0,0,0)	75333.51	(0.03)	[73042]
	16(3,13) - 17(2,16)	(0,0,0)	75630.18	(0.03)	[73042]
	23(4,19) - 24(3,22)	(0,0,0)	75664.21	(0.03)	[73042]
	20(2,18) - 19(3,17)	(0,0,0)	78295.95	(0.03)	[73042]
	36(4,32) - 35(5,31)	(0,0,0)	78571.27	(0.03)	[73042]
	28(3,25) - 27(4,24)	(0,0,0)	80205.621	(*0.01)	[76000]
	14(3,12) - 15(2,13)	(0,0,0)	81156.991	(*0.01)	[76000]
	30(5,25) - 31(4,28)	(0,0,0)	82662.967	(*0.01)	[76000]
	38(4,35) - 37(5,32)	(0,0,0)	83550.628	(*0.02)	[76000]
	9(2, 7) - 10(1,10)	(0,0,0)	83853.097	(*0.01)	[76000]
	24(2,22) - 25(1,25)	(0,0,0)	83926.066	(*0.03)	[76000]
	40(3,37) - 41(2,40)	(0,0,0)	85089.599	(*0.73)	[76000]
	7(0, 7) - 6(1, 6)	(0,0,0)	86715.404	(*4E-3)	[76000]
	32(3,30) - 31(4,27)	(0,0,0)	87711.449	(*0.01)	[76000]
	37(6,32) - 38(5,33)	(0,0,0)	88137.290	(*0.01)	[76000]
	13(1,12) - 12(2,11)	(0,0,0)	90866.532	(*0.01)	[76000]
	6(2, 5) - 7(1, 6)	(0,0,0)	92349.015	(*5E-3)	[76000]
	1(1, 0) - 1(0, 1)	(0,0,0)	93354.479	(*2E-3)	[76000]
	37(6,31) - 38(5,34)	(0,0,0)	93768.754	(*0.01)	[76000]
	2(1, 1) - 2(0, 2)	(0,0,0)	94748.704	(*2E-3)	[76000]
	15(3,12) - 16(2,15)	(0,0,0)	95574.373	(*0.01)	[76000]
	29(5,25) - 30(4,26)	(0,0,0)	96671.051	(*0.01)	[76000]
	3(1, 2) - 3(0, 3)	(0,0,0)	96868.704	(*2E-3)	[76000]
	22(4,18) - 23(3,21)	(0,0,0)	98640.273	(*0.01)	[76000]
	8(2, 6) - 9(1, 9)	(0,0,0)	98651.373	(*0.01)	[76000]
	4(1, 3) - 4(0, 4)	(0,0,0)	99748.641	(*2E-3)	[76000]
	25(2,23) - 26(1,26)	(0,0,0)	100206.512	(*0.05)	[76000]
	5(1, 4) - 5(0, 5)	(0,0,0)	103433.549	(*2E-3)	[76000]
	21(4,18) - 22(3,19)	(0,0,0)	103782.491	(*0.01)	[76000]
	33(3,31) - 32(4,28)	(0,0,0)	104023.034	(*0.01)	[76000]
	39(4,36) - 38(5,33)	(0,0,0)	105772.423	(*0.02)	[76000]
	29(5,24) - 30(4,27)	(0,0,0)	107200.012	(*0.01)	[76000]
	6(1, 5) - 6(0, 6)	(0,0,0)	107978.674	(*3E-3)	[76000]
	13(3,11) - 14(2,12)	(0,0,0)	110359.375	(*0.01)	[76000]
	41(3,38) - 42(2,41)	(0,0,0)	110397.004	(*0.92)	[76000]
	37(4,33) - 36(5,32)	(0,0,0)	110677.739	(*0.02)	[76000]
	21(2,19) - 20(3,18)	(0,0,0)	112796.837	(*0.01)	[76000]
	7(1, 6) - 7(0, 7)	(0,0,0)	113448.363	(*3E-3)	[76000]
	8(0, 8) - 7(1, 7)	(0,0,0)	114253.419	(*5E-3)	[76000]
	29(3,26) - 28(4,25)	(0,0,0)	114338.758	(*0.01)	[76000]
	36(6,31) - 37(5,32)	(0,0,0)	114619.458	(*0.01)	[76000]
	7(2, 5) - 8(1, 8)	(0,0,0)	114737.430	(*0.01)	[76000]
	1(1, 1) - 0(0, 0)	(0,0,0)	115779.78	(0.06)	[73042]
	14(3,11) - 15(2,14)	(0,0,0)	116218.20	(0.06)	[73042]
	26(2,24) - 27(1,27)	(0,0,0)	118289.271	(*0.07)	[76000]
	36(6,30) - 37(5,33)	(0,0,0)	118982.80	(0.06)	[73042]
	34(3,32) - 33(4,29)	(0,0,0)	119006.48	(0.06)	[73042]
	8(1, 7) - 8(0, 8)	(0,0,0)	119914.35	(0.06)	[73042]
	5(2, 4) - 6(1, 5)	(0,0,0)	120828.50	(0.06)	[73042]
	21(4,17) - 22(3,20)	(0,0,0)	121912.86	(0.06)	[73042]

TABLE 53.4. The microwave spectrum of O_3—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{16}O^{18}O$	14(1,13) - 13(2,12)	(0,0,0)	123198.64	(0.06)	[73042]
	28(5,24) - 29(4,25)	(0,0,0)	123675.96	(0.06)	[73042]
	40(4,37) - 39(5,34)	(0,0,0)	127375.470	(*0.02)	[76000]
	9(1, 8) - 9(0, 9)	(0,0,0)	127453.413	(*4E-3)	[76000]
	20(4,17) - 21(3,18)	(0,0,0)	131511.46	(0.06)	[73042]
	28(5,23) - 29(4,26)	(0,0,0)	131802.48	(0.06)	[73042]
	6(2, 4) - 7(1, 7)	(0,0,0)	131991.28	(0.06)	[73042]
	35(3,33) - 34(4,30)	(0,0,0)	132522.25	(0.06)	[73042]
	10(1, 9) - 10(0,10)	(0,0,0)	136143.99	(0.06)	[73042]
	42(3,39) - 43(2,42)	(0,0,0)	137187.887	(*0.14)	[76000]
	13(3,10) - 14(2,13)	(0,0,0)	137465.697	(*0.01)	[76000]
	27(2,25) - 28(1,28)	(0,0,0)	138077.680	(*0.10)	[76000]
	2(1, 2) - 1(0, 1)	(0,0,0)	138205.112	(*3E-3)	[76000]
	12(3,10) - 13(2,11)	(0,0,0)	138714.65	(0.06)	[73042]
	35(6,30) - 36(5,31)	(0,0,0)	140799.89	(0.06)	[73042]
	9(0, 9) - 8(1, 8)	(0,0,0)	142043.27	(0.06)	[73042]
	38(4,34) - 37(5,33)	(0,0,0)	143806.36	(0.06)	[73042]
	35(6,29) - 36(5,32)	(0,0,0)	144153.55	(0.06)	[73042]
	36(3,34) - 35(4,31)	(0,0,0)	144429.48	(0.06)	[73042]
	20(4,16) - 21(3,19)	(0,0,0)	145422.15	(0.06)	[73042]
	11(1,10) - 11(0,11)	(0,0,0)	146062.44	(0.06)	[73042]
	22(2,20) - 21(3,19)	(0,0,0)	148079.605	(*0.01)	[76000]
	41(4,38) - 40(5,35)	(0,0,0)	148260.77	(0.06)	[73042]
	4(2, 3) - 5(1, 4)	(0,0,0)	148669.18	(0.06)	[73042]
	30(3,27) - 29(4,26)	(0,0,0)	149536.93	(0.06)	[73042]
	27(5,23) - 28(4,24)	(0,0,0)	150233.67	(0.06)	[73042]
	5(2, 3) - 6(1, 6)	(0,0,0)	150302.66	(0.06)	[73042]
	37(3,35) - 36(4,32)	(0,0,0)	154588.566	(*0.02)	[76000]
	15(1,14) - 14(2,13)	(0,0,0)	155939.89	(0.06)	[73042]
	42(7,36) - 43(6,37)	(0,0,0)	156336.754	(*0.03)	[76000]
	27(5,22) - 28(4,25)	(0,0,0)	156440.76	(0.06)	[73042]
	12(1,11) - 12(0,12)	(0,0,0)	157278.14	(0.06)	[73042]
	42(7,35) - 43(6,38)	(0,0,0)	157646.814	(*0.03)	[76000]
	19(4,16) - 20(3,17)	(0,0,0)	158599.51	(0.06)	[73042]
	12(3, 9) - 13(2,12)	(0,0,0)	159229.44	(0.06)	[73042]
	28(2,26) - 29(1,29)	(0,0,0)	159466.359	(*0.14)	[76000]
	3(1, 3) - 2(0, 2)	(0,0,0)	159946.55	(0.06)	[73042]
	38(3,36) - 37(4,33)	(0,0,0)	162864.223	(*0.04)	[76000]
	11(3, 9) - 12(2,10)	(0,0,0)	166276.869	(*0.01)	[76000]
	34(6,29) - 35(5,30)	(0,0,0)	166713.934	(*0.01)	[76000]
	42(4,39) - 41(5,36)	(0,0,0)	168321.440	(*0.02)	[76000]
	19(4,15) - 20(3,18)	(0,0,0)	169116.010	(*0.01)	[76000]
	39(3,37) - 38(4,34)	(0,0,0)	169129.027	(*0.06)	[76000]
	34(6,28) - 35(5,31)	(0,0,0)	169270.027	(*0.01)	[76000]
	4(2, 2) - 5(1, 5)	(0,0,0)	169573.576	(*4E-3)	[76000]
	13(1,12) - 13(0,13)	(0,0,0)	169848.879	(*0.01)	[76000]
	10(0,10) - 9(1, 9)	(0,0,0)	169990.763	(*0.01)	[76000]
	43(3,41) - 42(4,38)	(0,0,0)	171994.792	(*0.26)	[76000]
	40(3,38) - 39(4,35)	(0,0,0)	173266.841	(*0.09)	[76000]
	42(3,40) - 41(4,37)	(0,0,0)	174773.417	(*0.19)	[76000]
	41(3,39) - 40(4,36)	(0,0,0)	175176.220	(*0.13)	[76000]
	3(2, 2) - 4(1, 3)	(0,0,0)	175858.42	(0.10)	[73042]
	26(5,22) - 27(4,23)	(0,0,0)	176401.20	(0.10)	[73042]
	39(4,35) - 38(5,34)	(0,0,0)	178016.237	(*0.04)	[76000]
	4(1, 4) - 3(0, 3)	(0,0,0)	181023.45	(0.10)	[73042]
	26(5,21) - 27(4,24)	(0,0,0)	181090.12	(0.10)	[73042]
	11(3, 8) - 12(2,11)	(0,0,0)	181430.479	(*0.01)	[76000]
	41(7,35) - 42(6,36)	(0,0,0)	181910.559	(*0.03)	[76000]
	29(2,27) - 30(1,30)	(0,0,0)	182341.580	(*0.19)	[76000]
	41(7,34) - 42(6,37)	(0,0,0)	182908.21	(0.10)	[73042]
	14(1,13) - 14(0,14)	(0,0,0)	183815.99	(0.10)	[73042]
	23(2,21) - 22(3,20)	(0,0,0)	184087.108	(*0.01)	[76000]
	18(4,15) - 19(3,16)	(0,0,0)	185124.46	(0.10)	[73042]
	31(3,28) - 30(4,27)	(0,0,0)	185791.013	(*0.01)	[76000]
	43(4,40) - 42(5,37)	(0,0,0)	187442.74	(0.10)	[73042]

