UNITED STATES DEPARTMENT OF COMMERCE ● Maurice H. Stans, *Secretary*

NATIONAL BUREAU OF STANDARDS ● Lewis M. Branscomb, *Director*

Selected Tables of Atomic Spectra

A Atomic Energy Levels-Second Edition

B Multiplet Tables

N IV, N V, N VI, N VII

Data Derived From the Analyses of Optical Spectra

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NSRDS–NBS 3, Section 4

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Abstract

The present publication is the fourth Section of a series being prepared in response to the persistent need for a current revision of two sets of tables containing data on atomic spectra as derived from analyses of optical spectra. As in the previous Sections, Part A contains the atomic energy levels and Part B the multiplet tables. Four spectra of nitrogen, N IV, N V, N VI and N VII, are included. The form of presentation is described in detail in the text to Section 1.

Key words: Atomic energy levels, N IV-N VII; Nitrogen spectra, N IV-N VII; Multiplet tables, N IV-N VII; Spectra, N IV-N VII; Wavelengths, nitrogen spectra N IV-N VII.

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Foreword

The National Standard Reference Data System provides effective access to the quantitative data of physical science, critically evaluated and compiled for convenience, and readily accessible through a variety of distribution channels. The System was established in 1963 by action of the President's Office of Science and Technology and the Federal Council for Science and Technology, with responsibility to administer it assigned to the National Bureau of Standards.

The System now comprises a complex of data centers and other activities, carried on in academic institutions and other laboratories both in and out of government. The independent operational status of existing critical data projects is maintained and encouraged. Data centers that are components of the NSRDS produce compilations of critically evaluated data, critical reviews of the state of quantitative knowledge in specialized areas, and computations of useful functions derived from standard reference data. In addition, the centers and projects establish criteria for evaluation and compilation of data and make recommendations on needed improvements in experimental techniques. They are normally closely associated with active research in the relevant field.

The technical scope of the NSRDS is indicated by the principal categories of data compilation projects now active or being planned: nuclear properties, atomic and molecular properties, solid state properties, thermodynamic and transport properties, chemical kinetics, and colloid and surface properties and mechanical properties.

The NSRDS receives advice and planning assistance from the National Research Council of the National Academy of Sciences-National Academy of Engineering. An overall Review Committee considers the program as a whole and makes recommendations on policy, long-term planning, and international collaboration. Advisory Panels, each concerned with a single technical area, meet regularly to examine major portions of the program, assign relative priorities, and identify specific key problems in need of further attention. For selected specific topics, the Advisory Panels sponsor subpanels which make detailed studies of users' needs, the present state of knowledge, and existing data resources, as a basis for recommending one or more data compilation activities. This assembly of advisory services contributes greatly to the guidance of NSRDS activities.

The NSRDS-NBS series of publications is intended primarily to include evaluated reference data and critical reviews of long-term interest to the scientific and technical community.

LEWIS M. BRANSCOMB, *Director*

Preface

The present publication is the fourth Section of a series that is being prepared in response to the increasing demand for a current revision of two sets of tables containing data on atomic spectra as derived from analyses of optical spectra.

The first set, *Atomic Energy Levels*, NBS Circular 467, consists of three Volumes published, respectively, in 1949, 1952, and 1958, and a fourth one on rare-earth spectra, still in course of preparation. This Circular has been reprinted as NSRDS–NBS 35, Volumes I, II, and III.

The second set consists of two Multiplet Tables; one published in 1945 by the Princeton University Observatory containing multiplets having wavelengths longer than 3000 Å; the other, *An Ultra-Violet Multiplet Table*, NBS Circular 488, appearing in five Sections, the first in 1950, the second in 1952, and the others in 1962. The 1945 Princeton Multiplet Table is being reprinted as NSRDS–NBS 40.

The present series includes both sets of data, the energy levels and multiplet tables as parts A and B, respectively, for selected spectra contained in Volume I of "Atomic Energy Levels." The Sections are being published at irregular intervals as revised analyses become available. A flexible paging system permits the arrangement of the various Sections by atomic number, regardless of the order in which the separate spectra are published. Section 1 includes three spectra of silicon, $Z=14$: Si II, Si III, Si IV. Section 2 contains similar data for Si I. Section 3 covers all the spectra of carbon, $Z=6$: C I, C II, C III, C IV, C V, C VI. Section 5 is scheduled to include the remaining spectra of nitrogen: N I, N II, N III. The form of presentation of the data is described in detail in the text of Section 1. All Sections are arranged identically and the same conversion factor, cm^{-1} to eV, 0.000123981 is used throughout.

The manuscript has been prepared by Charlotte E. Moore of the Office of Standard Reference Data, who published the earlier tables. She appreciates the cordial cooperation of the numerous atomic spectroscopists whose work is quoted here. She is particularly indebted to B. Edlén for his valuable guidance and advice. K. Bockasten and S. G. Tilford have also been most cooperative. The splendid work of Barbara N. Somerville in typing the press copy of this difficult tabular material is gratefully acknowledged.

Washington, D.C., December 18, 1970.

Contents

NSRDS–NBS 3, SECTION 4

NITROGEN. Z = 7

Part A NITROGEN

N IV

Be I sequence; 4 electrons $Z=7$

Ground state $1s^2\ 2s^2\ {}^1S_0$

$2s^2\ {}^1S_0$ **624866 ± 3,** 160.034 Å (Vac) I P 77.472 eV

The early analysis by Edlén has been revised and extended by R. Hallin, who has observed the spectrum from 300 Å to 8000 Å with a theta-pinch discharge as source. Hallin lists 127 classified lines and derives the ionization limit 624864.7 ± 2 cm^{-1} from hydrogen-like terms and by using the polarization formula. A slight revision of this value by A. Ölme in 1970 is quoted above.

The triplet and singlet systems are connected by the two intersystem combination lines at 823 Å and 1486 Å.

D. J. Michels has carried the analysis further by observations in the range 159 Å to 463 Å made with a Hinteregger-type water-cooled quartz capillary discharge tube—a windowless source operated as a pulse discharge. He reports 250 classified lines of which 22 are included by Hallin Fifty-three of his new terms lie above the first ionization limit.

Michels introduces some revisions to the 1966 analysis. He interchanges the terms $4s\ {}^3S$ and $3p'\ {}^3S$. This change has been adopted, but Hallin's values have been retained, as they are based on observations in the longer wavelength region. The level $3d'\ {}^1P^\circ$ has been revised by correcting a transcript error in the earlier work. This change leaves the line of intensity 2 at 2594.34 Å unclassified. Improved values for $6d\ {}^3D$, $4p'\ {}^1D$ and $4,5d'\ {}^3D^\circ$ have resulted from the 1970 observations.

One member in each of three series is missing because of masking: $5p'\ {}^1D$, $5d'\ {}^1F^\circ$ and $12d'\ {}^3D^\circ$.

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D. J. Michels, J. Opt. Soc. Am. **61,** No. 5, 625–631 (1971).

A. Ölme, Physica Scripta **1,** 256–260 (1970). I P

NIV

Config.	Desig.	J	Level	Interval
$2s^2$	$2s^2\ {}^1S$	0	0.0	
$2s(^2S)2p$	$2p\ {}^3P^\circ$	0	*67209.2*	
		1	*67272.3*	63.1
		2	*67416.3*	144.0
$2s(^2S)2p$	$2p\ {}^1P^\circ$	1	*130693.9*	
$2p^2$	$2p^2\ {}^3P$	0	175535.4	
		1	175608.1	72.7
		2	175732.9	124.8
$2p^2$	$2p^2\ {}^1D$	2	188882.5	
$2p^2$	$2p^2\ {}^1S$	0	235369.3	
$2s(^2S)3s$	$3s\ {}^3S$	1	377284.8	
$2s(^2S)3s$	$3s\ {}^1S$	0	388854.6	
$2s(^2S)3p$	$3p\ {}^1P^\circ$	1	*404522.4*	
$2s(^2S)3p$	$3p\ {}^3P^\circ$	0	*405971.6*	
		1	*405987.5*	15.9
		2	*406022.8*	35.3
$2s(^2S)3d$	$3d\ {}^3D$	1	420045.8	
		2	420049.6	3.8
		3	420058.0	8.4
$2s(^2S)3d$	$3d\ {}^1D$	2	429159.6	
$2p(^2P^\circ)3s$	$3s'\ {}^3P^\circ$	0	*465291.8*	
		1	*465371.0*	79.2
		2	*465536.6*	165.6
$2p(^2P^\circ_{1\frac{1}{2}})3s$	$3s'\ {}^1P^\circ$	1	*473029.3*	
$2p(^2P^\circ_{0\frac{1}{2}})3p$	$3p'\ {}^1P$	1	480884.2	
$2p(^2P^\circ)3p$	$3p'\ {}^3D$	1	484498.2	
		2	484594.9	96.7
		3	484746.2	151.3
$2s(^2S)4s$	$4s\ {}^3S$	1	487607.4	
$2p(^2P^\circ)3p$	$3p'\ {}^3P$	0	494253.1	
		1	494309.2	56.1
		2	494402.0	92.8
$2s(^2S)4s$	$4s\ {}^1S$	0	495057.7	
$2p(^2P^\circ)3d$	$3d'\ {}^3F^\circ$	2	*495406.2*	
		3	*495482.6*	76.4
		4	*495585.7*	103.1
$2p(^2P^\circ_{1\frac{1}{2}})3p$	$3p'\ {}^3S$	1	498045.5	
$2p(^2P^\circ_{0\frac{1}{2}})3d$	$3d'\ {}^1D^\circ$	2	*498310.3*	
$2p(^2P^\circ_{1\frac{1}{2}})3p$	$3p'\ {}^1D$	2	499705.9	
$2s(^2S)4p$	$4p\ {}^3P^\circ$	2	*503680.4*	
		1	*503691.9*	−11.5
		0	*503699.8*	−7.9

NIV

Config.	Desig.	J	Level	Interval
$2p(^2P^\circ)3d$	$3d'\ {}^3D^\circ$	1	*505554.6*	
		2	*505588.2*	34.2
		3	*505630.6*	42.4
$2p(^2P^\circ_{1\frac{1}{2}})3d$	$3d'\ {}^1F^\circ$	3	*506284.8*	
$2s(^2S)4p$	$4p\ {}^1P^\circ$	1	*507027.9*	
$2s(^2S)4d$	$4d\ {}^3D$	1	511440	
		2	511446	6
		3	511448.0	2
$2p(^2P^\circ_{1\frac{1}{2}})3d$	$3d'\ {}^3P^\circ$	2	*511509.3*	−51.1
		1	*511560.4*	−30.8
		0	*511591.2*	
$2s(^2S)4d$	$4d\ {}^1D$	2	514647.7	
$2p(^2P^\circ_{1\frac{1}{2}})3p$	$3p'\ {}^1S$	0	515569.8	
$2s(^2S)4f$	$4f\ {}^3F^\circ$	2	*516552.6*	
		3	*516560.8*	8.2
		4	*516572.0*	11.2
$2p(^2P^\circ_{1\frac{1}{2}})3d$	$3d'\ {}^1P^\circ$	1	*518610.5*	
$2s(^2S)4f$	$4f\ {}^1F^\circ$	3	*521862.8*	
$2s(^2S)5s$	$5s\ {}^3S$	1	544813.4	
$2s(^2S)5s$	$5s\ {}^1S$	0	546731.3	
$2s(^2S)5p$	$5p\ {}^1P^\circ$	1	*550232.6*	
$2s(^2S)5d$	$5d\ {}^3D$	1, 2	552789.6	
		3	552790.9	1.3
$2s(^2S)5d$	$5d\ {}^1D$	2	554300.7	
$2s(^2S)5g$	$5g\ {}^1G$	4	554339.1	
$2s(^2S)5g$	$5g\ {}^3G$	3, 4, 5	554339.7	
$2s(^2S)5f$	$5f\ {}^3F^\circ$	2, 3, 4	*554571.8*	
$2s(^2S)5f$	$5f\ {}^1F^\circ$	3	*554995.7*	
$2s(^2S)6s$	$6s\ {}^3S$	1	570381.3	
$2s(^2S)6s$	$6s\ {}^1S$	0	571172.1	
$2s(^2S)6p$	$6p\ {}^1P^\circ$	1	*572731.1*	
$2s(^2S)6d$	$6d\ {}^3D$	1, 2, 3	575030.5	
$2s(^2S)6g$	$6g\ {}^1G$	4	575807.9	
$2s(^2S)6g$	$6g\ {}^3G$	3, 4, 5	575809.4	
$2s(^2S)6d$	$6d\ {}^1D$	2	575872.4	
$2s(^2S)6f$	$6f\ {}^1F^\circ$	3	*575999.3*	
$2s(^2S)6h$	$6h^{1,3}H^\circ$	4, 5, 5, 6	*576042.9*	

N IV – Continued

Config.	Desig.	J	Level	Interval
$2p(^2P^\circ)4s$	$4s'\ ^3P^\circ$	0	*577957.8*	
		1	*578045.4*	87.6
		2	*578210.6*	165.2
$2p(^2P^\circ_{1\frac{1}{2}})4s$	$4s'\ ^1P^\circ$	1	*580817.5*	
$2p(^2P^\circ_{0\frac{1}{2}})4p$	$4p'\ ^1P$	1	584661.6	
$2s(^2S)7s$	$7s\ ^3S$	1	584977.1	
$2s(^2S)7s$	$7s\ ^1S$	0	584983.3	
$2p(^2P^\circ)4p$	$4p'\ ^3D$	1	585709.5	
		2	585798.1	88.6
		3	585929.8	131.7
$2s(^2S)7p$	$7p\ ^1P^\circ$	1	*587979.4*	
$2s(^2S)7d$	$7d\ ^3D$	1, 2, 3	588382.6	
$2p(^2P^\circ_{0\frac{1}{2}})4d$	$4d'\ ^1D^\circ$	2	588689.0	
$2p(^2P^\circ)4p$	$4p'\ ^3P$	0	588790.1	
		1	588991.2	201.1
		2	589059.3	68.1
$2s(^2S)7d$	$7d\ ^1D$	2	588884.0	
$2s(^2S)7h$	$7h^{1,3}H^\circ$	4, 5, 5, 6	*588994.3*	
$2s(^2S)7i$	$7i^{1,3}I$	5, 6, 6, 7	589021.4	
$2p(^2P^\circ_{1\frac{1}{2}})4d$	$4d'\ ^1F^\circ$	3	*591047.8*	
$2p(^2P^\circ_{1\frac{1}{2}})4p$	$4p'\ ^1D$	2	591060.9	
$2p(^2P^\circ)4d$	$4d'\ ^3D^\circ$	1	*593690.0*	
		2	*593713.7*	23.7
		3	*593772.1*	58.4
$2p(^2P^\circ_{1\frac{1}{2}})4p$	$4p'\ ^1S$	0	594182.6	
$2p(^2P^\circ)4d$	$4d'\ ^3P^\circ$	2	*594489.9*	
		1	*594547.7*	−57.8
		0	*594573.8*	−26.1
$2p(^2P^\circ_{1\frac{1}{2}})4p$	$4p'\ ^3S$	1	595296.3	
$2s(^2S)8s$	$8s\ ^1S$	0	596150.1	
$2s(^2S)8p$	$8p\ ^1P^\circ$	1	*596270.9*	
$2s(^2S)8d$	$8d\ ^3D$	1, 2, 3	597026.8	
$2s(^2S)8d$	$8d\ ^1D$	2	597349.1	
$2s(^2S)8s$	$8s\ ^3S$	1	597481.6	
$2p(^2P^\circ_{1\frac{1}{2}})4d$	$4d'\ ^1P^\circ$	1	*598538.2*	
$2s(^2S)9s$	$9s\ ^3S$	1	601621.5	
$2s(^2S)9p$	$9p\ ^1P^\circ$	1	*602609.3*	

N IV – Continued

Config.	Desig.	J	Level	Interval
$2s(^2S)9d$	$9d\ ^3D$	1, 2, 3	602865.7	
$2s(^2S)9d$	$9d\ ^1D$	2	603107.3	
$2s(^2S)10s$	$10s\ ^3S$	1	606142.6	
$2s(^2S)10p$	$10p\ ^1P^\circ$	1	*606818.2*	
$2s(^2S)10d$	$10d\ ^3D$	1, 2, 3	607064.2	
$2s(^2S)10d$	$10d\ ^1D$	2	607242.9′	
$2s(^2S)11s$	$11s\ ^3S$	1	609465.8	
$2s(^2S)11p$	$11p\ ^1P^\circ$	1	*609945.8*	
$2s(^2S)11d$	$11d\ ^3D$	1, 2, 3	610166.0	
$2s(^2S)11d$	$11d\ ^1D$	2	610287.2	
$2s(^2S)12p$	$12p\ ^1P^\circ$	1	*612328.6*	
$2s(^2S)12d$	$12d\ ^3D$	1, 2, 3	612525.1	
$2s(^2S)12d$	$12d\ ^1D$	2	612621.6	
$2s(^2S)13p$	$13p\ ^1P^\circ$	1	*614190.3*	
$2s(^2S)13d$	$13d\ ^3D$	1, 2, 3	614380.6	
$2s(^2S)13d$	$13d\ ^1D$	2	614470.5	
$2s(^2S)14d$	$14d\ ^3D$	1, 2, 3	615894.4	
$2s(^2S)15d$	$15d\ ^3D$	1, 2, 3	617038.7	
N V $(^2S_{0\frac{1}{2}})$	***Limit***	.....	**624866 ± 3**	
$2p(^2P^\circ)5s$	$5s'\ ^3P^\circ$	0	*626355.0*	
		1	*626445.3*	90.3
		2	*626611.9*	166.6
$2p(^2P^\circ_{1\frac{1}{2}})5s$	$5s'\ ^1P^\circ$	1	*628546.9*	
$2p(^2P^\circ_{0\frac{1}{2}})5p$	$5p'\ ^1P$	1	629845.3	
$2p(^2P^\circ)5p$	$5p'\ ^3D$	1	630268.8	
		2	630333.6	64.8
		3	630473.0	139.4
$2p(^2P^\circ)5p$	$5p'\ ^3P$	0		
		1	631807.7	60.5
		2	631868.2	
$2p(^2P^\circ)5d$	$5d'\ ^3D^\circ$	1	*634158.4*	
		2	*634182.8*	24.4
		3	*634263.4*	80.6
$2p(^2P^\circ)5d$	$5d'\ ^3P^\circ$	0, 1, 2	*634669.5*	
$2p(^2P^\circ_{1\frac{1}{2}})5d$	$5d'\ ^1P^\circ$	1	*636467*	

