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Selected Tables of Atomic Spectra

Atomic Energy Levels and Multiplet Tables

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

U.S. 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.

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Nitrogen:	7		
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		N V.....	B7 v 1 to B7 v 4
		N VI.....	B7 VI 1 to B7 VI 1
		N VII.....	B7 VII 1 to B7 VII 3

NSRDS-NBS 3, SECTION 4

NITROGEN. $Z = 7$

A N IV Atomic Energy Levels

B N IV Multiplet Table

Atomic Energy Levels

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 $\pm$ 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 $624864.7 \pm 2 \text{ cm}^{-1}$ 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

Atomic Energy Levels

NIV

NIV

Config.	Desig.	<i>J</i>	Level	Interval	Config.	Desig.	<i>J</i>	Level	Interval
$2s^2$	$2s^2\ ^1S$	0	0.0		$2p(^2P^\circ)3d$	$3d'\ ^3D^\circ$	1	505554.0	
$2s(^2S)2p$	$2p\ ^3P^\circ$	0	67209.2	63.1			2	505588.2	34.2
		1	67272.3	144.0			3	505630.6	42.4
		2	67416.3		$2p(^2P^\circ_{1/2})3d$	$3d'\ ^1F^\circ$	3	506284.8	
$2s(^2S)2p$	$2p\ ^1P^\circ$	1	130693.9		$2s(^2S)4p$	$4p\ ^1P^\circ$	1	507027.9	
$2p^2$	$2p^2\ ^3P$	0	175535.4	72.7	$2s(^2S)4d$	$4d\ ^3D$	1	511440	6
		1	175608.1	124.8			2	511446	2
		2	175732.9				3	511448.0	
$2p^2$	$2p^2\ ^1D$	2	188882.5		$2p(^2P^\circ_{1/2})3d$	$3d'\ ^3P^\circ$	2	511509.3	-51.1
$2p^2$	$2p^2\ ^1S$	0	235369.3				1	511560.4	-30.8
							0	511591.2	
$2s(^2S)3s$	$3s\ ^3S$	1	377284.8		$2s(^2S)4d$	$4d\ ^1D$	2	514647.7	
$2s(^2S)3s$	$3s\ ^1S$	0	388854.6		$2p(^2P^\circ_{1/2})3p$	$3p'\ ^1S$	0	515569.8	
$2s(^2S)3p$	$3p\ ^1P^\circ$	1	404522.4		$2s(^2S)4f$	$4f\ ^3F^\circ$	2	516552.6	8.2