TABLE 53.4. The microwave spectrum of O_3—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{16}O^{18}O$	16(1,15) - 15(2,14)	(0,0,0)	189037.630	(*0.01)	[76000]
	3(2, 1) - 4(1, 4)	(0,0,0)	189719.838	(*4E-3)	[76000]
	33(6,28) - 34(5,29)	(0,0,0)	192392.492	(*0.01)	[76000]
	18(4,14) - 19(3,17)	(0,0,0)	192949.008	(*0.01)	[76000]
	10(3, 8) - 11(2, 9)	(0,0,0)	193113.551	(*0.01)	[76000]
	33(6,27) - 34(5,30)	(0,0,0)	194323.639	(*0.01)	[76000]
	11(0,11) - 10(1,10)	(0,0,0)	197999.560	(*0.01)	[76000]
	15(1,14) - 15(0,15)	(0,0,0)	199200.191	(*0.01)	[76000]
	5(1, 5) - 4(0, 4)	(0,0,0)	201466.886	(*0.01)	[76000]
	25(5,21) - 26(4,22)	(0,0,0)	202229.512	(*0.01)	[76000]
	2(2, 1) - 3(1, 2)	(0,0,0)	202385.572	(*5E-3)	[76000]
	10(3, 7) - 11(2,10)	(0,0,0)	203997.969	(*0.01)	[76000]
	25(5,20) - 26(4,23)	(0,0,0)	205730.404	(*0.01)	[76000]
	30(2,28) - 31(1,31)	(0,0,0)	206581.621	(*0.25)	[76000]
	40(7,34) - 41(6,35)	(0,0,0)	207330.516	(*0.03)	[76000]
	40(7,33) - 41(6,36)	(0,0,0)	208084.668	(*0.03)	[76000]
	2(2, 0) - 3(1, 3)	(0,0,0)	210672.385	(*5E-3)	[76000]
	17(4,14) - 18(3,15)	(0,0,0)	211160.865	(*0.01)	[76000]
	40(4,36) - 39(5,35)	(0,0,0)	213354.917	(*0.05)	[76000]
	16(1,15) - 16(0,16)	(0,0,0)	215998.726	(*0.01)	[76000]
	17(4,13) - 18(3,16)	(0,0,0)	216882.207	(*0.01)	[76000]
	32(6,27) - 33(5,28)	(0,0,0)	217862.725	(*0.01)	[76000]
	9(3, 7) - 10(2, 8)	(0,0,0)	219302.639	(*0.01)	[76000]
	32(6,26) - 33(5,29)	(0,0,0)	219308.322	(*0.01)	[76000]
	24(2,22) - 23(3,21)	(0,0,0)	220755.690	(*0.01)	[76000]
	6(1, 6) - 5(0, 5)	(0,0,0)	221319.72	(0.10)	[73042]
	17(1,16) - 16(2,15)	(0,0,0)	222432.264	(*0.01)	[76000]
	32(3,29) - 31(4,28)	(0,0,0)	223075.308	(*0.01)	[76000]
	12(0,12) - 11(1,11)	(0,0,0)	225974.92	(0.10)	[73042]
	9(3, 6) - 10(2, 9)	(0,0,0)	226868.662	(*0.01)	[76000]
	24(5,20) - 25(4,21)	(0,0,0)	227764.025	(*0.01)	[76000]
	24(5,19) - 25(4,22)	(0,0,0)	230345.525	(*0.01)	[76000]
	31(2,29) - 32(1,32)	(0,0,0)	232057.254	(*0.33)	[76000]
	16(2,14) - 16(1,15)	(0,0,0)	232525.09	(0.10)	[73042]
	39(7,33) - 40(6,34)	(0,0,0)	232610.637	(*0.03)	[76000]
	17(2,15) - 17(1,16)	(0,0,0)	232723.674	(*0.01)	[76000]
	39(7,32) - 40(6,35)	(0,0,0)	233176.406	(*0.03)	[76000]
	15(2,13) - 15(1,14)	(0,0,0)	233351.16	(0.10)	[73042]
	18(2,16) - 18(1,17)	(0,0,0)	234056.06	(0.10)	[73042]
	17(1,16) - 17(0,17)	(0,0,0)	234183.60	(0.10)	[73042]
	14(2,12) - 14(1,13)	(0,0,0)	235082.09	(0.10)	[73042]
	19(2,17) - 19(1,18)	(0,0,0)	236620.94	(0.10)	[73042]
	16(4,13) - 17(3,14)	(0,0,0)	236778.387	(*0.01)	[76000]
	13(2,11) - 13(1,12)	(0,0,0)	237587.28	(0.10)	[73042]
	20(2,18) - 20(1,19)	(0,0,0)	240507.479	(*0.01)	[76000]
	7(1, 7) - 6(0, 6)	(0,0,0)	240636.517	(*0.01)	[76000]
	12(2,10) - 12(1,11)	(0,0,0)	240727.174	(*0.01)	[76000]
	16(4,12) - 17(3,15)	(0,0,0)	240882.797	(*0.01)	[76000]
	31(6,26) - 32(5,27)	(0,0,0)	243148.326	(*0.01)	[76000]
	31(6,25) - 32(5,28)	(0,0,0)	244219.998	(*0.01)	[76000]
	11(2, 9) - 11(1,10)	(0,0,0)	244355.166	(*0.01)	[76000]
	8(3, 6) - 9(2, 7)	(0,0,0)	244928.482	(*0.01)	[76000]
	21(2,19) - 21(1,20)	(0,0,0)	245795.899	(*0.01)	[76000]
	10(2, 8) - 10(1, 9)	(0,0,0)	248321.23	(0.12)	[73042]
	41(4,37) - 40(5,36)	(0,0,0)	249855.700	(*0.07)	[76000]
	8(3, 5) - 9(2, 8)	(0,0,0)	249986.49	(0.12)	[73042]
	9(2, 7) - 9(1, 8)	(0,0,0)	252475.21	(0.12)	[73042]
	22(2,20) - 22(1,21)	(0,0,0)	252558.00	(0.12)	[73042]
	23(5,19) - 24(4,20)	(0,0,0)	253044.65	(0.12)	[73042]
	18(1,17) - 18(0,18)	(0,0,0)	253701.48	(0.12)	[73042]
	13(0,13) - 12(1,12)	(0,0,0)	253827.69	(0.12)	[73042]
	23(5,18) - 24(4,21)	(0,0,0)	254922.990	(*0.01)	[76000]
	18(1,17) - 17(2,16)	(0,0,0)	256057.20	(0.12)	[73042]
	8(2, 6) - 8(1, 7)	(0,0,0)	256671.551	(*0.01)	[76000]
	38(7,32) - 39(6,33)	(0,0,0)	257763.270	(*0.03)	[76000]

TABLE 53.4. The microwave spectrum of O_3—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{16}O^{18}O$	25(2,23) - 24(3,22)	(0,0,0)	258016.42	(0.12)	[73042]
	38(7,31) - 39(6,34)	(0,0,0)	258184.346	(*0.03)	[76000]
	32(2,30) - 33(1,33)	(0,0,0)	258632.439	(*0.43)	[76000]
	8(1, 8) - 7(0, 7)	(0,0,0)	259482.83	(0.12)	[73042]
	7(2, 5) - 7(1, 6)	(0,0,0)	260771.94	(0.12)	[73042]
	23(2,21) - 23(1,22)	(0,0,0)	260856.62	(0.12)	[73042]
	33(3,30) - 32(4,29)	(0,0,0)	261348.68	(0.12)	[73042]
	15(4,12) - 16(3,13)	(0,0,0)	262040.713	(*0.01)	[76000]
	6(2, 4) - 6(1, 5)	(0,0,0)	264649.10	(0.12)	[73042]
	15(4,11) - 16(3,14)	(0,0,0)	264923.61	(0.12)	[73042]
	5(2, 3) - 5(1, 4)	(0,0,0)	268188.86	(0.12)	[73042]
	30(6,25) - 31(5,26)	(0,0,0)	268269.92	(0.12)	[73042]
	30(6,24) - 31(5,27)	(0,0,0)	269056.29	(0.12)	[73042]
	7(3, 5) - 8(2, 6)	(0,0,0)	270077.90	(0.12)	[73042]
	24(2,22) - 24(1,23)	(0,0,0)	270744.15	(0.12)	[73042]
	4(2, 2) - 4(1, 3)	(0,0,0)	271291.82	(0.12)	[73042]
	7(3, 4) - 8(2, 7)	(0,0,0)	273302.15	(0.12)	[73042]
	3(2, 1) - 3(1, 2)	(0,0,0)	273874.57	(0.12)	[73042]
	19(1,18) - 19(0,19)	(0,0,0)	274474.98	(0.12)	[73042]
	2(2, 0) - 2(1, 1)	(0,0,0)	275870.27	(0.12)	[73042]
	9(1, 9) - 8(0, 8)	(0,0,0)	277934.53	(0.12)	[73042]
	22(5,18) - 23(4,19)	(0,0,0)	278106.33	(0.12)	[73042]
	22(5,17) - 23(4,20)	(0,0,0)	279453.56	(0.12)	[73042]
	2(2, 1) - 2(1, 2)	(0,0,0)	279990.80	(0.12)	[73042]
	14(0,14) - 13(1,13)	(0,0,0)	281477.84	(0.12)	[73042]
	3(2, 2) - 3(1, 3)	(0,0,0)	282069.16	(0.12)	[73042]
	25(2,23) - 25(1,24)	(0,0,0)	282261.09	(0.12)	[73042]
	37(7,31) - 38(6,32)	(0,0,0)	282799.328	(*0.03)	[76000]
	37(7,30) - 38(6,33)	(0,0,0)	283110.117	(*0.03)	[76000]
	4(2, 3) - 4(1, 4)	(0,0,0)	284845.86	(0.12)	[73042]
	33(2,31) - 34(1,34)	(0,0,0)	286165.340	(*0.56)	[76000]
	14(4,11) - 15(3,12)	(0,0,0)	287005.01	(0.12)	[73042]
	42(4,38) - 41(5,37)	(0,0,0)	287535.850	(*0.10)	[76000]
	5(2, 4) - 5(1, 5)	(0,0,0)	288325.42	(0.12)	[73042]
	14(4,10) - 15(3,13)	(0,0,0)	288982.88	(0.12)	[73042]
	19(1,18) - 18(2,17)	(0,0,0)	289838.34	(0.12)	[73042]
	6(2, 5) - 6(1, 6)	(0,0,0)	292512.78	(0.12)	[73042]
	29(6,24) - 30(5,25)	(0,0,0)	293245.67	(0.12)	[73042]
	29(6,23) - 30(5,26)	(0,0,0)	293816.402	(*0.01)	[76000]
	6(3, 4) - 7(2, 5)	(0,0,0)	294836.13	(0.12)	[73042]
	26(2,24) - 26(1,25)	(0,0,0)	295432.72	(0.12)	[73042]
	26(2,24) - 25(3,23)	(0,0,0)	295795.86	(0.12)	[73042]
	10(1,10) - 9(0, 9)	(0,0,0)	296075.57	(0.12)	[73042]
	20(1,19) - 20(0,20)	(0,0,0)	296405.26	(0.12)	[73042]
	6(3, 3) - 7(2, 6)	(0,0,0)	296772.60	(0.12)	[73042]
	7(2, 6) - 7(1, 7)	(0,0,0)	297413.77	(0.12)	[73042]
	34(3,31) - 33(4,30)	(0,0,0)	300556.390	(*0.02)	[76000]
	21(5,17) - 22(4,18)	(0,0,0)	302979.31	(0.12)	[73042]
	8(2, 7) - 8(1, 8)	(0,0,0)	303033.87	(0.12)	[73042]
	21(5,16) - 22(4,19)	(0,0,0)	303930.75	(0.12)	[73042]
	36(7,30) - 37(6,31)	(0,0,0)	307728.492	(*0.04)	[76000]
	36(7,29) - 37(6,32)	(0,0,0)	307955.887	(*0.04)	[76000]
	15(0,15) - 14(1,14)	(0,0,0)	308858.09	(0.12)	[73042]
	9(2, 8) - 9(1, 9)	(0,0,0)	309378.98	(0.12)	[73042]
	27(2,25) - 27(1,26)	(0,0,0)	310267.38	(0.12)	[73042]
	13(4,10) - 14(3,11)	(0,0,0)	311722.05	(0.12)	[73042]
	13(4, 9) - 14(3,12)	(0,0,0)	313043.20	(0.12)	[73042]
	11(1,11) - 10(0,10)	(0,0,0)	313996.05	(0.12)	[73042]
	34(2,32) - 35(1,35)	(0,0,0)	314509.734	(*0.70)	[76000]
	10(2, 9) - 10(1,10)	(0,0,0)	316454.10	(0.12)	[73042]
	28(6,23) - 29(5,24)	(0,0,0)	318090.94	(0.12)	[73042]
	28(6,22) - 29(5,25)	(0,0,0)	318500.66	(0.12)	[73042]
	5(3, 3) - 6(2, 4)	(0,0,0)	319284.594	(*0.01)	[76000]
	21(1,20) - 21(0,21)	(0,0,0)	319375.36	(0.12)	[73042]
	5(3, 2) - 6(2, 5)	(0,0,0)	320360.75	(0.15)	[73042]