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N IV – Continued

Config.	Desig.	J	Level	Interval
$2p(^2P^\circ)6s$	$6s'\ ^3P^\circ$	0	*651590.1*	
		1	*651671.8*	81.7
		2	*651859.9*	188.1
$2p(^2P^\circ_{0\,1/2})6p$	$6p'\ ^1P$	1	653629.9	
$2p(^2P^\circ)6p$	$6p'\ ^3D$	1		
		2	653909.4	
		3	654053.9	144.5
$2p(^2P^\circ)6p$	$6p'\ ^3P$	0, 1, 2	654791.3	
$2p(^2P^\circ_{1\,1/2})6d$	$6d'\ ^1F^\circ$	3	*655270.0*	
$2p(^2P^\circ_{1\,1/2})6p$	$6p'\ ^1D$	2	655284.1	
$2p(^2P^\circ)6d$	$6d'\ ^3D^\circ$	1	*656043.6*	
		2	*656074.7*	31.1
		3	*656155.7*	81.0
$2p(^2P^\circ)6d$	$6d'\ ^3P^\circ$	0, 1, 2	*656349.6*	
$2p(^2P^\circ_{1\,1/2})6d$	$6d'\ ^1P^\circ$	1	*657392*	
$2p(^2P^\circ)7s$	$7s'\ ^3P^\circ$	0		
		1	*666458.2*	207.2
		2	*666665.4*	
$2p(^2P^\circ_{0\,1/2})7p$	$7p'\ ^1P$	1	667698.9	
$2p(^2P^\circ)7p$	$7p'\ ^3D$	1		
		2	667872.6	
		3	668031.3	158.7
$2p(^2P^\circ)7p$	$7p'\ ^3P$	0, 1, 2	668460.9	
$2p(^2P^\circ_{1\,1/2})7p$	$7p'\ ^1D$	2	668753.5	
$2p(^2P^\circ)7d$	$7d'\ ^3D^\circ$	1, 2, 3	*669328.5*	
$2p(^2P^\circ)7d$	$7d'\ ^3P^\circ$	0, 1, 2	*669596.6*	
$2p(^2P^\circ_{1\,1/2})7d$	$7d'\ ^1P^\circ$	1	*670086*	
$2p(^2P^\circ)8s$	$8s'\ ^3P^\circ$	0		
		1		
		2	*676090.7*	
$2p(^2P^\circ_{0\,1/2})8p$	$8p'\ ^1P$	1	676706.4	
$2p(^2P^\circ)8p$	$8p'\ ^3D$	1		
		2		
		3	676994.0	
$2p(^2P^\circ)8p$	$8p'\ ^3P$	0, 1, 2	677276.5	
$2p(^2P^\circ_{1\,1/2})8p$	$8p'\ ^1D$	2	677458.7	
$2p(^2P^\circ)8d$	$8d'\ ^3D^\circ$	1, 2, 3	*677844.3*	

N IV – Continued

Config.	Desig.	J	Level	Interval
$2p(^2P^\circ)8d$	$8d'\ ^3P^\circ$	0, 1, 2	*678025.9*	
$2p(^2P^\circ_{1\,1/2})8d$	$8d'\ ^1P^\circ$	1	*678355*	
$2p(^2P^\circ)9s$	$9s'\ ^3P^\circ$	0		
		1		
		2	*682464.8*	
$2p(^2P^\circ)9p$	$9p'\ ^3D$	1		
		2		
		3	683092.7	
$2p(^2P^\circ)9p$	$9p'\ ^3P$	0, 1, 2	683278.4	
$2p(^2P^\circ_{1\,1/2})9p$	$9p'\ ^1D$	2	683399.9	
$2p(^2P^\circ)9d$	$9d'\ ^3D^\circ$	1, 2, 3	*683692.6*	
$2p(^2P^\circ)9d$	$9d'\ ^3P^\circ$	0, 1, 2	*683857.8*	
$2p(^2P^\circ_{1\,1/2})9d$	$9d'\ ^1P^\circ$	1	*684015*	
$2p(^2P^\circ)10s$	$10s'\ ^3P^\circ$	0		
		1		
		2	*686954.2*	
$2p(^2P^\circ)10p$	$10p'\ ^3D$	1		
		2		
		3	687432.9	
$2p(^2P^\circ)10p$	$10p'\ ^3P$	0, 1, 2	687548.3	
$2p(^2P^\circ_{1\,1/2})10p$	$10p'\ ^1D$	2	687629.4	
$2p(^2P^\circ)10d$	$10d'\ ^3D^\circ$	1, 2, 3	*687875.8*	
$2p(^2P^\circ)10d$	$10d'\ ^3P^\circ$	0, 1, 2	*688022.7*	
$2p(^2P^\circ_{1\,1/2})10d$	$10d'\ ^1P^\circ$	1	*688094*	
$2p(^2P^\circ)11p$	$11p'\ ^3P$	0, 1, 2	690659.5	
$2p(^2P^\circ_{1\,1/2})11p$	$11p'\ ^1D$	2	690770.5	
$2p(^2P^\circ)11d$	$11d'\ ^3D^\circ$	1, 2, 3	*690976.4*	
$2p(^2P^\circ)12p$	$12p'\ ^3P$	0, 1, 2	693069.3	
$2p(^2P^\circ)13p$	$13p'\ ^3P$	0, 1, 2	694902.7	
$2p(^2P^\circ)13d$	$13d'\ ^3D^\circ$	1, 2, 3	*695124.4*	
N V$(2p\ ^2P^\circ_{0\,1/2})$	*Limit*		*705327.9*	259.7
N V$(2p\ ^2P^\circ_{1\,1/2})$	*Limit*		*705586.6*	

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N IV Observed Terms

Config. $1s^2+$	Observed Terms			
$2s^2$	$2s^2\ ^1S$			
$2s(^2S)2p$	$2p\ ^3P^\circ$ $2p\ ^1P^\circ$			
$2p^2$	$2p^2\ ^3P$ $2p^2\ ^1S$ $2p^2\ ^1D$			
	$ns(n \geq 3)$	$np(n \geq 3)$	$nd(n \geq 3)$	
$2s(^2S)nl$	$3\text{–}11s\ ^3S$ $3\text{–}8s\ ^1S$	$3, 4p\ ^3P^\circ$ $3\text{–}13p\ ^1P^\circ$	$3\text{–}15d\ ^3D$ $3\text{–}13d\ ^1D$	
$2p(^2P^\circ)nl'$	$3\text{–}10s'\ ^3P^\circ$ $3\text{–}5s'\ ^1P^\circ$	$3, 4p'\ ^3S$ $3\text{–}13p'\ ^3P$ $3\text{–}10p'\ ^3D$ $3, 4p'\ ^1S$ $3\text{–}8p'\ ^1P$ $3, 4, 6\text{–}11p'\ ^1D$	$3\text{–}10d'\ ^3P^\circ$ $3\text{–}11, 13d'\ ^3D^\circ$ $3d'\ ^3F^\circ$ $3\text{–}10d'\ ^1P^\circ$ $3, 4d'\ ^1D^\circ$ $3, 4, 6d'\ ^1F^\circ$	
	$nf(n \geq 4)$	$ng(n \geq 5)$	$nh(n \geq 6)$	$ni(n \geq 7)$
$2s(^2S)nl$	$4, 5f\ ^3F^\circ$ $4\text{–}6f\ ^1F^\circ$	$5, 6g\ ^3G$ $5, 6g\ ^1G$	$6, 7h\ ^{3,1}H^\circ$	$7i\ ^{3,1}I$

Part B NITROGEN

N IV ($Z = 7$)

I P 77.472 eV Limit 628466 ± 3 cm^{-1} 160.034 Å (Vac)

Anal A List A October 1970

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P Predicted Lines

In column 3 parentheses indicate that the estimated intensities are from a different reference and on a different scale than the entries without parentheses.

New Multiplet Numbers, not inserted between older ones, start with UV 20 and 18.

*Blend

‡*Raie ultime*

N IV **N IV**

I A	Ref	Int	E P Low	E P High	J	Multiplet No.	I A	Ref	Int	E P Low	E P High	J	Multiplet No.
Vac 1486.496	A	2	0.00	8.34	0–1	$2s^2\ ^1S - 2p\ ^3P^\circ$ UV 0.01	Vac 211.405	B	(400)	0.00	58.65	0–1	$2s^2\ ^1S - 3s'\ ^1P^\circ$ UV 2.03
765.148‡	A	15	0.00	16.20	0–1	$2s^2\ ^1S - 2p\ ^1P^\circ$ UV 1	197.230	C	(500)	0.00	62.86	0–1	$2s^2\ ^1S - 4p\ ^1P^\circ$ UV 2.04
569.450	P		0.00	21.77	0–1	$2s^2\ ^1S - 2p^2\ ^3P$ UV 1.01F	192.823	P		0.00	64.30	0–1	$2s^2\ ^1S - 3d'\ ^1P^\circ$ UV 2.05
529.430	P		0.00	23.42	0–2	$2s^2\ ^1S - 2p^2\ ^1D$ UV 1.02F	181.746	C	(400)	0.00	68.22	0–1	$2s^2\ ^1S - 5p\ ^1P^\circ$ UV 2.06
424.864	P		0.00	29.18	0–0	$2s^2\ ^1S - 2p^2\ ^1S$ UV 1.03F	174.602	B	(200)	0.00	71.01	0–1	$2s^2\ ^1S - 6p\ ^1P^\circ$ UV 2.07
247.205	C	(900)	0.00	50.15	0–1	$2s^2\ ^1S - 3p\ ^1P^\circ$ UV 2	172.171	P		0.00	72.01	0–1	$2s^2\ ^1S - 4s'\ ^1P^\circ$ UV 2.08
246.313	P		0.00	50.33	0–1	$2s^2\ ^1S - 3p\ ^3P^\circ$ UV 2.01	170.074	B	(200)	0.00	72.90	0–1	$2s^2\ ^1S - 7p\ ^1P^\circ$ UV 2.09
214.882	P		0.00	57.70	0–1	$2s^2\ ^1S - 3s'\ ^3P^\circ$ UV 2.02	167.709	B	(150)	0.00	73.93	0–1	$2s^2\ ^1S - 8p\ ^1P^\circ$ UV 2.10

N IV—Continued

I A	Ref	Int	E P Low	E P High	J	Multiplet No.
Vac						
167.074	P		0.00	74.21	0–1	$2s^2\ ^1S - 4d'\ ^1P^\circ$ UV 2.11
165.945	B	(50)	0.00	74.71	0–1	$2s^2\ ^1S - 9p\ ^1P^\circ$ UV 2.12
164.794	B	(30)	0.00	75.23	0–1	$2s^2\ ^1S - 10p\ ^1P^\circ$ UV 2.13
163.949	B	(10*d*)	0.00	75.62	0–1	$2s^2\ ^1S - 11p\ ^1P^\circ$ UV 2.14
163.311	B	(1*d*)	0.00	75.92	0–1	$2s^2\ ^1S - 12p\ ^1P^\circ$ UV 2.15
162.816	B	(1*d*)	0.00	76.15	0–1	$2s^2\ ^1S - 13p\ ^1P^\circ$ UV 2.16
923.220	A	16	8.36	21.79	2–2	$2p\ ^3P^\circ - 2p^2\ ^3P$ UV 3
923.057	A	14−	8.34	21.77	1–1	
924.283	A	14+	8.36	21.77	2–1	
923.675	A	14	8.34	21.76	1–0	
921.992	A	14+	8.34	21.79	1–2	
922.519	A	14	8.33	21.77	0–1	
823.273	A	2	8.36	23.42	2–2	$2p\ ^3P^\circ - 2p^2\ ^1D$ UV 3.01
822.299	P		8.34	23.42	1–2	
594.895	P		8.34	29.18	1–0	$2p\ ^3P^\circ - 2p^2\ ^1S$ UV 3.02
322.722	B	9	8.36	46.78	2–1	$2p\ ^3P^\circ - 3s\ ^3S$ UV 4
322.572	B	8	8.34	46.78	1–1	
322.506	B	7	8.33	46.78	0–1	
310.962	P		8.34	48.21	1–0	$2p\ ^3P^\circ - 3s\ ^1S$ UV 4.01
283.583	B	12	8.36	52.08	2–3	$2p\ ^3P^\circ - 3d\ ^3D$ UV 5
283.476	B	11	8.34	52.08	1–2	
283.419	B	10	8.33	52.08	0–1	
276.439	P		8.36	53.21	2–2	$2p\ ^3P^\circ - 3d\ ^1D$ UV 5.01
276.329	P		8.34	53.21	1–2	
241.857	P		8.36	59.62	2–1	$2p\ ^3P^\circ - 3p'\ ^1P$ UV 5.02
241.773	P		8.34	59.62	1–1	
241.736	P		8.33	59.62	0–1	
239.616	B	(500*w*)	8.36	60.10	2–3	$2p\ ^3P^\circ - 3p'\ ^3D$ UV 5.03
239.632	B		8.34	60.08	1–2	
239.659	B		8.33	60.07	0–1	
239.708	B	(400*w*)*	8.36	60.08	2–2	
239.679	B		8.34	60.07	1–1	
239.763	B		8.36	60.07	2–1	
237.991	B	(500)	8.36	60.45	2–1	$2p\ ^3P^\circ - 4s\ ^3S$ UV 5.04
237.908	B	(400*w*)*	8.34	60.45	1–1	
237.873	B		8.33	60.45	0–1	

N IV—Continued

I A	Ref	Int	E P Low	E P High	J	Multiplet No.
Vac						
234.195	C	(600*w*)*	8.36	61.30	2–2	$2p\ ^3P^\circ - 3p'\ ^3P$ UV 5.05
234.172	P		8.34	61.28	1–1	
234.249	C	(600*w*)*	8.36	61.28	2–1	
234.203	P		8.34	61.28	1–0	
234.124	C	(600*w*)*	8.34	61.30	1–2	
233.762	P		8.34	61.38	1–0	$2p\ ^3P^\circ - 4s\ ^1S$ UV 5.06
232.223	B	(200)	8.36	61.75	2–1	$2p\ ^3P^\circ - 3p'\ ^3S$ UV 5.07
232.145	B	(150)	8.34	61.75	1–1	
232.112	B	(100)	8.33	61.75	0–1	
231.326	P		8.36	61.95	2–2	$2p\ ^3P^\circ - 3p'\ ^1D$ UV 5.08
231.249	P		8.34	61.95	1–2	
225.212	B	(800)	8.36	63.41	2–3	$2p\ ^3P^\circ - 4d\ ^3D$ UV 6
225.142	B	(800*w*)*	8.34	63.41	1–2	
225.110	B		8.33	63.41	0–1	
223.598	P		8.36	63.81	2–2	$2p\ ^3P^\circ - 4d\ ^1D$ UV 6.01
223.526	P		8.34	63.81	1–2	
223.066	P		8.34	63.92	1–0	$2p\ ^3P^\circ - 3p'\ ^1S$ UV 6.02
209.471	B		8.36	67.55	2–1	$2p\ ^3P^\circ - 5s\ ^3S$ UV 6.03
209.407	B	(400*w*)*	8.34	67.55	1–1	
209.378	B		8.33	67.55	0–1	
206.028	B	(500)	8.36	68.54	2–3	$2p\ ^3P^\circ - 5d\ ^3D$ UV 6.04
205.968	B	(500*w*)*	8.34	68.54	1–2	
205.940	B		8.33	68.54	0–1	
198.821	B	(300)	8.36	70.72	2–1	$2p\ ^3P^\circ - 6s\ ^3S$ UV 6.05
198.764	B	(250*w*)*	8.34	70.72	1–1	
198.740	B		8.33	70.72	0–1	
197.000	B	(400)	8.36	71.29	2–	$2p\ ^3P^\circ - 6d\ ^3D$ UV 6.06
196.944	B	(400*w*)*	8.34	71.29	1–	
196.921	B		8.33	71.29	0–1	
193.214	B	(350)	8.36	72.53	2–1	$2p\ ^3P^\circ - 7s\ ^3S$ UV 6.07
193.160	B	(300*w*)*	8.34	72.53	1–1	
193.139	B		8.33	72.53	0–1	
192.859	B		8.36	72.64	2–3	$2p\ ^3P^\circ - 4p'\ ^3D$ UV 6.08
192.908	B	(400*w*)*	8.36	72.63	2–2	
192.888	B		8.34	72.62	1–1	
192.941	B		8.36	72.62	2–1	
191.951	B	(350)	8.36	72.95	2–	$2p\ ^3P^\circ - 7d\ ^3D$ UV 6.09
191.898	B	(350*w*)*	8.34	72.95	1–	
191.868	B		8.33	72.95	0–1	
191.702	B		8.36	73.03	2–2	$2p\ ^3P^\circ - 4p'\ ^3P$ UV 6.10
191.676	B		8.34	73.02	1–1	
191.727	B	(400*w*)*	8.36	73.02	2–1	
191.748	B		8.34	73.00	1–0	
*191.651	B		8.34	73.03	1–2	
*191.651	B		8.33	73.02	0–1	