$2s(^2S)3p$	$3p\ ^3P^\circ$	0	405971.6	15.9			3	516560.8	11.2
		1	405987.5	35.3			4	516572.0	
		2	406022.8		$2p(^2P^\circ_{1/2})3d$	$3d'\ ^1P^\circ$	1	518610.5	
$2s(^2S)3d$	$3d\ ^3D$	1	420045.8		$2s(^2S)4f$	$4f\ ^1F^\circ$	3	521862.8	
		2	420049.6	3.8					
		3	420058.0	8.4	$2s(^2S)5s$	$5s\ ^3S$	1	544813.4	
$2s(^2S)3d$	$3d\ ^1D$	2	429159.6		$2s(^2S)5s$	$5s\ ^1S$	0	546731.3	
$2p(^2P^\circ)3s$	$3s'\ ^3P^\circ$	0	465291.8	79.2	$2s(^2S)5p$	$5p\ ^1P^\circ$	1	550232.6	
		1	465371.0	165.6					
		2	465536.6		$2s(^2S)5d$	$5d\ ^3D$	1, 2	552789.6	1.3
$2p(^2P^\circ_{1/2})3s$	$3s'\ ^1P^\circ$	1	473029.3				3	552790.9	
$2p(^2P^\circ_{0/2})3p$	$3p'\ ^1P$	1	480884.2		$2s(^2S)5d$	$5d\ ^1D$	2	554300.7	
$2p(^2P^\circ)3p$	$3p'\ ^3D$	1	484498.2	96.7	$2s(^2S)5g$	$5g\ ^1G$	4	554339.1	
		2	484594.9	151.3	$2s(^2S)5g$	$5g\ ^3G$	3, 4, 5	554339.7	
		3	484746.2		$2s(^2S)5f$	$5f\ ^3F^\circ$	2, 3, 4	554571.8	
$2s(^2S)4s$	$4s\ ^3S$	1	487607.4		$2s(^2S)5f$	$5f\ ^1F^\circ$	3	554995.7	
$2p(^2P^\circ)3p$	$3p'\ ^3P$	0	494253.1	56.1	$2s(^2S)6s$	$6s\ ^3S$	1	570381.3	
		1	494309.2	92.8					
		2	494402.0		$2s(^2S)6s$	$6s\ ^1S$	0	571172.1	
$2s(^2S)4s$	$4s\ ^1S$	0	495057.7		$2s(^2S)6p$	$6p\ ^1P^\circ$	1	572731.1	
$2p(^2P^\circ)3d$	$3d'\ ^3F^\circ$	2	495406.2	76.4	$2s(^2S)6d$	$6d\ ^3D$	1, 2, 3	575030.5	
		3	495482.6	103.1					
		4	495585.7		$2s(^2S)6g$	$6g\ ^1G$	4	575807.9	
$2p(^2P^\circ_{1/2})3p$	$3p'\ ^3S$	1	498045.5		$2s(^2S)6g$	$6g\ ^3G$	3, 4, 5	575809.4	
$2p(^2P^\circ_{0/2})3d$	$3d'\ ^1D^\circ$	2	498310.3		$2s(^2S)6d$	$6d\ ^1D$	2	575872.4	
$2p(^2P^\circ_{1/2})3p$	$3p'\ ^1D$	2	499705.9		$2s(^2S)6f$	$6f\ ^1F^\circ$	3	575999.3	
$2s(^2S)4p$	$4p\ ^3P^\circ$	2	503680.4	-11.5	$2s(^2S)6h$	$6h^{1,3}H^\circ$	4, 5, 5, 6	576042.9	
		1	503691.9	-7.9					
		0	503699.8						