TABLE 53.4. The microwave spectrum of O_3—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{16}O^{18}O$	20(1,19) - 19(2,18)	(0,0,0)	323696.163	(*0.01)	[76000]
	11(2,10) - 11(1,11)	(0,0,0)	324263.443	(*0.01)	[76000]
	2(2, 1) - 1(1, 0)	(0,0,0)	324841.416	(*0.01)	[76000]
	2(2, 0) - 1(1, 1)	(0,0,0)	326235.54	(0.15)	[73042]
	43(4,39) - 42(5,38)	(0,0,0)	326395.406	(*0.13)	[76000]
	28(2,26) - 28(1,27)	(0,0,0)	326752.326	(*0.01)	[76000]
	20(5,16) - 21(4,17)	(0,0,0)	327689.934	(*0.01)	[76000]
	20(5,15) - 21(4,18)	(0,0,0)	328350.61	(0.15)	[73042]
	12(1,12) - 11(0,11)	(0,0,0)	331789.04	(0.15)	[73042]
	35(7,29) - 36(6,30)	(0,0,0)	332559.395	(*0.04)	[76000]
	35(7,28) - 36(6,31)	(0,0,0)	332724.250	(*0.04)	[76000]
	12(2,11) - 12(1,12)	(0,0,0)	332810.014	(*0.01)	[76000]
	27(2,25) - 26(3,24)	(0,0,0)	334016.48	(0.15)	[73042]
	16(0,16) - 15(1,15)	(0,0,0)	335915.591	(*0.01)	[76000]
	12(4, 9) - 13(3,10)	(0,0,0)	336235.738	(*0.01)	[76000]
	12(4, 8) - 13(3,11)	(0,0,0)	337091.797	(*0.01)	[76000]
	35(3,32) - 34(4,31)	(0,0,0)	340632.145	(*0.03)	[76000]
	13(2,12) - 13(1,13)	(0,0,0)	342095.182	(*0.01)	[76000]
	27(6,22) - 28(5,23)	(0,0,0)	342819.887	(*0.02)	[76000]
	27(6,21) - 28(5,24)	(0,0,0)	343110.176	(*0.02)	[76000]
	22(1,21) - 22(0,22)	(0,0,0)	343254.587	(*0.01)	[76000]
	4(3, 2) - 5(2, 3)	(0,0,0)	343496.945	(*0.01)	[76000]
	35(2,33) - 36(1,36)	(0,0,0)	343516.840	(*0.88)	[76000]
	4(3, 1) - 5(2, 4)	(0,0,0)	344035.059	(*0.01)	[76000]
	29(2,27) - 29(1,28)	(0,0,0)	344853.469	(*0.02)	[76000]
	42(8,35) - 43(7,36)	(0,0,0)	346530.801	(*0.10)	[76000]
	42(8,34) - 43(7,37)	(0,0,0)	346594.074	(*0.10)	[76000]
	3(2, 2) - 2(1, 1)	(0,0,0)	347267.044	(*0.01)	[76000]
	13(1,13) - 12(0,12)	(0,0,0)	349546.895	(*0.01)	[76000]
	3(2, 1) - 2(1, 2)	(0,0,0)	351479.816	(*0.01)	[76000]
	14(2,13) - 14(1,14)	(0,0,0)	352118.35	(0.15)	[73042]
	19(5,15) - 20(4,16)	(0,0,0)	352260.723	(*0.01)	[76000]
	19(5,14) - 20(4,17)	(0,0,0)	352711.137	(*0.01)	[76000]
	31(3,28) - 31(2,29)	(0,0,0)	353247.273	(*0.03)	[76000]
	30(3,27) - 30(2,28)	(0,0,0)	353529.494	(*0.03)	[76000]
	32(3,29) - 32(2,30)	(0,0,0)	354471.668	(*0.04)	[76000]
	29(3,26) - 29(2,27)	(0,0,0)	355208.68	(0.15)	[73042]
	33(3,30) - 33(2,31)	(0,0,0)	357298.419	(*0.05)	[76000]
	34(7,28) - 35(6,29)	(0,0,0)	357299.754	(*0.05)	[76000]
	34(7,27) - 35(6,30)	(0,0,0)	357418.125	(*0.05)	[76000]
	21(1,20) - 20(2,19)	(0,0,0)	357544.71	(0.15)	[73042]
	28(3,25) - 28(2,26)	(0,0,0)	358161.46	(0.15)	[73042]
	11(4, 8) - 12(3, 9)	(0,0,0)	360584.13	(0.15)	[73042]
	11(4, 7) - 12(3,10)	(0,0,0)	361119.687	(*0.01)	[76000]
	34(3,31) - 34(2,32)	(0,0,0)	361809.72	(0.15)	[73042]
	27(3,24) - 27(2,25)	(0,0,0)	362250.02	(0.15)	[73042]
	17(0,17) - 16(1,16)	(0,0,0)	362613.44	(0.15)	[73042]
	15(2,14) - 15(1,15)	(0,0,0)	362876.70	(0.15)	[73042]
	30(2,28) - 30(1,29)	(0,0,0)	364513.29	(0.15)	[73042]
	26(3,23) - 26(2,24)	(0,0,0)	367323.91	(0.15)	[73042]
	14(1,14) - 13(0,13)	(0,0,0)	367357.21	(0.15)	[73042]
	26(6,21) - 27(5,22)	(0,0,0)	367444.09	(0.15)	[73042]
	3(3, 1) - 4(2, 2)	(0,0,0)	367538.613	(*0.01)	[76000]
	26(6,20) - 27(5,23)	(0,0,0)	367647.312	(*0.02)	[76000]
	3(3, 0) - 4(2, 3)	(0,0,0)	367769.223	(*0.01)	[76000]
	23(1,22) - 23(0,23)	(0,0,0)	367902.69	(0.15)	[73042]
	35(3,32) - 35(2,33)	(0,0,0)	368074.31	(0.15)	[73042]
	4(2, 3) - 3(1, 2)	(0,0,0)	369000.69	(0.15)	[73042]
	41(8,34) - 42(7,35)	(0,0,0)	371259.230	(*0.11)	[76000]
	41(8,33) - 42(7,36)	(0,0,0)	371305.082	(*0.11)	[76000]
	28(2,26) - 27(3,25)	(0,0,0)	372596.946	(*0.01)	[76000]
	36(2,34) - 37(1,37)	(0,0,0)	373037.633	(*0.09)	[76000]
	25(3,22) - 25(2,23)	(0,0,0)	373221.63	(0.15)	[73042]
	16(2,15) - 16(1,16)	(0,0,0)	374364.80	(0.15)	[73042]
	36(3,33) - 36(2,34)	(0,0,0)	376148.234	(*0.08)	[76000]