N IV—Continued

I A	Ref	Int	E P Low	E P High	J	Multiplet No.
Vac						
189.437	B	(10)	8.36	73.81	2–1	$2p\ ^3P^\circ - 4p'\ ^3S$
189.386	B	(5)	8.34	73.81	1–1	UV 6.11
189.365	B	(1)	8.33	73.81	0–1	
188.818	B	(300)	8.36	74.02	2–	$2p\ ^3P^\circ - 8d\ ^3D$
188.762	B	(300w)*	8.34	74.02	1–	UV 6.12
188.743	B		8.33	74.02	0–1	
188.656	B	(250)	8.36	74.08	2–1	$2p\ ^3P^\circ - 8s\ ^3S$
188.606	B	(200w)*	8.34	74.08	1–1	UV 6.13
188.583	B		8.33	74.08	0–1	
187.194	B	(20)	8.36	74.59	2–1	$2p\ ^3P^\circ - 9s\ ^3S$
187.142	B	(10)	8.34	74.59	1–1	UV 6.14
187.123	B	(10)	8.33	74.59	0–1	
186.759	B	(300d)	8.36	74.74	2–	$2p\ ^3P^\circ - 9d\ ^3D$
186.709	B	(250d)*	8.34	74.74	1–	UV 6.15
186.690	B		8.33	74.74	0–1	
185.623	B	(5)	8.36	75.15	2–1	$2p\ ^3P^\circ - 10s\ ^3S$
185.568	B	(3)	8.34	75.15	1–1	UV 6.16
185.306	B	(200d)	8.36	75.26	2–	$2p\ ^3P^\circ - 10d\ ^3D$
185.257	B	(150d)*	8.34	75.26	1–	UV 6.17
185.237	B		8.33	75.26	0–1	
184.485	B	(2)	8.36	75.56	2–1	$2p\ ^3P^\circ - 11s\ ^3S$
184.437	B	(1)	8.34	75.56	1–1	UV 6.18
184.247	B	(75d)*	8.36	75.65	2–	$2p\ ^3P^\circ - 11d\ ^3D$
184.200	B		8.34	75.65	1–	UV 6.19
183.450	B	(50d)*	8.36	75.94	2–	$2p\ ^3P^\circ - 12d\ ^3D$
183.402	B		8.34	75.94	1	UV 6.20
182.827	B	(30d)	8.36	76.17	2–	$2p\ ^3P^\circ - 13d\ ^3D$
182.779	P		8.34	76.17	1–	UV 6.21
182.323	B	(20d)	8.36	76.36	2–	$2p\ ^3P^\circ - 14d\ ^3D$
182.275	P		8.34	76.36	1–	UV 6.22
181.943	B	(10d)	8.36	76.50	2–	$2p\ ^3P^\circ - 15d\ ^3D$
181.895			8.34	76.50	1–	UV 6.23
177.602	B	(100w)*	8.36	78.17	2–3	$2p\ ^3P^\circ - 5p'\ ^3D$
177.646	B	(250)	8.36	78.15	2–2	UV 6.24
177.621	B	(100w)*	8.34	78.14	1–1	
177.163	B	(200)	8.36	78.34	2–2	$2p\ ^3P^\circ - 5p'\ ^3P$
177.142	B	(100w)*	8.34	78.33	1–1	UV 6.25
177.182	B		8.36	78.33	2–1	
177.119	B		8.34	78.34	1–2	
170.463	B	(50)	8.36	81.09	2–3	$2p\ ^3P^\circ - 6p'\ ^3D$
170.505	B	(100)	8.36	81.07	2–2	UV 6.26
170.249	B	(100)	8.36	81.18	2–2	$2p\ ^3P^\circ - 6p'\ ^3P$
170.208	B	(50)	8.34	81.18	1–2	2p UV 6.27

N IV—Continued

I A	Ref	Int	E P Low	E P High	J	Multiplet No.
Vac						
166.496	B	(20)	8.36	82.82	2–3	$2p\ ^3P^\circ - 7p'\ ^3D$
166.540	B	(75)	8.36	82.80	2–2	UV 6.28
166.377	B	(20)	8.36	82.88	2–2	$2p\ ^3P^\circ - 7p'\ ^3P$
166.337	B	(10)	8.34	82.88	1–2	UV 6.29
164.048	B	(50)	8.36	83.93	2–3	$2p\ ^3P^\circ - 8p'\ ^3D$
						UV 6.30
163.972	B	(2)	8.36	83.97	2–2	$2p\ ^3P^\circ - 8p'\ ^3P$
						UV 6.31
162.423	B	(10)	8.36	84.69	2–3	$2p\ ^3P^\circ - 9p'\ ^3D$
						UV 6.32
162.374	B	(2)	8.36	84.71	2–2	$2p\ ^3P^\circ - 9p'\ ^3P$
						UV 6.33
161.286	B	(2d)	8.36	85.23	2–3	$2p\ ^3P^\circ - 10p'\ ^3D$
						UV 6.34
161.256	B	(2d)	8.36	85.24	2–2	$2p\ ^3P^\circ - 10p'\ ^3P$
						UV 6.35
160.451	B	(1d)	8.36	85.63	2–	$2p\ ^3P^\circ - 11p'\ ^3P$
						UV 6.36
159.833	B	(1d)	8.36	85.93	2–	$2p\ ^3P^\circ - 12p'\ ^3P$
						UV 6.37
159.366	B	(1d)	8.36	86.15	2–	$2p\ ^3P^\circ - 13p'\ ^3P$
						UV 6.38
Air						
2219.61	P		16.20	21.79	1–2	$2p\ ^1P^\circ - 2p^2\ ^3P$
2225.78	P		16.20	21.77	1–1	UV 6.39
2229.38	P		16.20	21.76	1–0	
Vac						
1718.551	A	20	16.20	23.42	1–2	$2p\ ^1P^\circ - 2p^2\ ^1D$
						UV 7
955.335	A	20	16.20	29.18	1–0	$2p\ ^1P^\circ - 2p^2\ ^1S$
						UV 8
405.530	P		16.20	46.78	1–1	$2p\ ^1P^\circ - 3s\ ^3S$
						UV 8.01
387.353	C	4	16.20	48.21	1–0	$2p\ ^1P^\circ - 3s\ ^1S$
						UV 9
345.595	P		16.20	52.08	1–2	$2p\ ^1P^\circ - 3d\ ^3D$
345.600	P		16.20	52.08	1–1	UV 9.01
335.052	B	11	16.20	53.21	1–2	$2p\ ^1P^\circ - 3d\ ^1D$
						UV 10
285.561	B	(600)	16.20	59.62	1–1	$2p\ ^1P^\circ - 3p'\ ^1P$
						UV 11

N IV—Continued

I A	Ref	Int	E P Low	E P High	J	Multiplet No.
Vac						
82.565	P		16.20	60.08	1–2	$2p\ ^1P^\circ - 3p'\ ^3D$
82.642	P		16.20	60.07	1–1	UV 11.01
80.180	P		16.20	60.45	1–1	$2p\ ^1P^\circ - 4s\ ^3S$ UV 11.02
74.946	P		16.20	61.30	1–2	$2p\ ^1P^\circ - 3p'\ ^3P$
75.016			16.20	61.28	1–1	UV 11.03
75.058			16.20	61.28	1–0	
74.451	B	(250)	16.20	61.38	1–0	$2p\ ^1P^\circ - 4s\ ^1S$ UV 11.04
72.219	P		16.20	61.75	1–1	$2p\ ^1P^\circ - 3p'\ ^3S$ UV 11.05
70.994	B	(650)	16.20	61.95	1–2	$2p\ ^1P^\circ - 3p'\ ^1D$ UV 12
62.638	P		16.20	63.41	1–2	$2p\ ^1P^\circ - 4d\ ^3D$
62.642	P		16.20	63.41	1–1	UV 12.01
60.447	B	(600)	16.20	63.81	1–2	$2p\ ^1P^\circ - 4d\ ^1D$ UV 12.02
59.824	B	(450)	16.20	63.92	1–0	$2p\ ^1P^\circ - 3p'\ ^1S$ UV 12.03
40.363	B	(200)	16.20	67.78	1–0	$2p\ ^1P^\circ - 5s\ ^1S$ UV 12.04
36.068	B	(550)	16.20	68.72	1–2	$2p\ ^1P^\circ - 5d\ ^1D$ UV 12.05
27.026	B	(100)	16.20	70.81	1–0	$2p\ ^1P^\circ - 6s\ ^1S$ UV 12.06
24.629	B	(450*w*)	16.20	71.40	1–2	$2p\ ^1P^\circ - 6d\ ^1D$ UV 12.07
20.280	B	(400)	16.20	72.49	1–1	$2p\ ^1P^\circ\ 4p'\ ^1P$ UV 12.08
220.124	B	(50)	16.20	72.53	1–0	$2p\ ^1P^\circ - 7s\ ^1S$ UV 12.09
218.250	B	(400)	16.20	73.01	1–2	$2p\ ^1P^\circ - 7d\ ^1D$ UV 12.10
217.218	B	(500)	16.20	73.28	1–2	$2p\ ^1P^\circ - 4p'\ ^1D$ UV 12.11
215.755	B	(75)	16.20	73.67	1–0	$2p\ ^1P^\circ - 4p'\ ^1S$ UV 12.12
214.843	B	(10)	16.20	73.91	1–0	$2p\ ^1P^\circ - 8s\ ^1S$ UV 12.13
214.291	B	(250)	16.20	74.06	1–2	$2p\ ^1P^\circ - 8d\ ^1D$ UV 12.14
211.679	B	(250*d*)	16.20	74.77	1–2	$2p\ ^1P^\circ - 9d\ ^1D$ UV 12.15

N IV—Continued

I A	Ref	Int	E P Low	E P High	J	Multiplet No.
Vac						
209.842	B	(150*w*)	16.20	75.29	1–2	$2p\ ^1P^\circ - 10d\ ^1D$ UV 12.16
208.510	B	(100*d*)	16.20	75.66	1–2	$2p\ ^1P^\circ - 11d\ ^1D$ UV 12.17
207.500	B	(20*d*)	16.20	75.95	1–2	$2p\ ^1P^\circ - 12d\ ^1D$ UV 12.18
206.707	B	(10*d*)	16.20	76.18	1–2	$2p\ ^1P^\circ - 13d\ ^1D$ UV 12.19
200.340	B	(300)	16.20	78.09	1–1	$2p\ ^1P^\circ - 5p'\ ^1P$ UV 12.20
191.228	B	(100)	16.20	81.04	1–1	$2p\ ^1P^\circ - 6p'\ ^1P$ UV 12.21
190.625	B	(200)	16.20	81.24	1–2	$2p\ ^1P^\circ - 6p'\ ^1D$ UV 12.22
186.218	B	(50)	16.20	82.78	1–2	$2p\ ^1P^\circ - 7p'\ ^1P$ UV 12.23
185.853	B	(75)	16.20	82.91	1–2	$2p\ ^1P^\circ - 7p'\ ^1D$ UV 12.24
183.146	B	(5*d*)	16.20	83.90	1–1	$2p\ ^1P^\circ - 8p'\ ^1P$ UV 12.25
182.894	B	(10)	16.20	83.99	1–2	$2p\ ^1P^\circ - 8p'\ ^1D$ UV 12.26
180.928	B	(5)	16.20	84.73	1–2	$2p\ ^1P^\circ - 9p'\ ^1D$ UV 12.27
179.554	B	(2)	16.20	85.25	1–2	$2p\ ^1P^\circ - 10p'\ ^1D$ UV 12.28
178.547	B	(1)	16.20	85.64	1–2	$2p\ ^1P^\circ - 11p'\ ^1D$ UV 12.29
437.083	P		21.79	50.15	2–1	$2p^2\ ^3P - 3p\ ^1P^\circ$
436.845	P		21.77	50.15	1–1	UV 12.30
436.706	P		21.76	50.15	0–1	
434.235	P		21.79	50.34	2–2	$2p^2\ ^3P - 3p\ ^3P^\circ$
434.067	P		21.77	50.33	1–1	UV 12.31
434.302	P		21.79	50.33	2–1	
434.097	P		21.77	50.33	1–0	
434.000	P		21.77	50.34	1–2	
433.930	P		21.76	50.33	0–1	
345.062	B	(600*w*)*	21.79	57.72	2–2	$2p^2\ ^3P - 3s'\ ^3P^\circ$
345.111	B		21.77	57.70	1–1	UV 13
345.261	B		21.79	57.70	2–1	
345.207	B		21.77	57.69	1–0	
344.916	B		21.77	57.72	1–2	
345.025	B		21.76	57.70	0–1	

N IV – Continued

I A	Ref	Int	E P Low	E P High	J	Multiplet No.
Vac						
3.365	P		21.79	58.65	2–1	$2p^2\,{}^3P - 3s'\,{}^1P^\circ$
3.224	P		21.77	58.65	1–1	UV 13.01
3.141	P		21.76	58.65	0–1	
0.003	P		21.79	61.78	2–2	$2p^2\,{}^3P - 3d'\,{}^1D^\circ$
0.883	P		21.77	61.78	1–2	UV 13.02
0.927	P		21.79	62.45	2–2	$2p^2\,{}^3P - 4p\,{}^3P^\circ$
0.800	P		21.77	62.45	1–1	UV 13.03
0.916	P		21.79	62.45	2–1	
0.793	P		21.77	62.45	1–0	
0.811	P		21.77	62.45	1–2	
0.733	P		21.76	62.45	0–1	
0.124	B	(500w)*	21.79	62.69	2–3	$2p^2\,{}^3P - 3d'\,{}^3D^\circ$
0.048	C		21.77	62.68	1–2	UV 14
0.006	B		21.76	62.68	0–1	
0.162	B		21.79	62.68	2–2	
0.078	B		21.77	62.68	1–1	
0.191	B		21.79	62.68	2–1	
0.816	B	(700)	21.79	63.42	2–2	$2p^2\,{}^3P - 3d'\,{}^3P^\circ$
0.657	B	(600w)*	21.77	63.42	1–1	UV 15
0.770	B		21.79	63.42	2–1	
0.634	B		21.77	63.43	1–0	
0.704	B		21.77	63.42	1–2	
0.595	C		21.76	63.42	0–1	
0.461	B	(500w)*	21.79	71.69	2–2	$2p^2\,{}^3P - 4s'\,{}^3P^\circ$
0.484	B	(500w)*	21.77	71.67	1–1	UV 15.01
0.563	B	(500)*	21.79	71.67	2–1	
0.540	B		21.77	71.66	1–0	
0.383	B		21.77	71.69	1–2	
0.433	B	(500w)*	21.76	71.67	0–1	
0.212	B	(450w)*	21.79	73.62	2–3	$2p^2\,{}^3P - 4d'\,{}^3D^\circ$
0.174	B		21.77	73.61	1–2	UV 15.02
0.146	B		21.76	73.61	0–1	
0.243	B		21.79	73.61	2–2	
0.188	P		21.77	73.61	1–1	
0.259	P		21.79	73.61	2–1	
0.302	B	(600)	21.79	73.71	2–2	$2p^2\,{}^3P - 4d'\,{}^3P^\circ$
0.594	B	(500w)*	21.77	73.71	1–1	UV 15.03
0.769	B		21.79	73.71	2–1	
0.583	B		21.77	73.72	1–0	
0.731	B		21.77	73.71	1–2	
0.557	B		21.76	73.71	0–1	
0.789	B	(450)	21.79	77.69	2–2	$2p^2\,{}^3P - 5s'\,{}^3P^\circ$
0.810	P		21.77	77.67	1–1	UV 15.04
0.671	B	(300w)*	21.79	77.67	2–1	
0.654	B		21.77	77.66	1–0	
0.729	B		21.77	77.69	1–2	
0.774	P		21.76	77.67	0–1	
0.888	B	(400w)*	21.79	78.64	2–3	$2p^2\,{}^3P - 5d'\,{}^3D^\circ$
0.867	B		21.77	78.63	1–2	UV 15.05
0.844	B		21.76	78.62	0–1	
0.816	B		21.79	78.63	2–2	
0.779	P		21.77	78.62	1–1	
0.838	P		21.79	78.62	2–1	

N IV – Continued

I A	Ref	Int	E P Low	E P High	J	Multiplet No.
Vac						
217.895	B	(500d)	21.79	78.69	2–	$2p^2\,{}^3P - 5d'\,{}^3P^\circ$
217.836	P		21.77	78.69	1–	UV 15.06
210.028	B	(200)	21.79	80.82	2–2	$2p^2\,{}^3P - 6s'\,{}^3P^\circ$
210.056	P		21.77	80.79	1–1	UV 15.07
210.111	B	(100w)*	21.79	80.79	2–1	
210.092	B		21.77	80.78	1–0	
209.976	B		21.77	80.82	1–2	
210.024	P		21.76	80.79	0–1	
208.150	B	(400w)*	21.79	81.35	2–3	$2p^2\,{}^3P - 6d'\,{}^3D^\circ$
208.131	B		21.77	81.34	1–2	UV 15.08
208.113	B		21.76	81.34	0–1	
208.185	P		21.79	81.34	2–2	
208.144	P		21.77	81.34	1–1	
208.113	P		21.79	81.34	2–1	
208.066	B	(400d)	21.79	81.37	2–	$2p^2\,{}^3P - 6d'\,{}^3P^\circ$
208.012	P		21.77	81.37	1–	UV 15.09
203.694	B	(50w)*	21.79	82.65	2–2	$2p^2\,{}^3P - 7s'\,{}^3P'$
203.728	P		21.77	82.63	1–1	UV 15.10
203.780	B	(50)	21.79	82.63	2–1	
203.642	B	(50w)*	21.77	82.65	1–2	
202.595	B	(500w)	21.79	82.98	2–	$2p^2\,{}^3P - 7d'\,{}^3D^\circ$ UV 15.11
202.485	B	(300d)	21.79	83.02		$2p^2\,{}^3P - 7d'\,{}^3P^\circ$ UV 15.12
199.857	B	(50)	21.79	83.82	2–2	$2p^2\,{}^3P - 8s'\,{}^3P^\circ$
199.806	B	(20)	21.77	83.82	1–2	UV 15.13
199.159	B	(450w)	21.79	84.04	2–	$2p^2\,{}^3P - 8d'\,{}^3D^\circ$ UV 15.14
199.087	B	(200d)	21.79	84.06	2–	$2p^2\,{}^3P - 8d'\,{}^3P^\circ$ UV 15.15
197.343	B	(2)	21.79	84.61	2–	$2p^2\,{}^3P - 9s'\,{}^3P^\circ$ UV 15.16
196.866	B	(500w)	21.79	84.76	2–	$2p^2\,{}^3P - 9d'\,{}^3D^\circ$ UV 15.17
196.802	B	(100d)	21.79	84.79	2–	$2p^2\,{}^3P - 9d'\,{}^3P^\circ$ UV 15.18
195.610	B	(1)	21.79	85.17	2–2	$2p^2\,{}^3P - 10s'\,{}^3P^\circ$ UV 15.19
195.258	B	(100d)	21.79	85.28	2–	$2p^2\,{}^3P - 10d'\,{}^3D^\circ$ UV 15.20
195.202	B	(20d)	21.79	85.30	2–	$2p^2\,{}^3P - 10d'\,{}^3P^\circ$ UV 15.21
194.083	B	(75d)	21.79	85.67		$2p^2\,{}^3P - 11d'\,{}^3D^\circ$ UV 15.22