Atomic Energy Levels

NIV – Continued

NIV – Continued

Config.	Desig.	<i>J</i>	Level	Interval	Config.	Desig.	<i>J</i>	Level	Interval
$2p(^2P^{\circ})4s$	$4s' ^3P^{\circ}$	0 1 2	577957.8 578045.4 578210.6	87.6 165.2	$2s(^2S)9d$	$9d ^3D$	1, 2, 3	602865.7	
$2p(^2P^{\circ}_{1/2})4s$	$4s' ^1P^{\circ}$	1	580817.5		$2s(^2S)9d$	$9d ^1D$	2	603107.3	
$2p(^2P^{\circ}_{3/2})4p$	$4p' ^1P$	1	584661.6		$2s(^2S)10s$	$10s ^3S$	1	606142.6	
$2s(^2S)7s$	$7s ^3S$	1	584977.1		$2s(^2S)10p$	$10p ^1P^{\circ}$	1	606818.2	
$2s(^2S)7s$	$7s ^1S$	0	584983.3		$2s(^2S)10d$	$10d ^3D$	1, 2, 3	607064.2	
$2p(^2P^{\circ})4p$	$4p' ^3D$	1 2 3	585709.5 585798.1 585929.8	88.6 131.7	$2s(^2S)10d$	$10d ^1D$	2	607242.9'	
$2s(^2S)7p$	$7p ^1P^{\circ}$	1	587979.4		$2s(^2S)11s$	$11s ^3S$	1	609465.8	
$2s(^2S)7d$	$7d ^3D$	1, 2, 3	588382.6		$2s(^2S)11p$	$11p ^1P^{\circ}$	1	609945.8	
$2p(^2P^{\circ}_{3/2})4d$	$4d' ^1D^{\circ}$	2	588689.0		$2s(^2S)11d$	$11d ^3D$	1, 2, 3	610166.0	
$2p(^2P^{\circ})4p$	$4p' ^3P$	0 1 2	588790.1 588991.2 589059.3	201.1 68.1	$2s(^2S)11d$	$11d ^1D$	2	610287.2	
$2s(^2S)7d$	$7d ^1D$	2	588884.0		$2s(^2S)12p$	$12p ^1P^{\circ}$	1	612328.6	
$2s(^2S)7h$	$7h^{1,3}H^{\circ}$	4, 5, 5, 6	588994.3		$2s(^2S)12d$	$12d ^3D$	1, 2, 3	612525.1	
$2s(^2S)7i$	$7i^{1,3}I$	5, 6, 6, 7	589021.4		$2s(^2S)12d$	$12d ^1D$	2	612621.6	
$2p(^2P^{\circ}_{1/2})4d$	$4d' ^1F^{\circ}$	3	591047.8		$2s(^2S)13p$	$13p ^1P^{\circ}$	1	614190.3	
$2p(^2P^{\circ}_{1/2})4p$	$4p' ^1D$	2	591060.9		$2s(^2S)13d$	$13d ^3D$	1, 2, 3	614380.6	
$2p(^2P^{\circ})4d$	$4d' ^3D^{\circ}$	1 2 3	593690.0 593713.7 593772.1	23.7 58.4	$2s(^2S)13d$	$13d ^1D$	2	614470.5	
$2p(^2P^{\circ}_{1/2})4p$	$4p' ^1S$	0	594182.6		$2s(^2S)14d$	$14d ^3D$	1, 2, 3	615894.4	
$2p(^2P^{\circ})4d$	$4d' ^3P^{\circ}$	2 1 0	594489.9 594547.7 594573.8	— 57.8 — 26.1	$2s(^2S)15d$	$15d ^3D$	1, 2, 3	617038.7	
$2p(^2P^{\circ}_{1/2})4p$	$4p' ^3S$	1	595296.3		N V ($^2S_{01/2}$)	Limit		624866 ± 3	
$2s(^2S)8s$	$8s ^1S$	0	596150.1		$2p(^2P^{\circ})5s$	$5s' ^3P^{\circ}$	0 1 2	626355.0 626445.3 626611.9	90.3 166.6
$2s(^2S)8p$	$8p ^1P^{\circ}$	1	596270.9		$2p(^2P^{\circ}_{1/2})5s$	$5s' ^1P^{\circ}$	1	628546.9	
$2s(^2S)8d$	$8d ^3D$	1, 2, 3	597026.8		$2p(^2P^{\circ}_{3/2})5p$	$5p' ^1P$	1	629845.3	
$2s(^2S)8d$	$8d ^1D$	2	597349.1		$2p(^2P^{\circ})5p$	$5p' ^3D$	1 2 3	630268.8 630333.6 630473.0	64.8 139.4
$2s(^2S)8s$	$8s ^3S$	1	597481.6		$2p(^2P^{\circ})5p$	$5p' ^3P$	0 1 2	631807.7 631868.2	60.5
$2p(^2P^{\circ}_{1/2})4d$	$4d' ^1P^{\circ}$	1	598538.2		$2p(^2P^{\circ})5d$	$5d' ^3D^{\circ}$	1 2 3	634158.4 634182.8 634263.4	24.4 80.6
$2s(^2S)9s$	$9s ^3S$	1	601621.5		$2p(^2P^{\circ})5d$	$5d' ^3P^{\circ}$	0, 1, 2	634669.5	
$2s(^2S)9p$	$9p ^1P^{\circ}$	1	602609.3		$2p(^2P^{\circ}_{1/2})5d$	$5d' ^1P^{\circ}$	1	636467	