TABLE 53.4. The microwave spectrum of O_3—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{16}O^{18}O$	18(5,14) - 19(4,15)	(0,0,0)	376711.176	(*0.01)	[76000]
	18(5,13) - 19(4,16)	(0,0,0)	377012.102	(*0.01)	[76000]
	4(2, 2) - 3(1, 3)	(0,0,0)	377502.58	(0.15)	[73042]
	24(3,21) - 24(2,22)	(0,0,0)	379772.93	(0.15)	[73042]
	36(3,33) - 35(4,32)	(0,0,0)	381500.031	(*0.04)	[76000]
	33(7,27) - 34(6,28)	(0,0,0)	381956.531	(*0.05)	[76000]
	33(7,26) - 34(6,29)	(0,0,0)	382040.664	(*0.05)	[76000]
	10(4, 7) - 11(3, 8)	(0,0,0)	384799.492	(*0.01)	[76000]
	10(4, 6) - 11(3, 9)	(0,0,0)	385121.039	(*0.01)	[76000]
	15(1,15) - 14(0,14)	(0,0,0)	385299.156	(*0.01)	[76000]
	31(2,29) - 31(1,30)	(0,0,0)	385651.148	(*0.03)	[76000]
	37(3,34) - 37(2,35)	(0,0,0)	386071.554	(*0.09)	[76000]
	17(2,16) - 17(1,17)	(0,0,0)	386574.458	(*0.01)	[76000]
	23(3,20) - 23(2,21)	(0,0,0)	386802.078	(*0.01)	[76000]
	18(0,18) - 17(1,17)	(0,0,0)	388930.092	(*0.01)	[76000]
	5(2, 4) - 4(1, 3)	(0,0,0)	390043.630	(*0.01)	[76000]
	22(1,21) - 21(2,20)	(0,0,0)	391294.380	(*0.01)	[76000]
	25(6,20) - 26(5,21)	(0,0,0)	391974.664	(*0.03)	[76000]
	25(6,19) - 26(5,22)	(0,0,0)	392114.742	(*0.03)	[76000]
	24(1,23) - 24(0,24)	(0,0,0)	393175.369	(*0.03)	[76000]
	22(3,19) - 22(2,20)	(0,0,0)	394132.548	(*0.01)	[76000]
	40(8,33) - 41(7,34)	(0,0,0)	395918.234	(*0.12)	[76000]
	40(8,32) - 41(7,35)	(0,0,0)	395951.184	(*0.12)	[76000]
	38(3,35) - 38(2,36)	(0,0,0)	397869.763	(*0.11)	[76000]
	18(2,17) - 18(1,18)	(0,0,0)	399494.699	(*0.01)	[76000]
$^{16}O^{18}O^{18}O$	21(2,20) - 20(3,17)	(0,0,0)	20681.13	(0.03)	[73042]
	15(2,13) - 16(1,16)	(0,0,0)	22226.86	(0.03)	[73042]
	16(2,14) - 17(1,17)	(0,0,0)	22552.10	(0.03)	[73042]
	14(2,12) - 15(1,15)	(0,0,0)	24189.71	(0.03)	[73042]
	17(3,14) - 18(2,17)	(0,0,0)	24932.73	(0.03)	[73042]
	17(2,15) - 18(1,18)	(0,0,0)	25195.46	(0.03)	[73042]
	17(2,15) - 16(3,14)	(0,0,0)	25257.46	(0.03)	[73042]
	23(4,19) - 24(3,22)	(0,0,0)	25387.65	(0.03)	[73042]
	13(2,11) - 14(1,14)	(0,0,0)	28384.01	(0.03)	[73042]
	18(2,16) - 19(1,19)	(0,0,0)	30161.41	(0.03)	[73042]
	22(2,21) - 21(3,18)	(0,0,0)	32800.36	(0.03)	[73042]
	12(2,10) - 13(1,13)	(0,0,0)	34726.84	(0.03)	[73042]
	32(2,31) - 31(3,28)	(0,0,0)	35002.90	(0.03)	[73042]
	1(1, 1) - 2(0, 2)	(0,0,0)	36688.20	(0.03)	[73042]
	27(3,25) - 26(4,22)	(0,0,0)	37340.71	(0.03)	[73042]
	19(2,17) - 20(1,20)	(0,0,0)	37431.09	(0.03)	[73042]
	14(3,12) - 15(2,13)	(0,0,0)	37977.84	(0.03)	[73042]
	29(5,24) - 30(4,27)	(0,0,0)	38503.62	(0.03)	[73042]
	7(2, 6) - 8(1, 7)	(0,0,0)	38859.57	(0.03)	[73042]
	5(0, 5) - 4(1, 4)	(0,0,0)	40475.34	(0.03)	[73042]
	16(3,13) - 17(2,16)	(0,0,0)	42697.08	(0.03)	[73042]
	23(2,22) - 22(3,19)	(0,0,0)	43110.16	(0.03)	[73042]
	11(2, 9) - 12(1,12)	(0,0,0)	43111.53	(0.03)	[73042]
	21(4,18) - 22(3,19)	(0,0,0)	44127.00	(0.03)	[73042]
	22(4,18) - 23(3,21)	(0,0,0)	47553.44	(0.03)	[73042]
	25(3,22) - 24(4,21)	(0,0,0)	48659.58	(0.03)	[73042]
	28(5,24) - 29(4,25)	(0,0,0)	49173.62	(0.03)	[73042]
	24(2,23) - 23(3,20)	(0,0,0)	51457.30	(0.03)	[73042]
	35(6,30) - 36(5,31)	(0,0,0)	51634.70	(0.03)	[73042]
	11(1,10) - 10(2, 9)	(0,0,0)	52863.67	(0.03)	[73042]
	10(2, 8) - 11(1,11)	(0,0,0)	53411.52	(0.03)	[73042]
	25(2,24) - 24(3,21)	(0,0,0)	57700.10	(0.03)	[73042]
	18(2,16) - 17(3,15)	(0,0,0)	58314.18	(0.03)	[73042]
	21(2,19) - 22(1,22)	(0,0,0)	58704.68	(0.03)	[73042]
	29(2,28) - 28(3,25)	(0,0,0)	59469.00	(0.03)	[73042]
	15(3,12) - 16(2,15)	(0,0,0)	61493.78	(0.03)	[73042]
	26(2,25) - 25(3,22)	(0,0,0)	61713.65	(0.03)	[73042]
	28(5,23) - 29(4,26)	(0,0,0)	62844.74	(0.03)	[73042]
	27(2,26) - 26(3,23)	(0,0,0)	63394.28	(0.03)	[73042]
	9(2, 7) - 10(1,10)	(0,0,0)	65486.13	(0.03)	[73042]

TABLE 53.4. The microwave spectrum of O_3—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{18}O^{18}O$	6(0, 6) - 5(1, 5)	(0,0,0)	67283.39	(0.03)	[73042]
	13(3,11) - 14(2,12)	(0,0,0)	68133.10	(0.03)	[73042]
	6(2, 5) - 7(1, 6)	(0,0,0)	68208.59	(0.03)	[73042]
	21(4,17) - 22(3,20)	(0,0,0)	70178.48	(0.03)	[73042]
	20(4,17) - 21(3,18)	(0,0,0)	73105.58	(0.03)	[73042]
	29(3,27) - 28(4,24)	(0,0,0)	74821.06	(0.03)	[73042]
	27(5,23) - 28(4,24)	(0,0,0)	76828.73	(0.03)	[73042]
	34(6,29) - 35(5,30)	(0,0,0)	78404.10	(0.03)	[73042]
	8(2, 6) - 9(1, 9)	(0,0,0)	79186.93	(0.03)	[73042]
	35(4,32) - 34(5,29)	(0,0,0)	79324.02	(0.03)	[73042]
	27(3,24) - 26(4,23)	(0,0,0)	115977.20	(0.06)	[73042]
	19(4,15) - 20(3,18)	(0,0,0)	116472.99	(0.06)	[73042]
	13(1,12) - 12(2,11)	(0,0,0)	116724.43	(0.06)	[73042]
	32(3,30) - 31(4,27)	(0,0,0)	121696.81	(0.06)	[73042]
	8(0, 8) - 7(1, 7)	(0,0,0)	122016.61	(0.06)	[73042]
	9(1, 8) - 9(0, 9)	(0,0,0)	122753.88	(0.06)	[73042]
	12(3, 9) - 13(2,12)	(0,0,0)	122782.98	(0.06)	[73042]
	37(4,34) - 36(5,31)	(0,0,0)	123171.92	(0.06)	[73042]
	4(2, 3) - 5(1, 4)	(0,0,0)	124919.88	(0.06)	[73042]
	2(1, 2) - 1(0, 1)	(0,0,0)	130027.19	(0.06)	[73042]
	25(5,21) - 26(4,22)	(0,0,0)	130486.76	(0.06)	[73042]
	32(6,27) - 33(5,28)	(0,0,0)	130883.57	(0.06)	[73042]
	10(1, 9) - 10(0,10)	(0,0,0)	132354.45	(0.06)	[73042]
	35(4,31) - 34(5,30)	(0,0,0)	133644.15	(0.06)	[73042]
	33(3,31) - 32(4,28)	(0,0,0)	134195.48	(0.06)	[73042]
	25(5,20) - 26(4,23)	(0,0,0)	136429.96	(0.06)	[73042]
	18(4,14) - 19(3,17)	(0,0,0)	139999.97	(0.06)	[73042]
	11(1,10) - 11(0,11)	(0,0,0)	143336.34	(0.06)	[73042]
	11(3, 8) - 12(2,11)	(0,0,0)	144468.34	(0.06)	[73042]
	4(2, 2) - 5(1, 5)	(0,0,0)	147360.94	(0.06)	[73042]
	14(1,13) - 13(2,12)	(0,0,0)	149328.44	(0.06)	[73042]
	9(0, 9) - 8(1, 8)	(0,0,0)	149734.31	(0.06)	[73042]
	28(3,25) - 27(4,24)	(0,0,0)	151352.09	(0.06)	[73042]
	3(1, 3) - 2(0, 2)	(0,0,0)	151527.15	(0.06)	[73042]
	10(3, 8) - 11(2, 9)	(0,0,0)	153048.05	(0.06)	[73042]
	17(4,14) - 18(3,15)	(0,0,0)	155370.07	(0.06)	[73042]
	12(1,11) - 12(0,12)	(0,0,0)	155768.28	(0.06)	[73042]
	24(5,20) - 25(4,21)	(0,0,0)	156632.64	(0.06)	[73042]
	31(6,26) - 32(5,27)	(0,0,0)	156680.21	(0.06)	[73042]
	4(1, 4) - 3(0, 3)	(0,0,0)	172319.68	(0.10)	[73042]
	10(0,10) - 9(1, 9)	(0,0,0)	177538.61	(0.10)	[73042]
	9(3, 7) - 10(2, 8)	(0,0,0)	179704.41	(0.10)	[73042]
	16(4,13) - 17(3,14)	(0,0,0)	181537.22	(0.10)	[73042]
	37(7,30) - 38(6,33)	(0,0,0)	182027.88	(0.10)	[73042]
	30(6,25) - 31(5,26)	(0,0,0)	182229.78	(0.10)	[73042]
	15(1,14) - 14(2,13)	(0,0,0)	182301.41	(0.10)	[73042]
	23(5,19) - 24(4,20)	(0,0,0)	182406.21	(0.10)	[73042]
	40(4,37) - 39(5,34)	(0,0,0)	182781.62	(0.10)	[73042]
	30(6,24) - 31(5,27)	(0,0,0)	183796.12	(0.10)	[73042]
	14(1,13) - 14(0,14)	(0,0,0)	185150.33	(0.10)	[73042]
	16(4,12) - 17(3,15)	(0,0,0)	187525.70	(0.10)	[73042]
	15(1,14) - 15(0,15)	(0,0,0)	202115.85	(0.10)	[73042]
	19(2,17) - 19(1,18)	(0,0,0)	222852.65	(0.10)	[73042]
	10(2, 8) - 10(1, 9)	(0,0,0)	224160.70	(0.10)	[73042]
	30(3,27) - 29(4,26)	(0,0,0)	225453.08	(0.10)	[73042]
	9(2, 7) - 9(1, 8)	(0,0,0)	228137.31	(0.10)	[73042]
	20(2,18) - 20(1,19)	(0,0,0)	229020.08	(0.10)	[73042]
	8(2, 6) - 8(1, 7)	(0,0,0)	232280.10	(0.10)	[73042]
	14(4,11) - 15(3,12)	(0,0,0)	232497.93	(0.10)	[73042]
	28(6,22) - 29(5,25)	(0,0,0)	233523.25	(0.10)	[73042]
	7(3, 4) - 8(2, 7)	(0,0,0)	235103.62	(0.10)	[73042]
	14(4,10) - 15(3,13)	(0,0,0)	235392.12	(0.10)	[73042]
	23(2,21) - 22(3,20)	(0,0,0)	236109.50	(0.10)	[73042]
	7(2, 5) - 7(1, 6)	(0,0,0)	236421.70	(0.10)	[73042]
	17(1,16) - 17(0,17)	(0,0,0)	240401.23	(0.10)	[73042]