N IV — Continued

I A	Ref	Int	E P Low	E P High	J	Multiplet No.
Vac 192.533	B	(10*d*)	21.79	86.18		$2p^2\ ^3P - 13d'\ ^3D^\circ$ UV 15.23
463.740	B	(650)	23.42	50.15	2–1	$2p^2\ ^1D - 3p\ ^1P^\circ$ UV 15.24
460.532	P		23.42	50.34	2–2	$2p^2\ ^1D - 3p\ ^3P^\circ$
460.607	P		23.42	50.33	2–1	UV 15.25
361.462	P		23.42	57.72	2–2	$2p^2\ ^1D - 3s'\ ^3P^\circ$
361.679	P		23.42	57.70	2–1	UV 15.26
351.931	C	(500*w*)	23.42	58.65	2–1	$2p^2\ ^1D - 3s'\ ^1P^\circ$ UV 16
323.178	B	(600*w*)	23.42	61.78	2–2	$2p^2\ ^1D - 3d'\ ^1D^\circ$ UV 17
317.664	P		23.42	62.45	2–2	$2p^2\ ^1D - 4p\ ^3P^\circ$
317.653	P		23.42	62.45	2–1	UV 17.01
315.708	P		23.42	62.69	2–3	$2p^2\ ^1D - 3d'\ ^3D^\circ$
315.751	P		23.42	62.68	2–2	UV 17.02
315.785	P		23.42	62.68	2–1	
315.060	B	(600)	23.42	62.77	2–3	$2p^2\ ^1D - 3d'\ ^1F^\circ$ UV 18
314.324	B	(20)	23.42	62.86	2–1	$2p^2\ ^1D - 4p\ ^1P^\circ$ UV 18.01
309.956	P		23.42	63.42	2–2	$2p^2\ ^1D - 3d'\ ^3P^\circ$
309.907	P		23.42	63.42	2–1	UV 18.02
305.177	P		23.42	64.04	2–3	$2p^2\ ^1D - 4f\ ^3F^\circ$
305.185	P		23.42	64.04	2–2	UV 18.03
303.280	B	(500)	23.42	64.30	2–1	$2p^2\ ^1D - 3d'\ ^1P^\circ$ UV 18.04
300.318	B	(650)	23.42	64.70	2–3	$2p^2\ ^1D - 4f\ ^1F^\circ$ UV 18.05
276.741	B	(10)	23.42	68.22	2–1	$2p^2\ ^1D - 5p\ ^1P^\circ$ UV 18.06
273.140	B	(300)	23.42	68.81	2–3	$2p^2\ ^1D - 5f\ ^1F^\circ$ UV 18.07
260.519	P		23.42	71.01	2–1	$2p^2\ ^1D - 6p\ ^1P^\circ$ UV 18.08
258.320	B	(150)	23.42	71.41	2–3	$2p^2\ ^1D - 6f\ ^1F^\circ$ UV 18.09
255.148	B	(380)	23.42	72.01	2–1	$2p^2\ ^1D - 4s'\ ^1P^\circ$ UV 18.10
250.566	P		23.42	72.90	2–1	$2p^2\ ^1D - 7p\ ^1P^\circ$ UV 18.11

N IV — Continued

I A	Ref	Int	E P Low	E P High	J	Multiplet No.
Vac 250.121	B	(300)	23.42	72.99	2–2	$2p^2\ ^1D - 4d'\ ^1D^\circ$ UV 18.12
248.654	B	(450)	23.42	73.28	2–3	$2p^2\ ^1D - 4d'\ ^1F^\circ$ UV 18.13
244.100	B	(300*w*)	23.42	74.21	2–1	$2p^2\ ^1D - 4d'\ ^1P^\circ$ UV 18.14
227.446	P		23.42	77.91	2–1	$2p^2\ ^1D - 5s'\ ^1P^\circ$ UV 18.15
223.421 [a]	P	(500*d*)	23.42	78.91	2–1	$2p^2\ ^1D - 5d'\ ^1P^\circ$ UV 18.16
214.414	B	(50*d*)	23.42	81.24	2–3	$2p^2\ ^1D - 6d'\ ^1F^\circ$ UV 18.17
213.443 [a]	P	(300*d*)	23.42	81.50	2–1	$2p^2\ ^1D - 6d'\ ^1P^\circ$ UV 18.19
207.812 [a]	P	(200*d*)	23.42	83.08	2–1	$2p^2\ ^1D - 7d'\ ^1P^\circ$ UV 18.20
204.354 [a]	B	(150*d*)	23.42	84.10	2–1	$2p^2\ ^1D - 8d'\ ^1P^\circ$ UV 18.21
201.988	B	(100*d*)	23.42	84.80	2–1	$2p^2\ ^1D - 9d'\ ^1P^\circ$ UV 18.22
200.316	P		23.42	85.31	2–1	$2p^2\ ^1D - 10d'\ ^1P^\circ$ UV 18.23
591.180	P		29.18	50.15	0–1	$2p^2\ ^1S - 3p\ ^1P^\circ$ UV 18.24
586.104	P		29.18	50.33	0–1	$2p^2\ ^1S - 3p\ ^3P^\circ$ UV 18.25
434.779	P		29.18	57.70	0–1	$2p^2\ ^1S - 3s'\ ^3P^\circ$ UV 18.26
420.769	B	(500)	29.18	58.65	0–1	$2p^2\ ^1S - 3s'\ ^1P^\circ$ UV 18.27
368.108	B	(450)	29.18	62.86	0–1	$2p^2\ ^1S - 4p\ ^1P^\circ$ UV 18.29
353.056	B	(700)	29.18	64.30	0–1	$2p^2\ ^1S - 3d'\ ^1P^\circ$ UV 18.30
317.596	B	(200)	29.18	68.22	0–1	$2p^2\ ^1S - 5p\ ^1P^\circ$ UV 18.31
296.418	P		29.18	71.01	0–1	$2p^2\ ^1S - 6p\ ^1P^\circ$ UV 18.32

[a] Observed members of this series are shifted to longer waves by 0.309Å to 0.052Å ($n=5$ to 8), when autoionization is effective.

N IV — Continued

I A	Ref	Int	E P Low	E P High	J	Multiplet No.
Vac						
289.479	B	(300)	29.18	72.01	0–1	$2p^2\ ^1S - 4s'\ ^1P^\circ$ UV 18.33
283.599	P		29.18	72.90	0–1	$2p^2\ ^1S - 7p\ ^1P^\circ$ UV 18.34
275.354	B	(450)	29.18	74.21	0–1	$2p^2\ ^1S - 4d'\ ^1P^\circ$ UV 18.35
254.338	B	(100)	29.18	77.91	0–1	$2p^2\ ^1S - 5s'\ ^1P^\circ$ UV 18.36
249.316	B	(300*d*)	29.18	78.91	0–1	$2p^2\ ^1S - 5d'\ ^1P^\circ$ UV 18.37
236.954	B	(150*d*)	29.18	81.50	0–1	$2p^2\ ^1S - 6d'\ ^1P^\circ$ UV 18.38
230.035	B	(100*d*)	29.18	83.08	0–1	$2p^2\ ^1S - 7d'\ ^1P^\circ$ UV 18.39
225.741	B	(50*d*)	29.18	84.10	0–1	$2p^2\ ^1S - 8d'\ ^1P^\circ$ UV 18.40
222.893	B	(30*d*)	29.18	84.80	0–1	$2p^2\ ^1S - 9d'\ ^1P^\circ$ UV 18.41
220.885	B	(2*d*)	29.18	85.31	0–1	$2p^2\ ^1S - 10d'\ ^1P^\circ$ UV 18.42
Air						
670.35	P		46.78	50.15	1–1	$3s\ ^3S - 3p\ ^1P^\circ$ 0.01
678.71	A	15	46.78	50.34	1–2	$3s\ ^3S - 3p\ ^3P^\circ$ 1
682.99	A	14	46.78	50.33	1 1	
684.96	A	13	46.78	50.33	1–0	
Vac						
33.117	A	4	46.78	57.72	1–2	$3s\ ^3S - 3s'\ ^3P^\circ$ UV 18.43
35.244	A	3	46.78	57.70	1–1	
36.241	A	2	46.78	57.69	1–0	
91.045	P		46.78	62.45	1–2	$3s\ ^3S - 4p\ ^3P^\circ$ UV 18.44
91.095	P		46.78	62.45	1–1	
91.167	P		46.78	62.45	1–0	
45.020	P		46.78	63.42	1–2	$3s\ ^3S - 3d'\ ^3P^\circ$ UV 18.45
44.737	P		46.78	63.42	1–1	
44.566	P		46.78	63.43	1–0	
07.696	P		46.78	71.69	1–2	$3s\ ^3S - 4s'\ ^3P^\circ$ UV 18.46
08.106	P		46.78	71.67	1–1	
08.323	P		46.78	71.66	1–0	
60.394	P		46.78	73.71	1–2	$3s\ ^3S - 4d'\ ^3P^\circ$ UV 18.47
60.272	P		46.78	73.71	1–1	
60.217	P		46.78	73.72	1–0	

N IV — Continued

I A	Ref	Int	E P Low	E P High	J	Multiplet No.
Air						
6380.77	A	8	48.21	50.15	0–1	$3s\ ^1S - 3p\ ^1P^\circ$ 2
5835.11	P		48.21	50.33	0–1	$3s\ ^1S - 3p\ ^3P^\circ$ 2.01
Vac						
1306.909	P		48.21	57.70	0–1	$3s\ ^1S - 3s'\ ^3P^\circ$ UV 18.48
1188.006	A	6	48.21	58.65	0–1	$3s\ ^1S - 3s'\ ^1P^\circ$ UV 18.49
846.215	P		48.21	62.86	0–1	$3s\ ^1S - 4p\ ^1P^\circ$ UV 18.50
770.678	P		48.21	64.30	0–1	$3s\ ^1S - 3d'\ ^1P^\circ$ UV 18.51
619.663	P		48.21	68.22	0–1	$3s\ ^1S - 5p\ ^1P^\circ$ UV 18.52
520.934	P		48.21	72.01	0–1	$3s\ ^1S - 4s'\ ^1P^\circ$ UV 18.53
476.909	P		48.21	74.21	0–1	$3s\ ^1S - 4d'\ ^1P^\circ$ UV 18.54
Air						
6438.53	P		50.15	52.08	1–2	$3p\ ^1P^\circ - 3d\ ^3D$ 2.02
6440.11	P		50.15	52.08	1–1	
4057.759	A	8	50.15	53.21	1–2	$3p\ ^1P^\circ - 3d\ ^1D$ 3
Vac						
1309.557	A	4	50.15	59.62	1–1	$3p\ ^1P^\circ - 3p'\ ^1P$ UV 18.55
1248.868	P		50.15	60.08	1–2	$3p\ ^1P^\circ - 3p'\ ^3D$ UV 18.56
1250.378	P		50.15	60.07	1–1	
1203.587	P		50.15	60.45	1–1	$3p\ ^1P^\circ - 4s\ ^3S$ UV 18.57
1112.600	P		50.15	61.30	1–2	$3p\ ^1P^\circ - 3p'\ ^3P$ UV 18.58
1113.749	P		50.15	61.28	1–1	
1114.446	P		50.15	61.28	1–0	
1104.542	P		50.15	61.38	1–0	$3p\ ^1P^\circ - 4s\ ^1S$ UV 18.59
1069.255	P		50.15	61.75	1–1	$3p\ ^1P^\circ - 3p'\ ^3S$ UV 18.60
1050.602	P		50.15	61.95	1–2	$3p\ ^1P^\circ - 3p'\ ^1D$ UV 18.61
908.057	P		50.15	63.81	1–2	$3p\ ^1P^\circ - 4d\ ^1D$ UV 18.62

N IV – Continued

I A	Ref	Int	E P Low	E P High	J	Multiplet No.
Vac						
900.516	P		50.15	63.92	1–0	$3p\ ^1P^\circ - 3p'\ ^1S$ UV 18.63
703.191	P		50.15	67.78	1–0	$3p\ ^1P^\circ - 5s\ ^1S$ UV 18.64
667.653	P		50.15	68.72	1–2	$3p\ ^1P^\circ - 5d\ ^1D$ UV 18.65
600.061	P		50.15	70.81	1–0	$3p\ ^1P^\circ - 6s\ ^1S$ UV 18.66
583.601	P		50.15	71.40	1–2	$3p\ ^1P^\circ - 6d\ ^1D$ UV 18.67
555.126	P		50.15	72.49	1–1	$3p\ ^1P^\circ - 4p'\ ^1P$ UV 18.68
554.137	P		50.15	72.53	1–0	$3p\ ^1P^\circ - 7s\ ^1S$ UV 18.69
542.412	P		50.15	73.01	1–2	$3p\ ^1P^\circ - 7d\ ^1D$ UV 18.70
536.082	P		50.15	73.28	1–2	$3p\ ^1P^\circ - 4p'\ ^1D$ UV 18.71
527.259	P		50.15	73.67	1–0	$3p\ ^1P^\circ - 4p'\ ^1S$ UV 18.72
521.845	P		50.15	73.91	1–0	$3p\ ^1P^\circ - 8s\ ^1S$ UV 18.73
518.600	P		50.15	74.06	1–2	$3p\ ^1P^\circ - 8d\ ^1D$ UV 18.74
Air						
7122.98	A	5	50.34	52.08	2–3	$3p\ ^3P^\circ - 3d\ ^3D$ 4
7109.40	A	3	50.33	52.08	1–2	
7103.28	A	2	50.33	52.08	0–1	
7127.27	A	1	50.34	52.08	2–2	
7111.30	A	1	50.33	52.08	1–1	
7129.18	P		50.34	52.08	2–1	
Vac						
1270.280	A	5	50.34	60.10	2–3	$3p\ ^3P^\circ - 3p'\ ^3D$ UV 18.75
1272.160	A	4	50.33	60.08	1–2	
1273.47	A	3	50.33	60.07	0–1	
1272.74	A	2	50.34	60.08	2–2	
1273.716	A	2	50.33	60.07	1–1	
1274.285	P		50.34	60.07	2–1	
1225.719	A	4	50.34	60.45	2–1	$3p\ ^3P^\circ - 4s\ ^3S$ UV 18.76
1225.192	A	3	50.33	60.45	1–1	
1224.960	A	1	50.33	60.45	0–1	
1131.488	P		50.34	61.30	2–2	$3p\ ^3P^\circ - 3p'\ ^3P$ UV 18.77
1132.225	P		50.33	61.28	1–1	
1086.691	A	2	50.34	61.75	2–1	$3p\ ^3P^\circ - 3p'\ ^3S$ UV 18.78
1086.269	A	1	50.33	61.75	1–1	
m1086.084	P	N1	50.33	61.75	0–1	

N IV – Continued

I A	Ref	Int	E P Low	E P High	J	Multiplet No.
Vac						
948.540	A	5	50.34	63.41	2–3	$3p\ ^3P^\circ - 4d\ ^3D$ UV 18.79
948.244	A	4	50.33	63.41	1–2	
948.155	A	2	50.33	63.41	0–1	
720.510	P		50.34	67.55	2–1	$3p\ ^3P^\circ - 5s\ ^3S$ UV 18.80
720.327	P		50.33	67.55	1–1	
720.244	P		50.33	67.55	0–1	
1323.98	A	2	52.08	61.44	3–4	$3d\ ^3D - 3d'\ ^3F^\circ$ UV 18.81
1325.685	A	1	52.08	61.43	2–3	
1326.964	A	0	52.08	61.42	1–2	
1195.852	P		52.08	62.45	3–2	$3d\ ^3D - 4p\ ^3P^\circ$ UV 18.82
1195.567	P		52.08	62.45	2–1	
1195.400	P		52.08	62.45	1–0	
1168.599	A	3	52.08	62.69	3–3	$3d\ ^3D - 3d'\ ^3D^\circ$ UV 18.83
1169.063	A	2	52.08	62.68	2–2	
1169.478	A	1	52.08	62.68	1–1	
1036.16	A	8w	52.08	64.05		$3d\ ^3D - 4f\ ^3F^\circ$ UV 18.84
1446.114	A	5	53.21	61.78	2–2	$3d\ ^1D - 3d'\ ^1D^\circ$ UV 18.85
1296.600	A	5	53.21	62.77	2–3	$3d\ ^1D - 3d'\ ^1F^\circ$ UV 18.86
1284.218	A	3	53.21	62.86	2–1	$3d\ ^1D - 4p\ ^1P^\circ$ UV 18.87
1078.708	A	6	53.21	64.70	2–3	$3d\ ^1D - 4f\ ^1F^\circ$ UV 18.88
Air						
5204.29	A	5	57.72	60.10	2–3	$3s'\ ^3P^\circ - 3p'\ ^3D$ 5
5200.40	A	4	57.70	60.08	1–2	
5205.15	A	3	57.69	60.07	0–1	
5245.61	A	3	57.72	60.08	2–2	
5226.69	A	3	57.70	60.07	1–1	
5272.35	P		57.72	60.07	2–1	
3463.37	A	6	57.72	61.30	2–2	$3s'\ ^3P^\circ - 3p'\ ^3P$ 7
3454.70	A	2	57.70	61.28	1–1	
3474.55	A	3	57.72	61.28	2–1	
3461.36	A	2	57.70	61.28	1 0	
3443.59	A	3	57.70	61.30	1–2	
3445.20	A	2	57.69	61.28	0–1	
3075.19	P		57.72	61.75	2–1	$3s'\ ^3P^\circ - 3p'\ ^3S$ 7.01
3059.60	P		57.70	61.75	1–1	
3052.20	P		57.69	61.75	0–1	
12727.43	P		58.65	59.62	1–1	$3s'\ ^1P^\circ - 3p'\ ^1P$ 7.02