TABLE 53.4. The microwave spectrum of O_3—Continued

Isotopic species	$J'(K'_-,K'_+)$ – $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{18}O^{18}O$	6(2, 4) – 6(1, 5)	(0,0,0)	240406.06	(0.10)	[73042]
	4(2, 2) – 4(1, 3)	(0,0,0)	247355.11	(0.12)	[73042]
	17(1,16) – 16(2,15)	(0,0,0)	249060.07	(0.12)	[73042]
	8(1, 8) – 7(0, 7)	(0,0,0)	249416.74	(0.12)	[73042]
	3(2, 1) – 3(1, 2)	(0,0,0)	250091.48	(0.12)	[73042]
	2(2, 0) – 2(1, 1)	(0,0,0)	252217.22	(0.12)	[73042]
	6(3, 4) – 7(2, 5)	(0,0,0)	255970.10	(0.12)	[73042]
	2(2, 1) – 2(1, 2)	(0,0,0)	256629.81	(0.12)	[73042]
	13(4,10) – 14(3,11)	(0,0,0)	257437.42	(0.12)	[73042]
	23(2,21) – 23(1,22)	(0,0,0)	257541.56	(0.12)	[73042]
	27(6,22) – 28(5,23)	(0,0,0)	257679.28	(0.12)	[73042]
	20(5,16) – 21(4,17)	(0,0,0)	257992.23	(0.12)	[73042]
	27(6,21) – 28(5,24)	(0,0,0)	258259.87	(0.12)	[73042]
	6(3, 3) – 7(2, 6)	(0,0,0)	258396.67	(0.12)	[73042]
	3(2, 2) – 3(1, 3)	(0,0,0)	258858.27	(0.12)	[73042]
	20(5,15) – 21(4,18)	(0,0,0)	259123.20	(0.12)	[73042]
	13(4, 9) – 14(3,12)	(0,0,0)	259372.70	(0.12)	[73042]
	13(0,13) – 12(1,12)	(0,0,0)	260402.09	(0.12)	[73042]
	18(1,17) – 18(0,18)	(0,0,0)	261550.84	(0.12)	[73042]
	4(2, 3) – 4(1, 4)	(0,0,0)	261836.48	(0.12)	[73042]
	31(3,28) – 30(4,27)	(0,0,0)	264086.64	(0.12)	[73042]
	5(2, 4) – 5(1, 5)	(0,0,0)	265569.97	(0.12)	[73042]
	9(1, 9) – 8(0, 8)	(0,0,0)	267545.24	(0.12)	[73042]
	6(2, 5) – 6(1, 6)	(0,0,0)	270065.02	(0.12)	[73042]
	24(2,22) – 24(1,23)	(0,0,0)	270552.37	(0.12)	[73042]
	7(2, 6) – 7(1, 7)	(0,0,0)	275328.22	(0.12)	[73042]
	8(2, 7) – 8(1, 8)	(0,0,0)	281366.48	(0.12)	[73042]
	33(7,26) – 34(6,29)	(0,0,0)	281774.02	(0.12)	[73042]
	5(3, 2) – 6(2, 5)	(0,0,0)	281837.57	(0.12)	[73042]
	12(4, 9) – 13(3,10)	(0,0,0)	282099.96	(0.12)	[73042]
	26(6,21) – 27(5,22)	(0,0,0)	282504.88	(0.12)	[73042]
	18(1,17) – 17(2,16)	(0,0,0)	282677.32	(0.12)	[73042]
	19(5,15) – 20(4,16)	(0,0,0)	282743.62	(0.12)	[73042]
	26(6,20) – 27(5,23)	(0,0,0)	282911.49	(0.12)	[73042]
	19(5,14) – 20(4,17)	(0,0,0)	283515.33	(0.12)	[73042]
	19(1,18) – 19(0,19)	(0,0,0)	283880.08	(0.12)	[73042]
	25(2,23) – 25(1,24)	(0,0,0)	285349.77	(0.12)	[73042]
	10(1,10) – 9(0, 9)	(0,0,0)	285405.12	(0.12)	[73042]
	14(0,14) – 13(1,13)	(0,0,0)	287534.79	(0.12)	[73042]
	9(2, 8) – 9(1, 9)	(0,0,0)	288185.76	(0.12)	[73042]
	10(2, 9) – 10(1,10)	(0,0,0)	295791.68	(0.12)	[73042]
	2(2, 1) – 1(1, 0)	(0,0,0)	301092.94	(0.12)	[73042]
	26(2,24) – 26(1,25)	(0,0,0)	301918.69	(0.12)	[73042]
	2(2, 0) – 1(1, 1)	(0,0,0)	302589.65	(0.12)	[73042]
	11(1,11) – 10(0,10)	(0,0,0)	303103.63	(0.12)	[73042]
	32(3,29) – 31(4,38)	(0,0,0)	303685.74	(0.12)	[73042]
	11(2,10) – 11(1,11)	(0,0,0)	304187.93	(0.12)	[73042]
	4(3, 2) – 5(2, 3)	(0,0,0)	304711.21	(0.12)	[73042]
	4(3, 1) – 5(2, 4)	(0,0,0)	305385.96	(0.12)	[73042]
	11(4, 8) – 12(3, 9)	(0,0,0)	306537.74	(0.12)	[73042]
	25(6,20) – 26(5,21)	(0,0,0)	307198.60	(0.12)	[73042]
	20(1,19) – 20(0,20)	(0,0,0)	307243.83	(0.12)	[73042]
	11(4, 7) – 12(3,10)	(0,0,0)	307323.39	(0.12)	[73042]
	18(5,14) – 19(4,15)	(0,0,0)	307326.22	(0.12)	[73042]
	25(6,19) – 26(5,22)	(0,0,0)	307479.37	(0.12)	[73042]
	25(2,23) – 24(3,22)	(0,0,0)	311714.58	(0.12)	[73042]
	12(2,11) – 12(1,12)	(0,0,0)	313376.41	(0.12)	[73042]
	15(0,15) – 14(1,14)	(0,0,0)	314310.79	(0.12)	[73042]
	19(1,18) – 18(2,17)	(0,0,0)	316327.25	(0.12)	[73042]
	12(1,12) – 11(0,11)	(0,0,0)	320748.22	(0.12)	[73042]
	30(3,27) – 30(2,28)	(0,0,0)	325519.63	(0.15)	[73042]
	26(3,23) – 26(2,24)	(0,0,0)	327220.73	(0.15)	[73042]
	31(3,28) – 31(2,29)	(0,0,0)	329236.28	(0.15)	[73042]
	25(3,22) – 25(2,23)	(0,0,0)	331134.58	(0.15)	[73042]
	10(4, 6) – 11(3, 9)	(0,0,0)	331267.54	(0.15)	[73042]

TABLE 53.4. The microwave spectrum of O_3—Continued

Isotopic species	$J'(K'_-,K'_+)$ – $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{18}O^{18}O$	21(1,20) – 21(0,21)	(0,0,0)	331482.89	(0.15)	[73042]
	17(5,13) – 18(4,14)	(0,0,0)	331765.32	(0.15)	[73042]
	14(2,13) – 14(1,14)	(0,0,0)	334125.29	(0.15)	[73042]
	32(3,29) – 32(2,30)	(0,0,0)	334810.58	(0.15)	[73042]
	15(2,14) – 15(1,15)	(0,0,0)	345675.72	(0.15)	[73042]
	14(1,14) – 13(0,13)	(0,0,0)	356274.72	(0.15)	[73042]
	22(1,21) – 22(0,22)	(0,0,0)	356430.51	(0.15)	[73042]
	16(2,15) – 16(1,16)	(0,0,0)	357997.84	(0.15)	[73042]
	29(2,27) – 29(1,28)	(0,0,0)	361677.43	(0.15)	[73042]
	17(2,16) – 17(1,17)	(0,0,0)	371077.90	(0.12)	[73042]
$^{18}O^{16}O^{18}O$	25(4,22) – 26(3,23)	(0,0,0)	18379.93	(0.03)	[73042]
	20(3,17) – 21(2,20)	(0,0,0)	19270.85	(0.03)	[73042]
	18(2,16) – 19(1,19)	(0,0,0)	27190.79	(0.03)	[73042]
	16(2,14) – 17(1,17)	(0,0,0)	28510.55	(0.03)	[73042]
	36(4,32) – 35(5,31)	(0,0,0)	31441.41	(0.03)	[73042]
	25(2,24) – 24(3,21)	(0,0,0)	32740.01	(0.03)	[73042]
	14(2,12) – 15(1,15)	(0,0,0)	37396.92	(0.03)	[73042]
	28(3,25) – 27(4,24)	(0,0,0)	41038.37	(0.03)	[73042]
	12(1,11) – 11(2,10)	(0,0,0)	42580.81	(0.03)	[73042]
	31(3,29) – 30(4,26)	(0,0,0)	44624.27	(0.03)	[73042]
	1(1, 1) – 2(0, 2)	(0,0,0)	45766.65	(0.03)	[73042]
	22(2,20) – 23(1,23)	(0,0,0)	47997.04	(0.03)	[73042]
	20(2,18) – 19(3,17)	(0,0,0)	49439.49	(0.03)	[73042]
	27(2,26) – 26(3,23)	(0,0,0)	49872.11	(0.03)	[73042]
	6(0, 6) – 5(1, 5)	(0,0,0)	52105.48	(0.03)	[73042]
	18(3,15) – 19(2,18)	(0,0,0)	52250.72	(0.03)	[73042]
	12(2,10) – 13(1,13)	(0,0,0)	53321.25	(0.03)	[73042]
	33(2,32) – 32(3,29)	(0,0,0)	56155.08	(0.03)	[73042]
	29(2,28) – 28(3,25)	(0,0,0)	59903.46	(0.03)	[73042]
	40(6,34) – 41(5,37)	(0,0,0)	60970.67	(0.03)	[73042]
	31(2,30) – 30(3,27)	(0,0,0)	62143.51	(0.03)	[73042]
	24(2,22) – 25(1,25)	(0,0,0)	69861.70	(0.03)	[73042]
	15(3,13) – 16(2,14)	(0,0,0)	70288.36	(0.03)	[73042]
	7(2, 6) – 8(1, 7)	(0,0,0)	72036.94	(0.03)	[73042]
	23(4,20) – 24(3,21)	(0,0,0)	74417.60	(0.03)	[73042]
	10(2, 8) – 11(1,11)	(0,0,0)	75531.71	(0.03)	[73042]
	24(4,20) – 25(3,23)	(0,0,0)	75914.89	(0.03)	[73042]
	33(3,31) – 32(4,28)	(0,0,0)	79159.85	(0.03)	[73042]
	8(1, 7) – 8(0, 8)	(0,0,0)	115939.17	(0.06)	[73042]
	22(4,18) – 23(3,21)	(0,0,0)	119532.27	(0.06)	[73042]
	13(3,11) – 14(2,12)	(0,0,0)	125273.59	(0.06)	[73042]
	10(1, 9) – 10(0,10)	(0,0,0)	130489.41	(0.06)	[73042]
	37(3,35) – 36(4,32)	(0,0,0)	134706.97	(0.06)	[73042]
	6(2, 4) – 7(1, 7)	(0,0,0)	135311.64	(0.06)	[73042]
	12(1,11) – 12(0,12)	(0,0,0)	149386.19	(0.06)	[73042]
	3(1, 3) – 2(0, 2)	(0,0,0)	155011.52	(0.06)	[73042]
	36(6,30) – 37(5,33)	(0,0,0)	156083.30	(0.10)	[73042]
	10(0,10) – 9(1, 9)	(0,0,0)	156250.68	(0.06)	[73042]
	28(5,23) – 29(4,26)	(0,0,0)	159662.76	(0.06)	[73042]
	32(3,29) – 31(4,28)	(0,0,0)	171165.66	(0.10)	[73042]
	4(2, 2) – 5(1, 5)	(0,0,0)	171225.50	(0.10)	[73042]
	14(1,13) – 14(0,14)	(0,0,0)	173099.87	(0.10)	[73042]
	30(2,28) – 31(1,31)	(0,0,0)	175818.99	(0.10)	[73042]
	11(3, 9) – 12(2,10)	(0,0,0)	177298.95	(0.10)	[73042]
	35(6,30) – 36(5,31)	(0,0,0)	177526.20	(0.10)	[73042]
	3(2, 2) – 4(1, 3)	(0,0,0)	177796.66	(0.10)	[73042]
	19(4,16) – 20(3,17)	(0,0,0)	178331.41	(0.10)	[73042]
	27(5,23) – 28(4,24)	(0,0,0)	178462.21	(0.10)	[73042]
	24(2,22) – 23(3,21)	(0,0,0)	181529.26	(0.10)	[73042]
	33(6,28) – 34(5,29)	(0,0,0)	225637.19	(0.10)	[73042]
	14(2,12) – 14(1,13)	(0,0,0)	233057.09	(0.10)	[73042]
	20(2,18) – 20(1,19)	(0,0,0)	233868.49	(0.10)	[73042]
	18(1,17) – 18(0,18)	(0,0,0)	235821.57	(0.10)	[73042]
	12(2,10) – 12(1,11)	(0,0,0)	239002.58	(0.10)	[73042]
	26(2,24) – 25(3,23)	(0,0,0)	251375.84	(0.12)	[73042]