N IV – Continued

I A	Ref	Int	E P Low	E P High	J	Multiplet No.
Air						
4538.32	P		58.65	61.38	1–0	$3s'\ ^1P^\circ - 4s\ ^1S$ 7.03
3747.54	A	6	58.65	61.95	1–2	$3s'\ ^1P^\circ - 3p'\ ^1D$ 8
2402.05	A	5	58.65	63.81	1–2	$3s'\ ^1P^\circ - 4d\ ^1D$ UV 18.89
5736.94	A	4	59.62	61.78	1–2	$3p'\ ^1P - 3d'\ ^1D^\circ$ 9
3823.95	A	0	59.62	62.86	1–1	$3p'\ ^1P - 4p\ ^1P^\circ$ 10
2649.88	P		59.62	64.30	1–1	$3p'\ ^1P - 3d'\ ^1P^\circ$ UV 18.90
9222.99	P		60.10	61.44	3–4	$3p'\ ^3D - 3d'\ ^3F^\circ$ 10.01
9182.16	P		60.08	61.43	2–3	
9165.07	P		60.07	61.42	1–2	
9311.55	P		60.10	61.43	3–3	
9247.04	P		60.08	61.42	2–2	
9378.29	P		60.10	61.42	3–2	
4786.92	P		60.10	62.69	3–3	$3p'\ ^3D - 3d'\ ^3D^\circ$ 11
4762.09	P		60.08	62.68	2–2	
4747.96	P		60.07	62.68	1–1	
4796.66	P		60.10	62.68	3–2	
4769.86	P		60.08	62.68	2–1	
4752.49	P		60.08	62.69	2–3	
4740.26	P		60.07	62.68	1–2	
3735.43	P		60.10	63.42	3–2	$3p'\ ^3D - 3d'\ ^3P^\circ$ 12
3707.39	P		60.08	63.42	2–1	
3689.94	P		60.07	63.43	1–0	
3714.43	P		60.08	63.42	2–2	
3694.14	P		60.07	63.42	1–1	
3701.13	P		60.07	63.42	1–2	
3141.16	A	3*p*	60.10	64.05	3–4	$3p'\ ^3D - 4f\ ^3F^\circ$ 12.01
3127.41	A	2*p*	60.08	64.04	2–3	
3118.79	A	1*p*	60.07	64.04	1–2	
6219.09	A	4	60.45	62.45	1–2	$4s\ ^3S - 4p\ ^3P^\circ$ 12.02
6215.43	A	3	60.45	62.45	1–1	
6212.41	A	1	60.45	62.45	1–0	
5843.84	P		61.30	63.42	2–2	$3p'\ ^3P - 3d'\ ^3P^\circ$ 15
5795.09	P		61.28	63.42	1–1	
5826.43	P		61.30	63.42	2–1	
5784.76	P		61.28	63.43	1–0	
5812.31	P		61.28	63.42	1–2	
5776.31	P		61.28	63.42	0–1	

N IV – Continued

I A	Ref	Int	E P Low	E P High	J	Multiplet No.
Vac						
1702.006	A	5	61.44	68.73	4–	$3d'\ ^3F^\circ - 5g\ ^3G$
1699.03	A	4	61.43	68.73	3–	UV 18.91
1696.86	A	3	61.42	68.73	2–	
1246.51	A	2	61.44	71.39	4–	$3d'\ ^3F^\circ - 6g\ ^3G$
1244.92	A	1	61.43	71.39	3–	UV 18.92
m1243.73	P	Nv	61.42	71.39	2–	
Air						
6119.23	P		61.78	63.81	2–2	$3d'\ ^1D^\circ - 4d\ ^1D$ 16
5288.25	P		61.95	64.30	2–1	$3p'\ ^1D - 3d'\ ^1P^\circ$ 17
12870.47	P		62.45	63.41	2–3	$4p\ ^3P^\circ - 4d\ ^3D$
12892.88	P		62.45	63.41	1–2	18
12916.03	P		62.45	63.41	0–1	
2430.41	A	3	62.45	67.55	2–1	$4p\ ^3P^\circ - 5s\ ^3S$
2431.07	A	2	62.45	67.55	1–1	UV 18.93
2431.55	A	0	62.45	67.55	0–1	
2035.57	A	5	62.45	68.54	2–3	$4p\ ^3P^\circ - 5d\ ^3D$
2036.10	A	4	62.45	68.54	1–2	UV 18.94
2036.42	A	1	62.45	68.54	0–1	
2080.34	A	6	62.77	68.73	3–4	$3d'\ ^1F^\circ - 5g\ ^1G$ UV 18.95
Vac						
1438.37	A	3	62.77	71.39	3–4	$3d'\ ^1F^\circ - 6g\ ^1G$ UV 18.96
Air						
2318.09	A	6*w*	63.41	68.76		$4d\ ^3D - 5f\ ^3F^\circ$ UV 18.97
2421.65	A	3	63.42	68.54	2–3	$3d'\ ^3P^\circ - 5d\ ^3D$
2424.73	A	2	63.42	68.54	1–2	UV 18.98
2426.54	A	1	63.43	68.54	0–1	
2809.35	A	2	63.81	68.22	2–1	$4d\ ^1D - 5p\ ^1P^\circ$ UV 18.99
2477.69	A	8	63.81	68.81	2–3	$4d\ ^1D - 5f\ ^1F^\circ$ UV 18.991
2646.956	A	12	64.05	68.73	4–	$4f\ ^3F^\circ - 5g\ ^3G$
2646.176	A	11	64.04	68.73	3–	UV 19
2645.654	A	10	64.04	68.73	2–	

N IV—Continued

I A	Ref	Int	E P Low	E P High	J	Multiplet No.
Vac						
1688.11	A	3	64.05	71.39	4–	$4f\ ^3F°-6g\ ^3G$
1687.82	A	2	64.04	71.39	3–	UV 20
1687.60	A	1	64.04	71.39	2–	
Air						
3078.25	A	6	64.70	68.73	3–4	$4f\ ^1F°-5g\ ^1G$ 19
4606.33	A	6	68.73	71.42		$5g\ ^3G-6h\ ^3H°$ 20

N IV—Continued

I A	Ref	Int	E P Low	E P High	J	Multiplet No.
Air						
2884.77	A	4*w*	68.73	73.02		$5g\ ^3G-7h\ ^3H°$ UV 21
4707.31	A	4*h*	68.76	71.39		$5f\ ^3F°-6g\ ^3G$ 21
7582.40	A	2*wl*	71.39	73.02		$6g\ ^3G-7h\ ^3H°$ 22
7702.96	A	4*ws*	71.42	73.03		$6h\ ^3H°-7i\ ^3I$ 23

NSRDS–NBS 3, SECTION 4

NITROGEN, $Z = 7$

A N v Atomic Energy Levels

B N v Multiplet Table

Part A

NITROGEN

N v

Li I sequence; 3 electrons $Z=7$

Ground state $1s^2\ 2s\ {}^2S_{01/2}$

$2s\ {}^2S_{01/2}$ **789537.2 ± 3.0** cm^{-1}, 126.656 Å (Vac) I P 97.888 eV

The analysis is from Hallin, who has observed the spectrum in the range 200 Å to 8000 Å with a theta pinch discharge as source. On the basis of these new measurements he has calculated unperturbed energy levels for the entire term system. The limit quoted above is determined from extended Ritz formulae for levels with $l=0$ and 1 and from the polarization formula for those with $l \geq 2$.

Tilford has observed the spectrum from 128 Å to 266 Å with a low-pressure, high-voltage condensed capillary discharge as source, and extended the observed *ns*-series to $n=10$, the *np*-series to $n=17$ and the *nd*-series to $n=18$. From a Ritz-Rydberg formula he derives the limit 789516 ± 24 cm^{-1} as compared with 789534.4 cm^{-1} calculated by Hallin from the ^2S series by an extended Ritz formula.

In the table the energy levels obtained from the observations are quoted from Hallin, supplemented by his calculated unperturbed values for the series to $n=10$. All calculated values are entered in brackets.

Tilford is quoted for the $nd\ ^2D$ terms ($n=9, 10$) and for all other *ns*, *np*, *nd* terms having $n > 10$. Hallin notes that in the region 140 Å to 250 Å the difference between his calculated wavelengths and the measurements by Tilford ranges from +0.002 Å to −0.006 Å, which introduces appreciable differences in the level values. It has been suggested by Edlén that the large and almost constant intervals observed experimentally by Tilford in the $nd\ ^2D$ terms, amounting to about 21 ± 9 cm^{-1}, may result from some sort of Stark Effect. The predicted intervals are small for these terms.

REFERENCES

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R. Hallin, Ark. Fys. (Stockholm) **31**, No. 36, 511–526 (1966). I P, T, C L, G D, Stark Effect

N v

Config.	Desig.	J	Level	Interval
$2s$	$2s\ ^2S$	$0\frac{1}{2}$	0.0	
$2p$	$2p\ ^2P^\circ$	$0\frac{1}{2}$	*30463.2*	258.7
		$1\frac{1}{2}$	*80721.9*	
$3s$	$3s\ ^2S$	$0\frac{1}{2}$	456126.6	
$3p$	$3p\ ^2P^\circ$	$0\frac{1}{2}$	*477765.7*	76.3
		$1\frac{1}{2}$	*477842.0*	
$3d$	$3d\ ^2D$	$1\frac{1}{2}$	484404.3	22.0
		$2\frac{1}{2}$	484426.3	
$4s$	$4s\ ^2S$	$0\frac{1}{2}$	606348.8	

N v

Config.	Desig.	J	Level	Interval
$4p$	$4p\ ^2P^\circ$	$0\frac{1}{2}$	*615141.0*	32.8
		$1\frac{1}{2}$	*615173.8*	
$4d$	$4d\ ^2D$	$1\frac{1}{2}$	617916.3	9.2
		$2\frac{1}{2}$	617925.5	
$4f$	$4f\ ^2F^\circ$	$2\frac{1}{2}$	*618059.3*	[4.8]
		$3\frac{1}{2}$	*618064.1*	
$5s$	$5s\ ^2S$	$0\frac{1}{2}$	673886.2	
$5p$	$5p\ ^2P^\circ$	$0\frac{1}{2}$	*678300.4*	16.1
		$1\frac{1}{2}$	*678316.5*	

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N V –Continued

Config.	Desig.	J	Level	Interval
$5d$	$5d\ ^2D$	$1\frac{1}{2}$ $2\frac{1}{2}$	[679712.7] 679717.6	[4.9]
$5f$	$5f\ ^2F°$	$2\frac{1}{2}, 3\frac{1}{2}$	*679790.4*	
$5g$	$5g\ ^2G$	$3\frac{1}{2}, 4\frac{1}{2}$	679802.3	
$6s$	$6s\ ^2S$	$0\frac{1}{2}$	709939.2	
$6p$	$6p\ ^2P°$	$0\frac{1}{2}$ $1\frac{1}{2}$	*712463.2* *712472.6*	9.4
$6d$	$6d\ ^2D$	$1\frac{1}{2}$ $2\frac{1}{2}$	713279.3 713281.5	2.2
$6f$	$6f\ ^2F°$	$2\frac{1}{2}, 3\frac{1}{2}$	*713324.7*	
$6g$	$6g\ ^2G$	$3\frac{1}{2}, 4\frac{1}{2}$	713328.9	
$6h$	$6h\ ^2H°$	$4\frac{1}{2}, 5\frac{1}{2}$	*713334.8*	
$7s$	$7s\ ^2S$	$0\frac{1}{2}$	731425.4	
$7p$	$7p\ ^2P°$	$0\frac{1}{2}$ $1\frac{1}{2}$	[*733003.3*] [*733009.2*]	[5.9]
$7d$	$7d\ ^2D$	$1\frac{1}{2}$ $2\frac{1}{2}$	[733515.4] [733517.2]	[1.8]
$7f$	$7f\ ^2F°$	$2\frac{1}{2}, 3\frac{1}{2}$	*733542.7*	
$7g$	$7g\ ^2C$	$3\frac{1}{2}, 4\frac{1}{2}$	[733549.0]	
$7h$	$7h\ ^2H°$	$4\frac{1}{2}, 5\frac{1}{2}$	[*733549.9*]	
$7i$	$7i\ ^2I$	$5\frac{1}{2}, 6\frac{1}{2}$	[733550.4]	
$8s$	$8s\ ^2S$	$0\frac{1}{2}$	[745255.6]	
$8p$	$8p\ ^2P°$	$0\frac{1}{2}$ $1\frac{1}{2}$	[*746306.0*] [*746309.9*]	[3.9]
$8d$	$8d\ ^2D$	$1\frac{1}{2}$ $2\frac{1}{2}$	[746648.5] [746649.7]	[1.2]
$8f$	$8f\ ^2F°$	$2\frac{1}{2}, 3\frac{1}{2}$	[*746669.2*]	
$8g$	$8g\ ^2G$	$3\frac{1}{2}, 4\frac{1}{2}$	[746671.3]	
$8h$	$8h\ ^2H°$	$4\frac{1}{2}, 5\frac{1}{2}$	[*746671.9*]	
$8i$	$8i\ ^2I$	$5\frac{1}{2}, 6\frac{1}{2}$	[746672.2]	
$8k$	$8k\ ^2K°$	$6\frac{1}{2}, 7\frac{1}{2}$	[*746672.4*]	

N V –Continued

Config.	Desig.	J	Level	Interval
$9s$	$9s\ ^2S$	$0\frac{1}{2}$	[754677.0]	
$9p$	$9p\ ^2P°$	$0\frac{1}{2}$ $1\frac{1}{2}$	[*755411.5*] [*755414.3*]	[2.8]
$9d$	$9d\ ^2D$	$1\frac{1}{2}$ $2\frac{1}{2}$	755608 755633	25
$9f$	$9f\ ^2F°$	$2\frac{1}{2}, 3\frac{1}{2}$	[*755666.5*]	
$9g$	$9g\ ^2G$	$3\frac{1}{2}, 4\frac{1}{2}$	[755667.9]	
$9h$	$9h\ ^2H°$	$4\frac{1}{2}, 5\frac{1}{2}$	[*755668.4*]	
$9i$	$9i\ ^2I$	$5\frac{1}{2}, 6\frac{1}{2}$	[755668.6]	
$9k$	$9k\ ^2K°$	$6\frac{1}{2}, 7\frac{1}{2}$	[*755668.7*]	
$9l$	$9l\ ^2L$	$7\frac{1}{2}, 8\frac{1}{2}$	[755668.8]	
$10s$	$10s\ ^2S$	$0\frac{1}{2}$	[761382.7]	
$10p$	$10p\ ^2P°$	$0\frac{1}{2}$ $1\frac{1}{2}$	[*761916.3*] [*761918.3*]	[2.0]
$10d$	$10d\ ^2D$	$1\frac{1}{2}$ $2\frac{1}{2}$	762048 762071	23
$10f$	$10f\ ^2F°$	$2\frac{1}{2}, 3\frac{1}{2}$	[*762102.1*]	
$10g$	$10g\ ^2G$	$3\frac{1}{2}, 4\frac{1}{2}$	[762103.1]	
$10h$	$10h\ ^2H°$	$4\frac{1}{2}, 5\frac{1}{2}$	[*762103.5*]	
$10i$	$10i\ ^2I$	$5\frac{1}{2}, 6\frac{1}{2}$	[762103.6]	
$10k$	$10k\ ^2K°$	$6\frac{1}{2}, 7\frac{1}{2}$	[*762103.7*]	
$10l$	$10l\ ^2L$	$7\frac{1}{2}, 8\frac{1}{2}$	[762103.8]	
$11p$	$11p\ ^2P°$	$0\frac{1}{2}, 1\frac{1}{2}$	*766687*	
$11d$	$11d\ ^2D$	$1\frac{1}{2}, 2\frac{1}{2}$	766866	
$12p$	$12p\ ^2P°$	$0\frac{1}{2}, 1\frac{1}{2}$	*770347*	
$12d$	$12d\ ^2D$	$1\frac{1}{2}, 2\frac{1}{2}$	770483	
$13p$	$13p\ ^2P°$	$0\frac{1}{2}, 1\frac{1}{2}$	*773174*	
$13d$	$13d\ ^2D$	$1\frac{1}{2}, 2\frac{1}{2}$	773282	
$14p$	$14p\ ^2P°$	$0\frac{1}{2}, 1\frac{1}{2}$	*775465*	
$14d$	$14d\ ^2D$	$1\frac{1}{2}, 2\frac{1}{2}$	775581	
$15p$	$15p\ ^2P°$	$0\frac{1}{2}, 1\frac{1}{2}$	*777230*	

N V —Continued

Config.	Desig.	J	Level	Interval
$15d$	$15d\,^2D$	$1\frac{1}{2}, 2\frac{1}{2}$	777490	
$16p$	$16p\,^2P^\circ$	$0\frac{1}{2}, 1\frac{1}{2}$	*778634*	
$16d$	$16d\,^2D$	$1\frac{1}{2}, 2\frac{1}{2}$	778847	
$17p$	$17p\,^2P^\circ$	$0\frac{1}{2}, 1\frac{1}{2}$	*779855*	

N V —Continued

Config.	Desig.	J	Level	Interval
$17d$	$17d\,^2D$	$1\frac{1}{2}, 2\frac{1}{2}$	780117	
$18d$	$18d\,^2D$	$1\frac{1}{2}, 2\frac{1}{2}$	781067	
.....	.....	.....	.....	
N VI ($^1S_0$)	***Limit***	.....	**789537.2 ± 3.0**	

July 1970.

Part B

NITROGEN

N v ($Z = 7$)

I P 91.888eV Limit 789537.2 ± 3.0 126.656 Å (Vac)

Anal A List A July 1970

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B S. G. Tilford, J. Opt. Soc. Am. **53**, No. 9, 1051–1054 (1963). I P, T, C L, (I); W L 128 Å to 1242 Å. (Note that intensities from Reference B are entered in parentheses).

P Predicted wavelengths from Ref A, Table 4 and from calculated unperturbed energy levels in Ref A, Table 5.

New Multiplet Numbers, not inserted between older ones, start with UV 7 and 13.

*Blend

* and § Blend of N v and N iv

N v

I A	Ref	Int	E P Low	E P High	J	Multiplet No.
Vac						
238.821‡	A	20	0.00	10.01	$0\frac{1}{2}$–$1\frac{1}{2}$	$2s\ ^2S - 2p\ ^2P^\circ$
242.804	A	19	0.00	9.98	$0\frac{1}{2}$–$0\frac{1}{2}$	UV 1
209.274	P	(80)	0.00	59.24	$0\frac{1}{2}$–$1\frac{1}{2}$	$2s\ ^2S - 3p\ ^2P^\circ$
209.308	P	(80)	0.00	59.23	$0\frac{1}{2}$–$0\frac{1}{2}$	UV 2
162.556	P	(48)	0.00	76.27	$0\frac{1}{2}$–$1\frac{1}{2}$	$2s\ ^2S - 4p\ ^2P^\circ$
162.564	P		0.00	76.27	$0\frac{1}{2}$–$0\frac{1}{2}$	UV 3
147.424	P	(24)	0.00	84.10	$0\frac{1}{2}$–$1\frac{1}{2}$	$2s\ ^2S - 5p\ ^2P^\circ$
147.427	P		0.00	84.10	$0\frac{1}{2}$–$0\frac{1}{2}$	UV 3.01
140.356	P	(16)	0.00	88.33	$0\frac{1}{2}$–$1\frac{1}{2}$	$2s\ ^2S - 6p\ ^2P^\circ$
140.358	P		0.00	88.33	$0\frac{1}{2}$–$0\frac{1}{2}$	UV 3.02
136.429	B	(8)	0.00	90.88	$0\frac{1}{2}$–	$2s\ ^2S - 7p\ ^2P^\circ$ UV 3.03
133.994	B	(7)	0.00	92.53	$0\frac{1}{2}$–	$2s\ ^2S - 8p\ ^2P^\circ$ UV 3.04
132.383	B	(6)	0.00	93.66	$0\frac{1}{2}$–	$2s\ ^2S - 9p\ ^2P^\circ$ UV 3.05

N v

I A	Ref	Int	E P Low	E P High	J	Multiplet No.
Vac						
131.254	B	(5)	0.00	94.46	$0\frac{1}{2}$–	$2s\ ^2S - 10p\ ^2P^\circ$ UV 3.06
130.431	B	(4)	0.00	95.05	$0\frac{1}{2}$–	$2s\ ^2S - 11p\ ^2P^\circ$ UV 3.07
129.811	B	(3)	0.00	95.51	$0\frac{1}{2}$–	$2s\ ^2S - 12p\ ^2P^\circ$ UV 3.08
129.337	B	(2)	0.00	95.86	$0\frac{1}{2}$–	$2s\ ^2S - 13p\ ^2P^\circ$ UV 3.09
128.954	B	(1)	0.00	96.14	$0\frac{1}{2}$–	$2s\ ^2S - 14p\ ^2P^\circ$ UV 3.10
128.662	B	(1)	0.00	96.36	$0\frac{1}{2}$–	$2s\ ^2S - 15p\ ^2P^\circ$ UV 3.11
128.430	B	(0)	0.00	96.54	$0\frac{1}{2}$–	$2s\ ^2S - 16p\ ^2P^\circ$ UV 3.12
128.229	B	(0)	0.00	96.69	$0\frac{1}{2}$–	$2s\ ^2S - 17p\ ^2P^\circ$ UV 3.13

N v –Continued

I A	Ref	Int	E P Low	E P High	J	Multiplet No.
Vac						
266.379	A	(84)	10.01	56.55	1½–0½	2p ²P°— 3s ²S
266.196	A	(80)	9.98	56.55	0½–0½	UV 4
247.706	A	(100)	10.01	60.06	1½–2½	2p ²P°— 3d ²D
247.561	A	(85)	9.98	60.06	0½–1½	UV 5
190.249	P	(32)	10.01	75.18	1½–0½	2p ²P°— 4s ²S
190.155	P	(20)	9.98	75.18	0½–0½	UV 5.01
186.149	P	(62)	10.01	76.61	1½–2½	2p ²P°— 4d ²D
186.063	P	(52)	9.98	76.61	0½–1½	UV 6
168.587	P	(12)	10.01	83.55	1½–0½	2p ²P°— 5s ²S
168.514	P	(5)	9.98	83.55	0½–0½	UV 7
166.946	P	(52)	10.01	84.27	1½–2½	2p ²P°— 5d ²D
166.875	P	(44)	9.98	84.27	0½–1½	UV 8
158.928	P	(7)	10.01	88.02	1½–0½	2p ²P°— 6s ²S
158.862	P	(4)	9.98	88.02	0½ 0½	UV 9
158.088	P	(36)	10.01	88.43	1½–2½	2p ²P°— 6d ²D
158.024	P	(24)	9.98	88.43	0½–1½	UV 10
153.683	B	(6)	10.01	90.68	1½–0½	2p ²P°— 7s ²S
153.624	B	(3)	9.98	90.68	0½–0½	UV 11
153.192	B	(28)	10.01	90.94	1½–2½	2p ²P°— 7d ²D
153.136	B	(18)	9.98	90.94	0½–1½	UV 12
150.488	B	(5)	10.01	92.40	1½–0½	2p ²P°— 8s ²S
150.429	B	(2)	9.98	92.40	0½–0½	UV 13
150.171	B	(14)	10.01	92.57	1½–2½	2p ²P°— 8d ²D
150.116	B	(7)	9.98	92.57	0½–1½	UV 14
148.387	B	(4)	10.01	93.57	1½–0½	2p ²P°— 9s ²S
148.328	B	(1)	9.98	93.57	0½–0½	UV 15
148.168	B	(7)	10.01	93.68	1½–2½	2p ²P°— 9d ²D
148.116	B	(4)	9.98	93.68	0½–1½	UV 16
146.921	B	(3)	10.01	94.40	1½–0½	2p ²P°—10s ²S UV 17
146.767	B	(6)	10.01	94.48	1½–2½	2p ²P°—10d ²D
146.716	B	(3)	9.98	94.48	0½–1½	UV 18
145.742	B	(5)	10.01	95.08	1½–	2p ²P°—11d ²D UV 19
144.978	B	(4)	10.01	95.53	1½–	2p ²P°—12d ²D UV 20
144.392	B	(3)	10.01	95.87	1½–	2p ²P°—13d ²D UV 21
143.914	B	(2)	10.01	96.16	1½–	2p ²P°—14d ²D UV 22
143.520	B	(1)	10.01	96.39	1½–	2p ²P°—15d ²D UV 23

N v –Continued

I A	Ref	Int	E P Low	E P High	J	Multiplet No.
Vac						
143.241	B	(1)	10.01	96.56	1½–	2p ²P°—16d ²D UV 24
142.981	B	(0)	10.01	96.72	1½–	2p ²P°—17d ²D UV 25
142.797	B	(0)	10.01	96.84	1½–	2p ²P°—18d ²D UV 26
Air						
4603.73	A	12	56.55	59.24	0½–1½	3s ²S — 3p ²P°
4619.98	A	10	56.55	59.23	0½–0½	1
Vac						
628.744	A	5	56.55	76.27	0½–1½	3s ²S — 4p ²P°
628.874	A	3	56.55	76.27	0½–0½	UV 27
450.072	P	3*	56.55	84.10	0½–1½	3s ²S — 5p ²P°
450.105	P	3*	56.55	84.10	0½–0½	UV 28
390.102	P		56.55	88.33	0½–1½	3s ²S — 6p ²P°
390.116	P		56.55	88.33	0½–0½	UV 29
Air						
15185.80	P		59.24	60.06	1½–2½	3p ²P°— 3d ²D
15061.34	P		59.23	60.06	0½–1½	1.01
Vac						
778.172	A	2	59.24	75.18	1½–0½	3p ²P°— 4s ²S
777.712	A	1	59.23	75.18	0½–0½	UV 30
713.860	A	8	59.24	76.61	1½–2½	3p ²P°— 4d ²D
713.518	A	6	59.23	76.61	0½–1½	UV 31
510.096	P		59.24	83.55	1½–0½	3p ²P°— 5s ²S
509.896	P		59.23	83.55	0½–0½	UV 32
495.356	P		59.24	84.27	1½–2½	3p ²P°— 5d ²D
495.180	P		59.23	84.27	0½–1½	UV 33
430.857	P		59.24	88.02	1½–0½	3p ²P°— 6s ²S
430.714	P		59.23	88.02	0½–0½	UV 34
424.75	A	2	59.24	88.43	1½ 2½	3p ²P°— 6d ²D
424.61	A	1	59.23	88.43	0½–1½	UV 35
394.348	P		59.24	90.68	1½–0½	3p ²P°— 7s ²S
394.228	P		59.23	90.68	0½–0½	UV 36
391.123	P		59.24	90.94	1½–2½	3p ²P°— 7d ²D
391.008	P		59.23	90.94	0½–1½	UV 37
764.840	P		60.06	76.27	2½–1½	3d ²D — 4p ²P°
764.896	P		60.06	76.27	1½–0½	UV 38

N v —Continued

I A	Ref	Int	E P Low	E P High	J	Multiplet No.
Vac						
748.291	A	9	60.06	76.63	2½–3½	$3d\ ^2D - 4f\ ^2F^\circ$
748.195	A	8	60.06	76.63	1½–2½	UV 39
515.757	P		60.06	84.10	2½–1½	$3d\ ^2D - 5p\ ^2P^\circ$
515.741	P		60.06	84.10	1½–0½	UV 40
511.834	A	5	60.06	84.28		$3d\ ^2D - 5f\ ^2F^\circ$ UV 41
436.85	A	4	60.06	88.44		$3d\ ^2D - 6f\ ^2F^\circ$ UV 42
Air						
1327.57	P		75.18	76.27	0½–1½	$4s\ ^2S - 4p\ ^2P^\circ$
1368.92	P		75.18	76.27	0½–0½	1.02
Vac						
1389.514	A	3	75.18	84.10	0½–1½	$4s\ ^2S - 5p\ ^2P^\circ$
1389.822	A	2	75.18	84.10	0½–0½	UV 43
942.278	P		75.18	88.33	0½–1½	$4s\ ^2S - 6p\ ^2P^\circ$
942.361	P		75.18	88.33	0½–0½	UV 44
1703.218	A	4	76.27	83.55	1½–0½	$4p\ ^2P^\circ - 5s\ ^2S$
1702.25§	A	3*	76.27	83.55	0½–0½	UV 45
1549.336	A	6	76.27	84.27	1½–2½	$4p\ ^2P^\circ - 5d\ ^2D$
1548.647	P		76.27	84.27	0½–1½	UV 46
1055.229	P		76.27	88.02	1½–0½	$4p\ ^2P^\circ - 6s\ ^2S$
1054.871	P		76.27	88.02	0½–0½	UV 47
1019.278	P		76.27	88.43	1½–2½	$4p\ ^2P^\circ - 6d\ ^2D$
1018.973	P		76.27	88.43	0½ 1½	UV 48
655.879	P	2*	76.61	84.10	2½–1½	$4d\ ^2D - 5p\ ^2P^\circ$
656.065	P	2*	76.61	84.10	1½–0½	UV 49
616.328	A	9*wl*	76.61	84.28		$4d\ ^2D - 5f\ ^2F^\circ$ UV 50
048.20	A	2*w*	76.61	88.44		$4d\ ^2D - 6f\ ^2F^\circ$ UV 51
621.966	A	1	76.63	84.27		$4f\ ^2F^\circ - 5d\ ^2D$ UV 52
619.688	A	12*wl*	76.63	84.28		$4f\ ^2F^\circ - 5g\ ^2G$ UV 53
049.65	A	3*w*	76.63	88.44		$4f\ ^2F^\circ - 6g\ ^2G$ UV 54

N v —Continued

I A	Ref	Int	E P Low	E P High	J	Multiplet No.
Air						
2590.81	A	2	83.55	88.33	0½–1½	$5s\ ^2S - 6p\ ^2P^\circ$
2591.44	A	1	83.55	88.33	0½–0½	UV 55
3161.38	A	3	84.10	88.02	1½–0½	$5p\ ^2P^\circ - 6s\ ^2S$
3159.75	A	2	84.10	88.02	0½–0½	2
2859.16	A	5*l*	84.10	88.43	1½–2½	$5p\ ^2P^\circ - 6d\ ^2D$
2858.03	A	4	84.10	88.43	0½–1½	UV 56
Vac						
1882.92	A	1	84.10	90.68	1½–0½	$5p\ ^2P^\circ - 7s\ ^2S$
1882.36	A	0	84.10	90.68	0½–0½	UV 57
1811.62	A	1*l*	84.10	90.94	1½–2½	$5p\ ^2P^\circ - 7d\ ^2D$
1811.08	A	0*l*	84.10	90.94	0½–1½	UV 58
Air						
2974.52	A	6*p*	84.27	88.44		$5d\ ^2D - 6f\ ^2F^\circ$ UV 59
Vac						
1857.88	A	3*l*	84.27	90.95	2½–	$5d\ ^2D - 7f\ ^2F^\circ$
1857.69	A	3*l*	84.27	90.95	1½–2½	UV 60
Air						
2980.78	A	8*wl*	84.28	88.44		$5f\ ^2F^\circ - 6g\ ^2G$ UV 61
Vac						
1860.37	A	6*w*	84.28	90.95		$5f\ ^2F^\circ - 7g\ ^2G$ etc. UV 62 etc.
1495.5	A	2*w*	84.28	92.57		$5f\ ^2F^\circ - 8g\ ^2G$ etc. UV 63 etc.
Air						
2981.31	A	10*wl*	84.28	88.44		$5g\ ^2G - 6h\ ^2H^\circ$ UV 64
Vac						
1860.37	A	6*w*	84.28	90.95		$5g\ ^2G - 7h\ ^2H^\circ$ etc. UV 65 etc.
1495.5	A	2*w*	84.28	92.57		$5g\ ^2G - 8h\ ^2H^\circ$ etc. UV 66 etc.
Air						
4333.38	P		88.02	90.88	0½–1½	$6s\ ^2S - 7p\ ^2P^\circ$
4334.49	P		88.02	90.88	0½–0½	3

Nv –Continued

I A	Ref	Int	E P Low	E P High	J	Multiplet No.
Air						
5274.66	P		88.33	90.68	$1\frac{1}{2}$–$0\frac{1}{2}$	$6p\ ^2P°$— $7s\ ^2S$
5272.04	P		88.33	90.68	$0\frac{1}{2}$–$0\frac{1}{2}$	4
4750.57	P		88.33	90.94	$1\frac{1}{2}$–$2\frac{1}{2}$	$6p\ ^2P°$— $7d\ ^2D$
4748.86	P		88.33	90.94	$0\frac{1}{2}$–$1\frac{1}{2}$	5
5067.60	P		88.43	90.88	$2\frac{1}{2}$–$1\frac{1}{2}$	$6d\ ^2D$ — $7p\ ^2P°$
5068.40	P		88.43	90.88	$1\frac{1}{2}$–$0\frac{1}{2}$	6
4933.36	P		88.43	90.95	$2\frac{1}{2}$–	$6d\ ^2D$ $7f\ ^2F°$
4932.68	P		88.43	90.95	$1\frac{1}{2}$–$2\frac{1}{2}$	7
4951.32	P		88.44	90.94	–$2\frac{1}{2}$	$6f\ ^2F°$— $7d\ ^2D$
4951.76	P		88.44	90.94	$2\frac{1}{2}$–$1\frac{1}{2}$	8
4944.56	A	9*w*	88.44	90.95		$6f\ ^2F°$— $7g\ ^2G$ etc. 9 etc.
2998.43	A	5*w*	88.44	92.57		$6f\ ^2F°$— $8g\ ^2G$ etc. 9.01 etc.

Nv –Continued

I A	Ref	Int	E P Low	E P High	J	Multiplet No.
Air						
4944.49	P		88.44	90.95		$6g\ ^2G$ — $7h\ ^2H°$ etc. 10 etc.
4944.71	P		88.44	90.95		$6h\ ^2H°$— $7i\ ^2I$ etc. 10.01 etc.
6716.95	P		90.68	92.53	$0\frac{1}{2}$–$1\frac{1}{2}$	$7s\ ^2S$ — $8p\ ^2P°$
6718.71	P		90.68	92.53	$0\frac{1}{2}$–$0\frac{1}{2}$	11
7329.09	P		90.88	92.57	$1\frac{1}{2}$–$2\frac{1}{2}$	$7p\ ^2P°$— $8d\ ^2D$
7326.57	P		90.88	92.57	$0\frac{1}{2}$–$1\frac{1}{2}$	12
7618.46	A	5*w*	90.95	92.57		$7g\ ^2G$ — $8h\ ^2H°$ etc. 13 etc.