TABLE 53.4. The microwave spectrum of O_3—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{18}O^{16}O^{18}O$	24(5,19) - 25(4,22)	(0,0,0)	252599.54	(0.12)	[73042]
	8(2, 6) - 8(1, 7)	(0,0,0)	254368.06	(0.12)	[73042]
	16(4,12) - 17(3,15)	(0,0,0)	254405.32	(0.12)	[73042]
	24(2,22) - 24(1,23)	(0,0,0)	257401.45	(0.12)	[73042]
	6(2, 4) - 6(1, 5)	(0,0,0)	261784.30	(0.12)	[73042]
	14(0,14) - 13(1,13)	(0,0,0)	261887.82	(0.12)	[73042]
	9(1, 9) - 8(0, 8)	(0,0,0)	267152.94	(0.12)	[73042]
	4(2, 2) - 4(1, 3)	(0,0,0)	267888.43	(0.12)	[73042]
	2(2, 0) - 2(1, 1)	(0,0,0)	272067.53	(0.12)	[73042]
	31(6,26) - 32(5,27)	(0,0,0)	273107.20	(0.12)	[73042]
	23(5,19) - 24(4,20)	(0,0,0)	274408.15	(0.12)	[73042]
	7(3, 5) - 8(2, 6)	(0,0,0)	274450.12	(0.12)	[73042]
	20(1,19) - 20(0,20)	(0,0,0)	274488.53	(0.12)	[73042]
	15(4,12) - 16(3,13)	(0,0,0)	274878.70	(0.12)	[73042]
	26(2,24) - 26(1,25)	(0,0,0)	277625.74	(0.12)	[73042]
	3(2, 2) - 3(1, 3)	(0,0,0)	277703.21	(0.12)	[73042]
	5(2, 4) - 5(1, 5)	(0,0,0)	283387.36	(0.12)	[73042]
	20(1,19) - 19(2,18)	(0,0,0)	291385.22	(0.12)	[73042]
	7(2, 6) - 7(1, 7)	(0,0,0)	291641.44	(0.12)	[73042]
	22(5,17) - 23(4,20)	(0,0,0)	298858.92	(0.12)	[73042]
	6(3, 3) - 7(2, 6)	(0,0,0)	299351.99	(0.12)	[73042]
	14(4,10) - 15(3,13)	(0,0,0)	299826.46	(0.12)	[73042]
	11(1,11) - 10(0,10)	(0,0,0)	301410.03	(0.12)	[73042]
	9(2, 8) - 9(1, 9)	(0,0,0)	302504.36	(0.12)	[73042]
	28(2,26) - 28(1,27)	(0,0,0)	303846.23	(0.12)	[73042]
	16(0,16) - 15(1,15)	(0,0,0)	313735.72	(0.12)	[73042]
	11(2,10) - 11(1,11)	(0,0,0)	316013.81	(0.12)	[73042]
	22(1,21) - 22(0,22)	(0,0,0)	317269.89	(0.12)	[73042]
	2(2, 0) - 1(1, 1)	(0,0,0)	319528.69	(0.12)	[73042]
	5(3, 3) - 6(2, 4)	(0,0,0)	320745.17	(0.15)	[73042]
	21(5,17) - 22(4,18)	(0,0,0)	321233.31	(0.15)	[73042]
	13(4,10) - 14(3,11)	(0,0,0)	321512.19	(0.15)	[73042]
	13(2,12) - 13(1,13)	(0,0,0)	332197.70	(0.15)	[73042]
	13(1,13) - 12(0,12)	(0,0,0)	335067.54	(0.15)	[73042]
	28(3,25) - 28(2,26)	(0,0,0)	357696.94	(0.15)	[73042]
	11(4, 8) - 12(3, 9)	(0,0,0)	367485.81	(0.15)	[73042]
	19(5,15) - 20(4,16)	(0,0,0)	367542.24	(0.15)	[73042]
	4(2, 2) - 3(1, 3)	(0,0,0)	367794.94	(0.15)	[73042]
	26(3,23) - 26(2,24)	(0,0,0)	368217.53	(0.15)	[73042]
	17(2,16) - 17(1,17)	(0,0,0)	372594.99	(0.15)	[73042]
	5(2, 4) - 4(1, 3)	(0,0,0)	380050.25	(0.15)	[73042]
	24(3,21) - 24(2,22)	(0,0,0)	381077.83	(0.15)	[73042]
$^{18}O^{18}O^{18}O$	18(3,15) - 19(2,18)	(0,0,0)	21022.39	(0.03)	[73042]
	16(2,14) - 17(1,17)	(0,0,0)	22592.58	(0.03)	[73042]
	24(4,20) - 25(3,23)	(0,0,0)	25519.12	(0.03)	[73042]
	15(3,13) - 16(2,14)	(0,0,0)	26581.48	(0.03)	[73042]
	14(2,12) - 15(1,15)	(0,0,0)	26648.21	(0.03)	[73042]
	23(2,22) - 22(3,19)	(0,0,0)	32256.23	(0.03)	[73042]
	18(2,16) - 17(3,15)	(0,0,0)	33781.13	(0.03)	[73042]
	1(1, 1) - 2(0, 2)	(0,0,0)	38049.79	(0.03)	[73042]
	37(6,32) - 38(5,33)	(0,0,0)	38642.63	(0.03)	[73042]
	12(2,10) - 13(1,13)	(0,0,0)	38651.49	(0.03)	[73042]
	30(5,25) - 31(4,28)	(0,0,0)	44216.67	(0.03)	[73042]
	35(4,32) - 34(5,29)	(0,0,0)	45735.94	(0.03)	[73042]
	26(3,23) - 25(4,22)	(0,0,0)	46457.04	(0.03)	[73042]
	7(2, 6) - 8(1, 7)	(0,0,0)	47653.58	(0.03)	[73042]
	25(2,24) - 24(3,21)	(0,0,0)	49462.19	(0.03)	[73042]
	29(3,27) - 28(4,24)	(0,0,0)	51926.10	(0.03)	[73042]
	31(2,30) - 30(3,27)	(0,0,0)	52191.20	(0.03)	[73042]
	29(5,25) - 30(4,26)	(0,0,0)	54280.36	(0.03)	[73042]
	16(3,13) - 17(2,16)	(0,0,0)	54884.84	(0.03)	[73042]
	10(2, 8) - 11(1,11)	(0,0,0)	57862.32	(0.03)	[73042]
	27(2,26) - 26(3,23)	(0,0,0)	58991.86	(0.03)	[73042]
	6(0, 6) - 5(1, 5)	(0,0,0)	59917.31	(0.03)	[73042]
	29(2,28) - 28(3,25)	(0,0,0)	60055.76	(0.03)	[73042]