NSRDS–NBS 3, SECTION 4

NITROGEN, $Z = 7$

A N VI Atomic Energy Levels

B N VI Multiplet Table

Part A

NITROGEN

N VI

He I sequence; 2 electrons $Z = 7$

Ground state $1s^2\ {}^1S_0$

$1s^2\ {}^1S_0$ **4452758** cm^{-1}, 22.458 Å (Vac) I P 552.057 eV

In 1940 Tyrén reported his observations of the first three members of the singlet series, and the intersystem combination $1s^2\ {}^1S_0 - 2p\ {}^3P^\circ_1$, in the range 23 Å to 29 Å. The resulting energy levels are given in Edlén's 1952 paper and are quoted here.

Bockasten and his colleagues have observed the triplet $2s\ {}^3S - 2p\ {}^3P^\circ$ in a theta-pinch discharge as source. Their wavelengths have been used to obtain the levels $2p\ {}^3P^\circ_{2,1}$. The third line of the group is blended with N III. For this reason, Edlén's estimated value is quoted for $2p\ {}^3P^\circ_0$ and entered in brackets in the table. The difference, o-c, is only -6 cm^{-1}.

The remaining levels are based on the observations reported in 1966 by Fawcett and Irons. The center of gravity of the $2p\ {}^3P^\circ$ term, 3438480 cm^{-1} has been used to evaluate the $nd\ {}^3D$ terms. These authors give calculated wavelengths for the combinations with terms $np\ {}^3P^\circ$ and $nd\ {}^3D$ to $n = 10$, but further observations are needed to extend the analysis.

The limit is from the theoretical work by Pekeris on the "Ground State of Two-Electron Atoms."

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B. C. Fawcett, F. E. Irons, Proc. Phys. Soc. (London) **89**, Part 4, No. 566, 1063–1064 (L) (1966).

N VI

Config.	Desig.	J	Level	Interval
$1s^2$	$1s^2\ {}^1S$	0	0	
$1s\,2s$	$2s\ {}^3S$	1	3385890	
$1s\,2p$	$2p\ {}^3P^\circ$	0	*[3438310]*	[10]
		1	*3438320*	290
		2	*3438610*	
$1s\,2p$	$2p\ {}^1P^\circ$	1	*3473790*	
$1s\,3p$	$3p\ {}^3P^\circ$	0, 1, 2	*4006160*	
$1s\,3d$	$3d\ {}^3D$	1, 2, 3	4013460	

N VI

Config.	Desig.	J	Level	Internal
$1s\,3p$	$3p\ {}^1P^\circ$	1	*4016390*	
$1s\,4p$	$4p\ {}^3P^\circ$	0, 1, 2	*4202620*	
$1s\,4d$	$4d\ {}^3D$	1, 2, 3	4205820	
$1s\,4p$	$4p\ {}^1P^\circ$	1	*4206810*	
$1s\,5p$	$5p\ {}^3P^\circ$	1, 2, 3	*4293080*	
$1s\,5d$	$5d\ {}^3D$	1, 2, 3	4294570	
.....	.....	.....	.....	.....
N VII ($^2S_{01/2}$)	**Limit**	.....	**4452758**	

July 1970

Part B NITROGEN

N VI ($Z=7$)

I P 552.057 eV Limit 4452758 cm^{-1} 22.458 Å

Anal C List A July 1970

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C B. C. Fawcett, F. E. Irons, Proc. Phys. Soc. (London) **89**, Part 4, No. 566, 1063–1064 (1966). C L; W L 97 Å to 173 Å

* and § Blend N III and N VI

N VI

I A	Ref	Int	E P Low	E P High	J	Multiplet No.
Vac 29.084	A		0.00	426.29	0–1	$1s^2\,{}^1S - 2p\,{}^3P^\circ$ 1
28.787‡	A		0.00	430.68	0–1	$1s^2\,{}^1S - 2p\,{}^1P^\circ$ 2
24.898	A		0.00	497.96	0–1	$1s^2\,{}^1S - 3p\,{}^1P^\circ$ 3
23.771	A		0.00	521.56	0–1	$1s^2\,{}^1S - 4p\,{}^1P^\circ$ 4
1896.82	B	3	419.79	426.32	1–2	$2s\,{}^3S - 2p\,{}^3P^\circ$ 5
1907.34	B	2	419.79	426.29	1–1	
1907.87§	B	2	419.79	426.29	1–0	

N VI

I A	Ref	Int	E P Low	E P High	J	Multiplet No.
Vac 161.22	C		419.79	496.69	1–	$2s\,{}^3S - 3p\,{}^3P^\circ$ 6
122.44	C		419.79	521.05	1–	$2s\,{}^3S - 4p\,{}^3P^\circ$ 7
110.23	C		419.79	532.26	1–	$2s\,{}^3S - 5p\,{}^3P^\circ$ 8
173.92	C		426.31	497.59		$2p\,{}^3P^\circ - 3d\,{}^3D$ 9
130.32	C		426.31	521.44		$2p\,{}^3P^\circ - 4d\,{}^3D$ 10
116.81	C		426.31	532.45		$2p\,{}^3P^\circ - 5d\,{}^3D$ 11

NSRDS–NBS 3, SECTION 4

NITROGEN, $Z = 7$

Part A

NITROGEN

N VII

H I sequence; 1 electron $Z=7$

Ground state $1s\ ^2S_{01/2}$

$1s\ ^2S_{01/2}$ **5380089** cm^{-1}, 18.587 Å (Vac) I P 667.029 eV

In 1940 Tyrén reported his observation of the first member of the Lyman series. This line was also detected in 1963 in the Zeta spectrum by the workers at Culham Laboratory, during the initial phase of their study of high-temperature plasmas. The first two members of this series, at 24.8 Å and 20.8 Å respectively, were identified in the far ultraviolet solar spectrum by R. L. Blake and his colleagues in 1964.

The terms listed below have been calculated by J. D. Garcia and J. E. Mack in their extensive paper on the H-like spectra, H I to Ca XX. Their values refer to the isotope ^{14}N VII for which they used the value R = 109733.00982.

Edlén has, also, calculated centre-of-gravity wavelengths of the Lyman lines $1s-np$, $n=2$ to 7 for the natural isotope mixture, but the difference is negligible for N VII.

REFERENCES

F. Tyrén, Nova Acta Reg. Soc. Sci. Uppsala [IV] **12**, No. 1, 1–66 (1940). C L

B. C. Fawcett, A. H. Gabriel, W. G. Griffin, B. B. Jones and R. Wilson, Nature **200**, No. 4913, 1303–1304 (L) (1963). C L

R. L. Blake, T. A. Chubb, H. Friedman and A. E. Unzicker, Science **146**, No. 3647, 1037–1038 (Nov. 20, 1964). C L

J. D. Garcia and J. E. Mack, J. Opt. Soc. Am. **55**, No. 6, 654–685 (1965). I P, T, C L

B. Edlén, Ark. Fys. (Stockholm) **31**, No. 35, 509–510 (1966). C L

N VII **N VII**

Config.	Desig.	J	Level	Interval	Config.	Desig.	J	Level	Interval
$1s$	$1s\ ^2S$	$0\frac{1}{2}$	0		$4p$	$4p\ ^2P°$	$0\frac{1}{2}$	5043853	6
					$4s$	$4s\ ^2S$	$0\frac{1}{2}$	5043859	104
$2p$	$2p\ ^2P°$	$0\frac{1}{2}$	4034761	45	$4p,\ 4d$	$4d\ ^2D$ $4p\ ^2P°$	$1\frac{1}{2}$	5043963	36
$2s$	$2s\ ^2S$	$0\frac{1}{2}$	4034806		$4d,\ 4f$	$4d\ ^2D$ $4f\ ^2F°$	$2\frac{1}{2}$	5043999	19
$2p$	$2p\ ^2P°$	$1\frac{1}{2}$	4035641	835	$4f$	$4f\ ^2F°$	$3\frac{1}{2}$	5044018	
					$5p$	$5p\ ^2P°$	$0\frac{1}{2}$	5164916	3
$3p$	$3p\ ^2P°$	$0\frac{1}{2}$	4782263		$5s$	$5s\ ^2S$	$0\frac{1}{2}$	5164919	54
$3s$	$3s\ ^2S$	$0\frac{1}{2}$	4782276	13	$5p,\ 5d$	$5d\ ^2D$ $5p\ ^2P°$	$1\frac{1}{2}$	5164973	18
$3d$	$3d\ ^2D$	$1\frac{1}{2}$	4782523	247	$5d,\ 5f$	$5d\ ^2D$ $5f\ ^2F°$	$2\frac{1}{2}$	5164991	10
$3p$	$3p\ ^2P°$	$1\frac{1}{2}$	4782524	1	$5f,\ 5g$	$5g\ ^2G$ $5f\ ^2F°$	$3\frac{1}{2}$	5165001	5
$3d$	$3d\ ^2D$	$2\frac{1}{2}$	4782610	86	$5g$	$5g\ ^2G$	$4\frac{1}{2}$	5165006	

N VII – Continued

Config.	Desig.		J	Level	Interval
$6p$		$6p\ ^2P°$	$0\frac{1}{2}$	5230673	2
$6s$	$6s\ ^2S$		$0\frac{1}{2}$	5230675	30
$6d$	$6d\ ^2D$		$1\frac{1}{2}$	5230705	1
$6p$		$6p\ ^2P°$	$1\frac{1}{2}$	5230706	10
$6d$, $6f$	$6d\ ^2D$	$6f\ ^2F°$	$2\frac{1}{2}$	5230716	6
$6f$, $6g$	$6g\ ^2G$	$6f\ ^2F°$	$3\frac{1}{2}$	5230722	3
$6g$, $6h$	$6g\ ^2G$	$6h\ ^2H°$	$4\frac{1}{2}$	5230725	2
$6h$		$6h\ ^2H°$	$5\frac{1}{2}$	5230727	
$7p$		$7p\ ^2P°$	$0\frac{1}{2}$	5270319	1
$7s$	$7s\ ^2S$		$0\frac{1}{2}$	5270320	20
$7p$, $7d$	$7d\ ^2D$	$7p\ ^2P°$	$1\frac{1}{2}$	5270340	6
$7d$, $7f$	$7d\ ^2D$	$7f\ ^2F°$	$2\frac{1}{2}$	5270346	4
$7f$, $7g$	$7g\ ^2G$	$7f\ ^2F°$	$3\frac{1}{2}$	5270350	2
$7g$, $7h$	$7g\ ^2G$	$7h\ ^2H°$	$4\frac{1}{2}$	5270352	1
$7h$, $7i$	$7i\ ^2I$	$7h\ ^2H°$	$5\frac{1}{2}$	5270353	1
$7i$	$7i\ ^2I$		$6\frac{1}{2}$	5270354	
$8p$		$8p\ ^2P°$	$0\frac{1}{2}$	5296049	1
$8s$	$8s\ ^2S$		$0\frac{1}{2}$	5296050	13
$8p$, $8d$	$8d\ ^2D$	$8p\ ^2P°$	$1\frac{1}{2}$	5296063	5
$8d$, $8f$	$8d\ ^2D$	$8f\ ^2F°$	$2\frac{1}{2}$	5296068	2
$8f$, $8g$	$8g\ ^2G$	$8f\ ^2F°$	$3\frac{1}{2}$	5296070	1
$8g$, $8h$	$8g\ ^2G$	$8h\ ^2H°$	$4\frac{1}{2}$	5296071	1
$8h$, $8i$	$8i\ ^2I$	$8h\ ^2H°$	$5\frac{1}{2}$	5296072	1
$8i$, $8k$	$8i\ ^2I$	$8k\ ^2K°$	$6\frac{1}{2}$	5296073	0
$8k$		$8k\ ^2K°$	$7\frac{1}{2}$	5296073	
$9p$		$9p\ ^2P°$	$0\frac{1}{2}$	5313689	1
$9s$	$9s\ ^2S$		$0\frac{1}{2}$	5313690	9
$9p$, $9d$	$9d\ ^2D$	$9p\ ^2P°$	$1\frac{1}{2}$	5313699	3
$9d$, $9f$	$9d\ ^2D$	$9f\ ^2F°$	$2\frac{1}{2}$	5313702	2
$9f$, $9g$	$9g\ ^2G$	$9f\ ^2F°$	$3\frac{1}{2}$	5313704	1
$9g$, $9h$	$9g\ ^2G$	$9h\ ^2H°$	$4\frac{1}{2}$	5313705	0
$9h$, $9i$	$9i\ ^2I$	$9h\ ^2H°$	$5\frac{1}{2}$	5313705	1
$9i$, $9k$	$9i\ ^2I$	$9k\ ^2K°$	$6\frac{1}{2}$	5313706	0
$9k$, $9l$	$9l\ ^2L$	$9k\ ^2K°$	$7\frac{1}{2}$	5313706	0
$9l$	$9l\ ^2L$		$8\frac{1}{2}$	5313706	
$10p$		$10p\ ^2P°$	$0\frac{1}{2}$	5326306	1
$10s$	$10s\ ^2S$		$0\frac{1}{2}$	5326307	6
$10d$	$10d\ ^2D$		$1\frac{1}{2}$	5326313	1
$10p$		$10p\ ^2P°$	$1\frac{1}{2}$	5326314	2
$10d$, $10f$	$10d\ ^2D$	$10f\ ^2F°$	$2\frac{1}{2}$	5326316	1
$10f$, $10g$	$10g\ ^2G$	$10f\ ^2F°$	$3\frac{1}{2}$	5326317	1
$10g$, $10h$	$10g\ ^2G$	$10h\ ^2H°$	$4\frac{1}{2}$	5326318	0
$10h$, $10i$	$10i\ ^2I$	$10h\ ^2H°$	$5\frac{1}{2}$	5326318	1
$10i$, $10k$	$10i\ ^2I$	$10k\ ^2K°$	$6\frac{1}{2}$	5326319	0
$10k$, $10l$	$10l\ ^2L$	$10k\ ^2K°$	$7\frac{1}{2}$	5326319	0
$10l$, $10m$	$10l\ ^2L$	$10m^2M°$	$8\frac{1}{2}$	5326319	0
$10m$		$10m^2M°$	$9\frac{1}{2}$	5326319	

N VII – Continued

Config.	Desig.		J	Level	Interval
$11p$		$11p\ ^2P°$	$0\frac{1}{2}$	5335641	1
$11s$	$11s\ ^2S$		$0\frac{1}{2}$	5335642	9
etc.			$10\frac{1}{2}$	to 51	
$12p$		$12p\ ^2P°$	$0\frac{1}{2}$	5342741	1
$12s$	$12s\ ^2S$		$0\frac{1}{2}$	5342742	7
etc.			$11\frac{1}{2}$	to 49	
$13s$, $13p$	$13s\ ^2S$	$13p\ ^2P°$	$0\frac{1}{2}$	5348267	5
etc.			$12\frac{1}{2}$	to 72	
$14s$, $14p$	$14s\ ^2S$	$14p\ ^2P°$	$0\frac{1}{2}$	5352651	4
etc.			$13\frac{1}{2}$	to 55	
$15s$, $15p$	$15s\ ^2S$	$15p\ ^2P°$	$0\frac{1}{2}$	5356187	4
etc.			$14\frac{1}{2}$	to 91	
$16s$, $16p$	$16s\ ^2S$	$16p\ ^2P°$	$0\frac{1}{2}$	5359082	3
etc.			$15\frac{1}{2}$	to 85	
$17s$, $17p$	$17s\ ^2S$	$17p\ ^2P°$	$0\frac{1}{2}$	5361481	2
etc.			$16\frac{1}{2}$	to 83	
$18s$, $18p$	$18s\ ^2S$	$18p\ ^2P°$	$0\frac{1}{2}$	5363491	2
etc.			$17\frac{1}{2}$	to 93	
$19s$, $19p$	$19s\ ^2S$	$19p\ ^2P°$	$0\frac{1}{2}$	5365192	2
etc.			$18\frac{1}{2}$	to 94	
$20s$, $20p$	$20s\ ^2S$	$20p\ ^2P°$	$0\frac{1}{2}$	5366645	1
etc.			$19\frac{1}{2}$	to 46	
∞ = ***Limit***			.....	**5380089**	

April 1970.

Multiplet Table

Part B NITROGEN

N VII ($Z=7$)

I P 667.029 eV Limit 5380089 cm^{-1} 18.587 Å (Vac)

Anal A List B April 1970

REFERENCES

A J. D. Garcia and J. E. Mack, J. Opt. Soc. Am. **55**, No. 6, 654–685 (1965). I P, T, C L; W L 18 Å to 18107 Å (All wavelengths are from theoretical calculations of H-like spectra. For unresolved groups the wavelength has been derived from "the wave number of the statistically weighted mean of all components.")

B. Edlén, Ark. Fys. (Stockholm) **31**, No. 35, 509–510 (1966). C L

N VII | **N VII**

I A	Ref	Int	E P Low	E P High	J	Multiplet No.
Vac						
24.7792	A		0.00	500.34	$0\frac{1}{2}-1\frac{1}{2}$	$1s\ ^2S - 2p\ ^2P^\circ$
24.7846	A		0.00	500.23	$0\frac{1}{2}-0\frac{1}{2}$	1
20.9095	A		0.00	592.94	$0\frac{1}{2}-1\frac{1}{2}$	$1s\ ^2S - 3p\ ^2P^\circ$
20.9106	A		0.00	592.91	$0\frac{1}{2}-0\frac{1}{2}$	2
19.8257	A		0.00	625.36	$0\frac{1}{2}-1\frac{1}{2}$	$1s\ ^2S - 4p\ ^2P^\circ$
19.8261	A		0.00	625.34	$0\frac{1}{2}-0\frac{1}{2}$	3
19.3612	A		0.00	640.36	$0\frac{1}{2}-1\frac{1}{2}$	$1s\ ^2S - 5p\ ^2P^\circ$
19.3614	A		0.00	640.35	$0\frac{1}{2}-0\frac{1}{2}$	4
19.1179	A		0.00	648.51	$0\frac{1}{2}-1\frac{1}{2}$	$1s\ ^2S - 6p\ ^2P^\circ$
19.1180	A		0.00	648.50	$0\frac{1}{2}-0\frac{1}{2}$	5
18.9741	A		0.00	653.42	$0\frac{1}{2}-1\frac{1}{2}$	$1s\ ^2S - 7p\ ^2P^\circ$
18.9742	A		0.00	653.42	$0\frac{1}{2}-0\frac{1}{2}$	6
18.8819	A		0.00	656.61	$0\frac{1}{2}-1\frac{1}{2}$	$1s\ ^2S - 8p\ ^2P^\circ$
18.8820	A		0.00	656.61	$0\frac{1}{2}-0\frac{1}{2}$	7
18.8193	A		0.00	658.80	$0\frac{1}{2}-$	$1s\ ^2S - 9p\ ^2P^\circ$
						8
18.7747	A		0.00	660.36	$0\frac{1}{2}-$	$1s\ ^2S - 10p\ ^2P^\circ$
						9
18.7419	A		0.00	661.52	$0\frac{1}{2}$	$1s\ ^2S - 11p\ ^2P^\circ$
						10
18.7170	A		0.00	662.40	$0\frac{1}{2}-$	$1s\ ^2S - 12p\ ^2P^\circ$
						11

I A	Ref	Int	E P Low	E P High	J	Multiplet No.
Vac						
18.6976	A		0.00	663.08	$0\frac{1}{2}-$	$1s\ ^2S - 13p\ ^2P^\circ$
						12
18.6823	A		0.00	663.63	$0\frac{1}{2}-$	$1s\ ^2S - 14p\ ^2P^\circ$
						13
18.6700	A		0.00	664.07	$0\frac{1}{2}-$	$1s\ ^2S - 15p\ ^2P^\circ$
						14
18.6599	A		0.00	664.42	$0\frac{1}{2}-$	$1s\ ^2S - 16p\ ^2P^\circ$
						15
18.6516	A		0.00	664.72	$0\frac{1}{2}-$	$1s\ ^2S - 17p\ ^2P^\circ$
						16
18.6446	A		0.00	664.97	$0\frac{1}{2}-$	$1s\ ^2S - 18p\ ^2P^\circ$
						17
18.6387	A		0.00	665.18	$0\frac{1}{2}-$	$1s\ ^2S - 19p\ ^2P^\circ$
						18
18.6336	A		0.00	665.36	$0\frac{1}{2}-$	$1s\ ^2S - 20p\ ^2P^\circ$
						19
		—				
133.934	A		500.34	592.91	$1\frac{1}{2}-0\frac{1}{2}$	$2p\ ^2P^\circ - 3s\ ^2S$
133.777	A		500.23	592.91	$0\frac{1}{2}-0\frac{1}{2}$	20
133.874	A		500.34	592.95	$1\frac{1}{2}-2\frac{1}{2}$	$2p\ ^2P^\circ - 3d\ ^2D$
133.732	A		500.23	592.94	$0\frac{1}{2}-1\frac{1}{2}$	21
133.890	A		500.34	592.94	$1\frac{1}{2}-1\frac{1}{2}$	

N VII – Continued

I A	Ref	Int	E P Low	E P High	J	Multiplet No.
Vac						
99.185	A		500.34	625.34	$1\frac{1}{2}-0\frac{1}{2}$	$2p\,^2P^\circ - 4s\,^2S$
99.098	A		500.23	625.34	$0\frac{1}{2}-0\frac{1}{2}$	22
99.134	A		500.30	625.36		$2p\,^2P^\circ - 4d\,^2D$
						etc. 23 etc.
88.552	A		500.34	640.35	$1\frac{1}{2}-0\frac{1}{2}$	$2p\,^2P^\circ - 5s\,^2S$
88.483	A		500.23	640.35	$0\frac{1}{2}-0\frac{1}{2}$	24
88.515	A		500.30	640.36		$2p\,^2P^\circ - 5d\,^2D$
						etc. 25 etc.
83.680	A		500.34	648.50	$1\frac{1}{2}-0\frac{1}{2}$	$2p\,^2P^\circ - 6s\,^2S$
83.618	A		500.23	648.50	$0\frac{1}{2}-0\frac{1}{2}$	26
83.648	A		500.30	648.51		$2p\,^2P^\circ - 6d\,^2D$
						etc. 27 etc.
80.993	A		500.34	653.42	$1\frac{1}{2}-0\frac{1}{2}$	$2p\,^2P^\circ - 7s\,^2S$
80.935	A		500.23	653.42	$0\frac{1}{2}-0\frac{1}{2}$	28
80.963	A		500.30	653.42		$2p\,^2P^\circ - 7d\,^2D$
						etc. 29 etc.
79.339	A		500.34	656.61	$1\frac{1}{2}-0\frac{1}{2}$	$2p\,^2P^\circ - 8s\,^2S$
79.284	A		500.23	656.61	$0\frac{1}{2}-0\frac{1}{2}$	30
79.311	A		500.30	656.61		$2p\,^2P^\circ - 8d\,^2D$
						etc. 31 etc.
78.244	A		500.34	658.80	$1\frac{1}{2}-0\frac{1}{2}$	$2p\,^2P^\circ - 9s\,^2S$
78.190	A		500.23	658.80	$0\frac{1}{2}-0\frac{1}{2}$	32
78.217	A		500.30	658.80		$2p\,^2P^\circ - 9d\,^2D$
						etc. 33 etc.
77.479	A		500.34	660.36	$1\frac{1}{2}-0\frac{1}{2}$	$2p\,^2P^\circ - 10s\,^2S$
77.427	A		500.23	660.36	$0\frac{1}{2}-0\frac{1}{2}$	34
77.453	A		500.30	660.36		$2p\,^2P^\circ - 10d\,^2D$
						etc. 35 etc.
76.923	A		500.34	661.52	$1\frac{1}{2}-0\frac{1}{2}$	$2p\,^2P^\circ - 11s\,^2S$
76.871	A		500.23	661.52	$0\frac{1}{2}-0\frac{1}{2}$	36
76.897	A		500.30	661.52		$2p\,^2P^\circ - 11d\,^2D$
						etc. 37 etc.
76.505	A		500.34	662.40	$1\frac{1}{2}-0\frac{1}{2}$	$2p\,^2P^\circ - 12s\,^2S$
76.454	A		500.23	662.40	$0\frac{1}{2}-0\frac{1}{2}$	38
76.480	A		500.30	662.40		$2p\,^2P^\circ - 12d\,^2D$
						etc. 39 etc.
76.158	A		500.30	663.08		$2p\,^2P^\circ - 13d\,^2D$
						etc. 40 etc.
75.904	A		500.30	663.63		$2p\,^2P^\circ - 14d\,^2D$
						etc. 41 etc.

N VII – Continued

I A	Ref	Int	E P Low	E P High	J	Multiplet No.
Vac						
75.701	A		500.30	664.07		$2p\,^2P^\circ - 15d\,^2D$
						etc. 42 etc.
133.740	A		500.24	592.24	$0\frac{1}{2}-1\frac{1}{2}$	$2s\,^2S - 3p\,^2P^\circ$
133.787	A		500.24	592.91	$0\frac{1}{2}-0\frac{1}{2}$	43
99.093	A		500.24	625.36	$0\frac{1}{2}-1\frac{1}{2}$	$2s\,^2S - 4p\,^2P^\circ$
99.103	A		500.24	625.34	$0\frac{1}{2}-0\frac{1}{2}$	44
88.482	A		500.24	640.36	$0\frac{1}{2}-1\frac{1}{2}$	$2s\,^2S - 5p\,^2P^\circ$
88.487	A		500.24	640.35	$0\frac{1}{2}-0\frac{1}{2}$	45
83.619	A		500.24	648.51	$0\frac{1}{2}-1\frac{1}{2}$	$2s\,^2S - 6p\,^2P^\circ$
83.621	A		500.24	648.50	$0\frac{1}{2}-0\frac{1}{2}$	46
80.937	A		500.24	653.42	$0\frac{1}{2}-1\frac{1}{2}$	$2s\,^2S - 7p\,^2P^\circ$
80.938	A		500.24	653.42	$0\frac{1}{2}-0\frac{1}{2}$	47
79.286	A		500.24	656.61	$0\frac{1}{2}-1\frac{1}{2}$	$2s\,^2S - 8p\,^2P^\circ$
79.287	A		500.24	656.61	$0\frac{1}{2}-0\frac{1}{2}$	48
78.193	A		500.24	658.80	$0\frac{1}{2}-1\frac{1}{2}$	$2s\,^2S - 9p\,^2P^\circ$
78.132	A		500.24	658.80	$0\frac{1}{2}-0\frac{1}{2}$	49
77.429	A		500.24	660.36	$0\frac{1}{2}-$	$2s\,^2S - 10p\,^2P^\circ$
						50
382.651	A		592.94	625.34	$1\frac{1}{2}-0\frac{1}{2}$	$3p\,^2P^\circ - 4s\,^2S$
382.269	A		592.91	625.34	$0\frac{1}{2}-0\frac{1}{2}$	51
261.510	A		592.94	640.35	$1\frac{1}{2}-0\frac{1}{2}$	$3p\,^2P^\circ - 5s\,^2S$
261.331	A		592.91	640.35	$0\frac{1}{2}-0\frac{1}{2}$	52
223.139	A		592.94	648.50	$1\frac{1}{2}-0\frac{1}{2}$	$3p\,^2P^\circ - 6s\,^2S$
223.009	A		592.91	648.50	$0\frac{1}{2}-0\frac{1}{2}$	53
205.004	A		592.94	653.42	$1\frac{1}{2}-0\frac{1}{2}$	$3p\,^2P^\circ - 7s\,^2S$
204.894	A		592.91	653.42	$0\frac{1}{2}-0\frac{1}{2}$	54
194.732	A		592.94	656.61	$1\frac{1}{2}-0\frac{1}{2}$	$3p\,^2P^\circ - 8s\,^2S$
194.633	A		592.91	656.61	$0\frac{1}{2}-0\frac{1}{2}$	55
188.265	A		592.94	658.80	$1\frac{1}{2}-0\frac{1}{2}$	$3p\,^2P^\circ - 9s\,^2S$
188.173	A		592.91	658.80	$0\frac{1}{2}-0\frac{1}{2}$	56
183.897	A		592.94	660.36	$1\frac{1}{2}-0\frac{1}{2}$	$3p\,^2P^\circ - 10s\,^2S$
183.809	A		592.91	660.36	$0\frac{1}{2}-0\frac{1}{2}$	57
382.136	A		592.91	625.36	$0\frac{1}{2}-1\frac{1}{2}$	$3s\,^2S - 4p\,^2P^\circ$
382.297	A		592.91	625.34	$0\frac{1}{2}-0\frac{1}{2}$	58
261.303	A		592.91	640.36	$0\frac{1}{2}-1\frac{1}{2}$	$3s\,^2S - 5p\,^2P^\circ$
261.342	A		592.91	640.35	$0\frac{1}{2}-0\frac{1}{2}$	59

N VII – Continued

I A	Ref	Int	EP Low	EP High	J	Multiplet No.
Vac						
223.000	A		592.91	648.51	$0\frac{1}{2}-1\frac{1}{2}$	$3s\ ^2S - 6p\ ^2P^\circ$
223.017	A		592.91	648.50	$0\frac{1}{2}-0\frac{1}{2}$	60
204.891	A		592.91	653.42	$0\frac{1}{2}-1\frac{1}{2}$	$3s\ ^2S - 7p\ ^2P^\circ$
204.900	A		592.91	653.42	$0\frac{1}{2}-0\frac{1}{2}$	61
382.445	A		592.95	625.36		$3d\ ^2D - 4f\ ^2F^\circ$
						etc. 62 etc.
261.449	A		592.95	640.36		$3d\ ^2D - 5f\ ^2F^\circ$
						etc. 63 etc.
223.106	A		592.95	648.51		$3d\ ^2D - 6f\ ^2F^\circ$
						etc. 64 etc.
204.980	A		592.95	653.42		$3d\ ^2D - 7f\ ^2F^\circ$
						etc. 65 etc.
194.713	A		592.95	656.61		$3d\ ^2D - 8f\ ^2F^\circ$
						etc. 66 etc.
188.248	A		592.95	658.80		$3d\ ^2D - 9f\ ^2F^\circ$
						etc. 67 etc.
183.881	A		592.95	660.36		$3d\ ^2D - 10f\ ^2F^\circ$
						etc. 68 etc.
826.747	A		625.36	640.35	$1\frac{1}{2}-0\frac{1}{2}$	$4p\ ^2P^\circ - 5s\ ^2S$
825.996	A		625.34	640.35	$0\frac{1}{2}-0\frac{1}{2}$	69
535.584	A		625.36	648.50	$1\frac{1}{2}-0\frac{1}{2}$	$4p\ ^2P^\circ - 6s\ ^2S$
535.269	A		625.34	648.50	$0\frac{1}{2}-0\frac{1}{2}$	70
441.780	A		625.36	653.42	$1\frac{1}{2}-0\frac{1}{2}$	$4p\ ^2P^\circ - 7s\ ^2S$
441.565	A		625.34	653.42	$0\frac{1}{2}-0\frac{1}{2}$	71
396.688	A		625.36	656.61	$1\frac{1}{2}-0\frac{1}{2}$	$4p\ ^2P^\circ - 8s\ ^2S$
396.515	A		625.34	656.61	$0\frac{1}{2}-0\frac{1}{2}$	72
370.745	A		625.36	658.80	$1\frac{1}{2}-0\frac{1}{2}$	$4p\ ^2P^\circ - 9s\ ^2S$
370.594	A		625.34	658.80	$0\frac{1}{2}-0\frac{1}{2}$	73
354.178	A		625.36	660.36	$1\frac{1}{2}-0\frac{1}{2}$	$4p\ ^2P^\circ - 10s\ ^2S$
354.040	A		625.34	660.36	$0\frac{1}{2}-0\frac{1}{2}$	74
826.385	A		625.36	640.36		$4d\ ^2D - 5f\ ^2F^\circ$
						etc. 75 etc.
535.510	A		625.36	648.51		$4d\ ^2D - 6f\ ^2F^\circ$
						etc. 76 etc.
441.753	A		625.36	653.42		$4d\ ^2D - 7f\ ^2F^\circ$
						etc. 77 etc.

N VII – Continued

I A	Ref	Int	EP Low	EP High	J	Multiplet No.
Vac						
396.677	A		625.36	656.61		$4d\ ^2D - 8f\ ^2F^\circ$
						etc. 78 etc.
370.741	A		625.36	658.80		$4d\ ^2D - 9f\ ^2F^\circ$
						etc. 79 etc.
354.177	A		625.36	660.36		$4d\ ^2D - 10f\ ^2F^\circ$
						etc. 80 etc.
1522.024	A		640.36	648.50	$1\frac{1}{2}-0\frac{1}{2}$	$5p\ ^2P^\circ - 6s\ ^2S$
1520.704	A		640.35	648.50	$0\frac{1}{2}-0\frac{1}{2}$	81
949.244	A		640.36	653.42	$1\frac{1}{2}-0\frac{1}{2}$	$5p\ ^2P^\circ - 7s\ ^2S$
948.731	A		640.35	653.42	$0\frac{1}{2}-0\frac{1}{2}$	82
762.910	A		640.36	656.61	$1\frac{1}{2}-0\frac{1}{2}$	$5p\ ^2P^\circ - 8s\ ^2S$
762.579	A		640.35	656.61	$0\frac{1}{2}-0\frac{1}{2}$	83
672.418	A		640.36	658.80	$1\frac{1}{2}-0\frac{1}{2}$	$5p\ ^2P^\circ - 9s\ ^2S$
672.160	A		640.35	658.80	$0\frac{1}{2}-0\frac{1}{2}$	84
619.832	A		640.36	660.36	$1\frac{1}{2}-0\frac{1}{2}$	$5p\ ^2P^\circ - 10s\ ^2S$
619.613	A		640.35	660.36	$0\frac{1}{2}-0\frac{1}{2}$	85
1521.41	A		640.36	648.51		$5d\ ^2D - 6f\ ^2F^\circ$
						etc. 86 etc.
949.134	A		640.36	653.42		$5d\ ^2D - 7f\ ^2F^\circ$
						etc. 87 etc.
762.884	A		640.36	656.61		$5d\ ^2D - 8f\ ^2F^\circ$
						etc. 88 etc.
Vac						
672.420	A		640.36	658.80		$5d\ ^2D - 9f\ ^2F^\circ$
						etc. 89 etc.
619.844	A		640.36	660.36		$5d\ ^2D - 10f\ ^2F^\circ$
						etc. 90 etc.
Air						
2523.601	A		648.51	653.42	$1\frac{1}{2}-0\frac{1}{2}$	$6p\ ^2P^\circ - 7s\ ^2S$
2521.500	A		648.50	653.42	$0\frac{1}{2}-0\frac{1}{2}$	91
Vac						
1530.362	A		648.51	656.61	$1\frac{1}{2}-0\frac{1}{2}$	$6p\ ^2P^\circ - 8s\ ^2S$
1529.590	A		648.50	656.61	$0\frac{1}{2}-0\frac{1}{2}$	92
1205.052	A		648.51	658.80	$1\frac{1}{2}-0\frac{1}{2}$	$6p\ ^2P^\circ - 9s\ ^2S$
1204.573	A		648.50	658.80	$0\frac{1}{2}-0\frac{1}{2}$	93
1046.014	A		648.51	660.36	$1\frac{1}{2}-0\frac{1}{2}$	$6p\ ^2P^\circ - 10s\ ^2S$
1045.653	A		648.50	660.36	$0\frac{1}{2}-0\frac{1}{2}$	94