TABLE 53.4. The microwave spectrum of O_3—Continued

Isotopic species	$J'(K'_-,K'_+)$ – $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{18}O^{18}O^{18}O$	22(2,20) – 23(1,23)	(0,0,0)	60540.04	(0.03)	[73042]
	22(4,18) – 23(3,21)	(0,0,0)	67713.31	(0.03)	[73042]
	42(5,37) – 41(6,36)	(0,0,0)	67962.89	(0.03)	[73042]
	12(1,11) – 11(2,10)	(0,0,0)	68122.59	(0.03)	[73042]
	21(4,18) – 22(3,19)	(0,0,0)	68803.59	(0.03)	[73042]
	36(6,30) – 37(5,33)	(0,0,0)	69936.16	(0.03)	[73042]
	43(7,37) – 44(6,38)	(0,0,0)	71922.57	(0.03)	[73042]
	43(5,39) – 42(6,36)	(0,0,0)	72357.23	(0.03)	[73042]
	36(4,32) – 35(5,31)	(0,0,0)	116884.83	(0.06)	[73042]
	34(6,28) – 35(5,31)	(0,0,0)	117460.25	(0.06)	[73042]
	19(4,16) – 20(3,17)	(0,0,0)	121507.23	(0.06)	[73042]
	26(2,24) – 27(1,27)	(0,0,0)	124830.79	(0.06)	[73042]
	12(3, 9) – 13(2,12)	(0,0,0)	132100.98	(0.06)	[73042]
	26(5,21) – 27(4,24)	(0,0,0)	136675.75	(0.06)	[73042]
	11(3, 9) – 12(2,10)	(0,0,0)	136831.95	(0.06)	[73042]
	35(3,33) – 34(4,30)	(0,0,0)	136984.72	(0.06)	[73042]
	33(6,28) – 34(5,29)	(0,0,0)	138570.21	(0.06)	[73042]
	3(1, 3) – 2(0, 2)	(0,0,0)	146631.77	(0.06)	[73042]
	12(1,11) – 12(0,12)	(0,0,0)	147324.96	(0.06)	[73042]
	4(2, 2) – 5(1, 5)	(0,0,0)	148890.05	(0.06)	[73042]
	18(4,14) – 19(3,17)	(0,0,0)	155816.40	(0.06)	[73042]
	17(4,14) – 18(3,15)	(0,0,0)	171747.17	(0.10)	[73042]
	14(1,13) – 14(0,14)	(0,0,0)	173668.94	(0.10)	[73042]
	10(3, 7) – 11(2,10)	(0,0,0)	173876.60	(0.10)	[73042]
	24(5,19) – 25(4,22)	(0,0,0)	183095.32	(0.10)	[73042]
	5(1, 5) – 4(0, 4)	(0,0,0)	185482.79	(0.10)	[73042]
	31(6,26) – 32(5,27)	(0,0,0)	186910.78	(0.10)	[73042]
	8(2, 6) – 8(1, 7)	(0,0,0)	229948.55	(0.10)	[73042]
	24(2,22) – 23(3,21)	(0,0,0)	233899.06	(0.10)	[73042]
	22(2,20) – 22(1,21)	(0,0,0)	234365.11	(0.10)	[73042]
	29(6,24) – 30(5,25)	(0,0,0)	234486.07	(0.10)	[73042]
	7(3, 5) – 8(2, 6)	(0,0,0)	235418.84	(0.10)	[73042]
	6(2, 4) – 6(1, 5)	(0,0,0)	237546.99	(0.10)	[73042]
	2(2, 0) – 2(1, 1)	(0,0,0)	248404.74	(0.10)	[73042]
	32(3,29) – 31(4,28)	(0,0,0)	249245.57	(0.10)	[73042]
	21(5,17) – 22(4,18)	(0,0,0)	251328.18	(0.12)	[73042]
	24(2,22) – 24(1,23)	(0,0,0)	254339.32	(0.12)	[73042]
	18(1,17) – 17(2,16)	(0,0,0)	254446.38	(0.12)	[73042]
	3(2, 2) – 3(1, 3)	(0,0,0)	254454.10	(0.12)	[73042]
	9(1, 9) – 8(0, 8)	(0,0,0)	256908.52	(0.12)	[73042]
	28(6,22) – 29(5,25)	(0,0,0)	258589.84	(0.12)	[73042]
	5(2, 4) – 5(1, 5)	(0,0,0)	260563.66	(0.12)	[73042]
	6(3, 3) – 7(2, 6)	(0,0,0)	260866.10	(0.12)	[73042]
	13(4,10) – 14(3,11)	(0,0,0)	267197.94	(0.12)	[73042]
	14(0,14) – 13(1,13)	(0,0,0)	268378.35	(0.12)	[73042]
	7(2, 6) – 7(1, 7)	(0,0,0)	269442.65	(0.12)	[73042]
	20(5,15) – 21(4,18)	(0,0,0)	275544.40	(0.12)	[73042]
	9(2, 8) – 9(1, 9)	(0,0,0)	281137.37	(0.12)	[73042]
	27(6,22) – 28(5,23)	(0,0,0)	281462.06	(0.12)	[73042]
	5(3, 3) – 6(2, 4)	(0,0,0)	281893.26	(0.12)	[73042]
	20(1,19) – 20(0,20)	(0,0,0)	284382.18	(0.12)	[73042]
	11(1,11) – 10(0,10)	(0,0,0)	290652.29	(0.12)	[73042]
	12(4, 8) – 13(3,11)	(0,0,0)	291348.32	(0.12)	[73042]
	11(2,10) – 11(1,11)	(0,0,0)	295689.10	(0.12)	[73042]
	2(2, 0) – 1(1, 1)	(0,0,0)	295878.44	(0.12)	[73042]
	19(5,15) – 20(4,16)	(0,0,0)	297965.74	(0.12)	[73042]
	4(3, 1) – 5(2, 4)	(0,0,0)	305286.51	(0.12)	[73042]
	26(2,24) – 25(3,23)	(0,0,0)	305392.38	(0.12)	[73042]
	13(2,12) – 13(1,13)	(0,0,0)	313122.78	(0.12)	[73042]
	11(4, 8) – 12(3, 9)	(0,0,0)	313356.37	(0.12)	[73042]
	28(2,26) – 28(1,27)	(0,0,0)	313626.81	(0.12)	[73042]
	3(2, 2) – 2(1, 1)	(0,0,0)	315562.44	(0.12)	[73042]
	20(1,19) – 19(2,18)	(0,0,0)	318064.45	(0.12)	[73042]
	30(3,27) – 30(2,28)	(0,0,0)	318378.93	(0.12)	[73042]
	16(0,16) – 15(1,15)	(0,0,0)	319099.80	(0.12)	[73042]

TABLE 53.4. The microwave spectrum of O_3—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{18}O^{18}O^{18}O$	28(3,25) - 28(2,26)	(0,0,0)	319658.56	(0.12)	[73042]
	26(3,23) - 26(2,24)	(0,0,0)	325992.28	(0.15)	[73042]
	22(1,21) - 22(0,22)	(0,0,0)	329742.24	(0.15)	[73042]
	15(2,14) - 15(1,15)	(0,0,0)	333432.78	(0.15)	[73042]
	34(3,31) - 34(2,32)	(0,0,0)	334467.70	(0.15)	[73042]
	5(2, 4) - 4(1, 3)	(0,0,0)	355629.04	(0.15)	[73042]
	17(2,16) - 17(1,17)	(0,0,0)	356573.28	(0.15)	[73042]
	15(1,15) - 14(0,14)	(0,0,0)	357794.81	(0.15)	[73042]
	9(4, 6) - 10(3, 7)	(0,0,0)	358923.60	(0.15)	[73042]
	20(3,17) - 20(2,18)	(0,0,0)	362907.29	(0.15)	[73042]
	18(0,18) - 17(1,17)	(0,0,0)	368366.19	(0.15)	[73042]
	18(3,15) - 18(2,16)	(0,0,0)	376576.79	(0.15)	[73042]
	24(1,23) - 24(0,24)	(0,0,0)	377592.83	(0.15)	[73042]
	28(2,26) - 27(3,25)	(0,0,0)	378262.22	(0.15)	[73042]
	22(1,21) - 21(2,20)	(0,0,0)	381348.92	(0.15)	[73042]

*Calculated transition frequency.

3. References to Spectral Data

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4. Appendix

4.1. Molecular Structures for Triatomic Molecules

Although none of the structures reported in the literature were reanalyzed in the present work, for completeness the structural parameters reported are given here in table A.1. Since the equilibrium, r_e, and substitution r_s, structures are considered most reliable, these are quoted when available.

4.2. Discussion of Centrifugal Distortion Analysis of F_2O

Historically, the analysis of the rotational spectrum of F_2O has caused considerable difficulty. The first observations on F_2O (Hilton et al. [61007] and Bransford et al. [60003]) were incorrectly interpreted and later Pierce et al. [63007] provided the correct assignments from a detailed centrifugal distortion analysis of new spectral measurements [61008] and [63007]. Although these results appeared consistent, Kirchhoff [72031] found that the $36_{4,32}$–$37_{3,36}$ transition reported in [63007] at 29473.73 MHz was erroneous. His conclusion was based on a detailed statistical analysis and several new measurements.

While examining Kirchhoff's calculations, provided to the author by W. H. Kirchhoff, it was noted that two of the resolved triplet (spin-rotation splitting) rotational lines reported by Pierce and DiCianni [63008] had been overlooked. Further, the questionable transitions of Hilton et al. assigned in [61007] were quite reasonably not included in the previous calculations. When the two new transitions, $24_{2,23}$–$23_{3,20}$ at 17257.86 MHz and $25_{3,22}$–$26_{2,25}$ at 14720.63 MHz, from [63008] were added to Kirchhoff's basic analysis, the fit substantially degraded with a standard deviation of 0.157 MHz versus 0.096 MHz without the two new transitions.

Following the procedure of successively eliminating one transition at a time as described by Kirchhoff [72031], three transitions were found which substantially degrade the fit, namely:

Transition	Frequency	σ_{Fit} (when excluded)
$17_{2,15}$–$18_{1,18}$	59 137.55	0.129 MHz
$22_{2,21}$–$21_{3,18}$	38 675.10	0.136 MHz
$25_{3,22}$–$26_{2,25}$	14 720.63	0.125 MHz

where σ_{Fit} is the standard deviation of the fit when each of the transitions is independently eliminated, as compared to $\sigma=0.157$ when all are included.

When all three of these questionable transitions were simultaneously eliminated from the fit, the standard deviation dropped significantly to 0.070 MHz and all transitions in the fit exhibited reasonable statistical behavior. In addition, the predicted frequency for the 14720 line was only 0.17 MHz higher than observed (t-test$=0.5$) while the 59137 line was predicted 2.5 MHz higher than observed (t-test$=14.2$) and the 38675 line was predicted 1.1 MHz higher (t-test$=12.6$). A calculation with only the latter two transitions (59.1 GHz and 38.6 GHz) eliminated appeared consistent. In the final analysis two of the low frequency lines from Hilton et al. were also included since they were in good agreement in all the fits which did not contain the questionable transitions.

The final results of this reanalysis are shown in table A.2 and compared to the results obtained with Kirchhoff's data set. In the upper part of the table all of the transitions excluded from the present analysis are given. The deviation found for the $17_{2,15}$–$18_{1,18}$ of $\sim$-2 MHz and $\sim$-1 MHz deviation for the $22_{2,21}$–$21_{3,18}$ suggest recording errors, i.e., the actual observed frequencies probably were 59139.55 and 38676.10, respectively. Note also the divergence between the present results and Kirchhoff's for the $36_{4,32}$–$37_{3,35}$ line with $\Delta\nu\sim-31$ MHz versus $\Delta\nu\sim+31$ MHz. This is also indicated in comparing the $\Delta\nu$'s and $t(\Delta\nu)$ results for the new transitions in the middle of table A.2. Although not added to the fit, the remaining lines from Hilton et al. [61007] in the 92–104 GHz range appear to be assigned correctly by Pierce et al. [63007] based on the expected measurement uncertainty.

The difficulties encountered in the analysis of F_2O are indicative of assigning spectral lines solely based on agreement with frequency predictions. Pierce et al. [63007] were forced to employ this method since Stark effect for lines with $J>5$ were unresolved. Thus, it is not surprising to find several transitions which are misassigned. Ideally, some additional measurements on F_2O should be made in order to firmly establish the assignments and provide a centrifugal distortion analysis which results in better quality sextic parameters than presently obtainable. In the lower portion of table A.2 a list of predicted transitions is given. Observation of these transitions would remove any lingering doubts between the present analysis and those previously reported. Some additional confidence can be placed in the present results since the two new lines fit (17.2 GHz and 14.7 GHz) have been observed as triplets and are in good agreement with the spin-rotation analysis of Flygare [65011].

After this review was submitted a sample of F_2O was obtained and new measurements were performed to resolve the questions relating to the analysis on F_2O. The measurements shown in table A.2.1, were carried out in a parallel plate Stark-modulated spectrometer with fields up to about 3000 V/cm. Many of the observed transitions with $J>30$ occurred as K-doublets which assisted in the assignment. Several of the transitions predicted in table A.2. were measured and agreed well with the reanalysis described above. The molecular constants obtained by combining the new measurements with the data in table 34.3. are given in table 34.

Table A.1. The molecular structures of triatomic molecules.

Molecule (ABC)	Type	r_{AB} (Å)	r_{BC} (Å)	∠ABC	Reference
$Ar^{35}ClF$	r_o	3.330	1.63178[a]	168.87°	[74009]
$Ar^{37}ClF$	r_o	3.329	1.63175[a]	168.94°	[74009]
ArClF	r_e	3.286			[74009]
$Ar^{35}ClH$	r_o	4.0065	1.2839	41.53°	[73026]
$Ar^{37}ClH$	r_o	4.0058	1.2839	41.53°	[73026]
$Ar^{35}ClD$	r_o	4.0247	1.2813	33.71°	[73026]
$Ar^{37}ClD$	r_o	4.0242	1.2813	33.71°	[73026]
ArFH	r_o	3.540	...	48.20(7)°	[74021]
HBS	r_s	1.1692(4)	1.5995(4)	180°	[73027]
BrNO	r_s	2.140(2)	1.146(10)	114.50(50)°	[70018]
BrCN	r_o	1.789(10)	1.160(10)	180°	[48003]
ClCN	r_s	1.631	1.159	180°	[63005]
	r_e	1.629(6)	1.160(7)	180°	[65009]
FCN	r_s	1.262	1.159	180°	[63005]
CF_2	r_a	1.3035(1)	1.3035(1)	104.78(2)°	[73030]
HCN	r_s	1.0635(3)	1.1551(2)	180°	[75007]
	r_e	1.0655(5)	1.15321(10)	180°	[71021]
HNC	r_s	0.98607(9)	1.17168(22)	180°	[76025]
HCO	r_a	1.1102	1.1712	127.4°	[74022]
	r_o	1.125	1.175	124.95°	[75035]
HCO^+	r_s	1.0930	1.1071	180°	[76013]
HCP	r_s	1.067	1.542	180°	[64002]
	r_e	1.0692(8)	1.5398(2)	180°	[73063]
ICN	r_o	1.9952	1.1581	180°	[72026]
OCS	r_e	1.1543(10)	1.5628(10)	180°	[73045]
OCSe	r_e	1.1535(1)	1.7098(1)	180°	[76015]
SCSe	r_o	1.553	1.695	180°	[71022]
SCTe	r_o	1.557	1.904	180°	[54002]
KrClF	r_e	3.3136	1.63178[a]	180°	[75034]
	r_o	3.388	1.63178[a]	169.93°	[75034]

[a] Assumed

Table A.1. Structure constants (continued)

Molecule (ABC)	Type	r_{AB} (Å)	r_{BC} (Å)	∠ABC	Reference
HOCl	r_s	0.97	1.690	102.5°	[71023]
ClNO	r_s	1.975	1.139	113.3°	[61005]
NSCl	r_s	1.450	2.161	117.7°	[70021]
ClO_2	r_s	1.471	1.471	117.5°	[62005]
Cl_2O	r_o	1.7004	1.7004	110.86°	[66015]
Cl_2S	r_o	2.014	2.014	102.8°	[72028]
CsOH	r_e	2.391(2)	0.960(10)	180°	[69025]
HOF	r_o	0.966	1.442	96.8°	[72030]
FNO	r_s	1.512	1.136	110.1°	[69026]
NSF	r_a	1.448	1.643	116.9°	[67013]
GeF_2	r_e	1.7321	1.7321	97.148°	[72032]
NF_2	r_o	1.3494	1.3494	103.3°	[74003]
OF_2	r_e	1.4053	1.4053	103.07°	[66019]
SF_2	r_e	1.5875(2)	1.5875(2)	97.96(2)°	[74010]
SiF_2	r_e	1.5901(1)	1.5901(1)	100.77(2)°	[73036]
KOH	r_o	2.2115	0.9120	180°	[73037]
LiOH	r_e	1.580	0.950	180°	[76007]
HNO	r_o	1.0628	1.2116	108.6°	b
HNN^+	r_o	1.0406	1.0949	180°	[76014]
RbOH	r_e	2.301(2)	0.957(10)	180°	[69025]
HO_2	r_o	0.977	1.335	104.1°	[76008]
H_2O	r_e	0.9587	0.9587	103.9°	[74036]
H_2S	r_e	1.3356	1.3356	92.11°	[67027][c]
H_2Se	r_e	1.4605(30)	1.4605(30)	90.92(12)°	[62011]
NO_2	r_e	1.1947	1.1947	133.82°	[75036]
NNO	r_s	1.1286(3)	1.1876(3)	180°	[58002]
SSO	r_o	1.883	1.464	118.2°	[74006]
SO_2	r_e	1.43076(13)	1.43076(13)	119.33(1)°	[69039]
SeO_2	r_e	1.6076(6)	1.6076(6)	113.83°	[70035]
O_3	r_e	1.2717(2)	1.2717(2)	116.78°	[70048]

[b] F. W. Dalby, Can. J. Phys. 36, 1336 (1958).

[c] See also [75020].

Table A.2. Centrifugal distortion analysis of F_2O.

Transition $J'_{K'_p,K'_0}$ $J''_{K''_p,K''_0}$	Measured Frequency (MHz)	Unweighted Fit		Kirchhoff's Fit	
		$\Delta\nu$[a] (MHz)	$t(\Delta\nu)$	$\Delta\nu$[a] (MHz)	$t(\Delta\nu)$
Transitions not included in present analysis:					
$7_{0,7} \leftarrow 6_{1,6}$	104 837.67	0.350	3.1	0.450	3.7
$9_{1,8} \leftarrow 9_{0,9}$	97 965.32	0.321	2.1	0.957	5.8
$10_{1,9} \leftarrow 9_{2,8}$	97 879.86	0.375	3.2	0.688	5.4
$11_{4,7} \leftarrow 12_{3,10}$	98 425.89	0.557	4.5	0.600	4.4
$16_{5,11} \leftarrow 17_{4,14}$	92 195.43	0.569	4.6	0.762	5.3
$17_{2,15} \leftarrow 18_{1,18}$	59 137.55	-1.962	-11.1	-0.059[b]	-1.7
$22_{2,21} \leftarrow 21_{3,18}$	38 675.10	-1.104	-10.5	-0.188[b]	-2.8
$36_{4,32} \leftarrow 37_{3,35}$	29 473.73	-30.740	-16.0	+31.045	+4.6
Additional transitions not included in Kirchhoff's fit:					
$18_{2,17} \leftarrow 17_{3,14}$	46 795.92	0.160	2.0	0.725	6.9
$21_{2,20} \leftarrow 20_{3,17}$	45 089.32	0.089	1.2	1.215	10.1
$24_{2,23} \leftarrow 23_{3,20}$	17 257.96	-0.044	-0.6	-1.360	-6.9
$25_{3,22} \leftarrow 26_{2,25}$	14 720.63	-0.003	-0.1	8.184	10.6

Some predicted transitions with standard deviations:

	Present Results ν_0 calc.	Kirchhoff's Results ν_0 calc.
$19_{2,17} \leftarrow 20_{1,20}$	95 193.233±0.33	95 187.297±0.31
$26_{3,23} \leftarrow 27_{2,26}$	34 189.509±0.18	34 175.032±1.35
$27_{3,24} \leftarrow 28_{2,27}$	55 661.343±0.34	55 637.913±2.21
$28_{3,25} \leftarrow 29_{2,28}$	78 868.074±0.59	78 832.342±3.41
$29_{3,26} \leftarrow 30_{2,29}$	103 521.610±0.96	103 469.450±5.04
$30_{3,28} \leftarrow 29_{4,25}$	101 226.877±0.36	101 212.210±1.43
$31_{3,29} \leftarrow 30_{4,26}$	90 570.656±0.38	90 555.764±1.50
$32_{3,30} \leftarrow 31_{4,27}$	76 921.974±0.36	76 908.831±1.35
$35_{3,33} \leftarrow 34_{4,30}$	19 751.208±0.42	19 764.853±1.47
$35_{4,31} \leftarrow 36_{3,34}$	3 945.408±1.03	3 911.673±3.69
$36_{4,32} \leftarrow 37_{3,35}$	29 504.470±1.91	29 442.685±6.80
$37_{4,33} \leftarrow 38_{3,36}$	56 618.503±3.13	56 519.049±11.04
$38_{4,34} \leftarrow 39_{3,37}$	84 965.079±4.75	84 816.543±16.62

[a] Observed minus calculated frequency.

[b] Transitions included in Kirchhoff's analysis [71031].

[c] Not fit in Kirchhoff's analysis [71031].

Table A.2.1 New Millimeter Measurements on F_2O.[a]

$J'_{K'_{-1},K'_{+1}} - J''_{K''_{-1},K''_{+1}}$	Measured[b] Frequency (MHz)	Calculated[b] Frequency (MHz)
$44_{8,37} - 43_{9,34}$	84401.810(45)	84401.795(35)
$30_{5,26} - 29_{6,23}$	84702.445(45)	84702.521(26)
$40_{10,31} - 41_{9,32}$	84993.425(45)	84993.505(27)
$40_{10,30} - 41_{9,33}$	85021.925(75)	85022.011(28)
$44_{8,36} - 43_{9,35}$	85824.800(80)	85824.794(36)
$21_{6,15} - 22_{5,18}$	86123.975(45)	86123.939(35)
$2_{1,2} - 1_{0,1}$	86283.335(45)	86283.354(22)
$8_{1,7} - 8_{0,8}$	86721.320(45)	86721.327(31)
$49_{9,41} - 48_{10,38}$	89202.875(75)	89202.865(46)
$26_{4,23} - 25_{5,20}$	89804.135(30)	89804.138(25)
$49_{9,40} - 48_{10,39}$	89813.855(75)	89813.879(47)
$16_{5,12} - 17_{4,13}$	90135.08(10)	90135.031(26)
$35_{9,27} - 36_{8,28}$	90339.200(30)	90339.231(27)
$35_{9,26} - 36_{8,29}$	90405.110(45)	90405.115(27)
$31_{3,29} - 30_{4,26}$	90569.98(10)	90569.989(22)
$2_{2,0} - 3_{1,3}$	91298.240(75)	91298.201(25)
$23_{3,21} - 22_{4,18}$	91780.385(30)	91780.399(28)
$16_{5,11} - 17_{4,14}$	92194.835(45)	92194.826(26)
$35_{6,30} - 34_{7,27}$	94190.375(45)	94190.439(36)
$19_{2,17} - 20_{1,20}$	95193.890(45)[c]	95193.873(60)
$30_{8,23} - 31_{7,24}$	95789.780(45)	95789.749(27)
$30_{8,22} - 31_{7,25}$	95937.560(45)	95937.496(27)
$49_{12,38} - 50_{11,39}$	95995.640(45)	95995.650(46)
$49_{12,37} - 50_{11,40}$	95998.940(45)	95998.887(46)

[a] Unpublished work of F.J. Lovas and R.D. Suenram, National Bureau of Standards, 1978. Also included in the analysis was the $1_{1,1} - 2_{0,2}$ at 7803.49(1) MHz reported privately by J. Muenter.

[b] Numbers in parentheses are measured uncertainties or standard deviation of calculated value and refer to the last digits given.

[c] This is the middle component of a resolved triplet. The other lines occur at 95193.575(45) MHz and 95194.220(45) MHz.