Atomic Energy Levels

N IV — Continued

N IV — Continued

Config.	Desig.	<i>J</i>	Level	Interval	Config.	Desig.	<i>J</i>	Level	Interval
$2p(^2P^\circ)6s$	$6s' ^3P^\circ$	0 1 2	651590.1 651671.8 651859.9	81.7 188.1	$2p(^2P^\circ)8d$	$8d' ^3P^\circ$	0, 1, 2	678025.9	
$2p(^2P^\circ_{01/2})6p$	$6p' ^1P$	1	653629.9		$2p(^2P^\circ_{11/2})8d$	$8d' ^1P^\circ$	1	678355	
$2p(^2P^\circ)6p$	$6p' ^3D$	1 2 3	653909.4 654053.9	144.5	$2p(^2P^\circ)9s$	$9s' ^3P^\circ$	0 1 2	682464.8	
$2p(^2P^\circ)6p$	$6p' ^3P$	0, 1, 2	654791.3		$2p(^2P^\circ)9p$	$9p' ^3D$	1 2 3	683092.7	
$2p(^2P^\circ_{11/2})6d$	$6d' ^1F^\circ$	3	655270.0		$2p(^2P^\circ)9p$	$9p' ^3P$	0, 1, 2	683278.4	
$2p(^2P^\circ_{11/2})6p$	$6p' ^1D$	2	655284.1		$2p(^2P^\circ_{11/2})9p$	$9p' ^1D$	2	683399.9	
$2p(^2P^\circ)6d$	$6d' ^3D^\circ$	1 2 3	656043.6 656074.7 656155.7	31.1 81.0	$2p(^2P^\circ)9d$	$9d' ^3D^\circ$	1, 2, 3	683692.6	
$2p(^2P^\circ)6d$	$6d' ^3P^\circ$	0, 1, 2	656349.6		$2p(^2P^\circ)9d$	$9d' ^3P^\circ$	0, 1, 2	683857.8	
$2p(^2P^\circ_{11/2})6d$	$6d' ^1P^\circ$	1	657392		$2p(^2P^\circ_{11/2})9d$	$9d' ^1P^\circ$	1	684015	
$2p(^2P^\circ)7s$	$7s' ^3P^\circ$	0 1 2	666458.2 666665.4	207.2	$2p(^2P^\circ)10s$	$10s' ^3P^\circ$	0 1 2	686954.2	
$2p(^2P^\circ_{01/2})7p$	$7p' ^1P$	1	667698.9		$2p(^2P^\circ)10p$	$10p' ^3D$	1 2 3	687432.9	
$2p(^2P^\circ)7p$	$7p' ^3D$	1 2 3	667872.6 668031.3	158.7	$2p(^2P^\circ)10p$	$10p' ^3P$	0, 1, 2	687548.3	
$2p(^2P^\circ)7p$	$7p' ^3P$	0, 1, 2	668460.9		$2p(^2P^\circ_{11/2})10p$	$10p' ^1D$	2	687629.4	
$2p(^2P^\circ_{11/2})7p$	$7p' ^1D$	2	668753.5		$2p(^2P^\circ)10d$	$10d' ^3D^\circ$	1, 2, 3	687875.8	
$2p(^2P^\circ)7d$	$7d' ^3D^\circ$	1, 2, 3	669328.5		$2p(^2P^\circ)10d$	$10d' ^3P^\circ$	0, 1, 2	688022.7	
$2p(^2P^\circ)7d$	$7d' ^3P^\circ$	0, 1, 2	669596.6		$2p(^2P^\circ_{11/2})10d$	$10d' ^1P^\circ$	1	688094	
$2p(^2P^\circ_{11/2})7d$	$7d' ^1P^\circ$	1	670086		$2p(^2P^\circ)11p$	$11p' ^3P$	0, 1, 2	690659.5	
$2p(^2P^\circ)8s$	$8s' ^3P^\circ$	0 1 2	676090.7		$2p(^2P^\circ_{11/2})11p$	$11p' ^1D$	2	690770.5	
$2p(^2P^\circ_{01/2})8p$	$8p' ^1P$	1	676706.4		$2p(^2P^\circ)11d$	$11d' ^3D^\circ$	1, 2, 3	690976.4	
$2p(^2P^\circ)8p$	$8p' ^3D$	1 2 3	676994.0		$2p(^2P^\circ)12p$	$12p' ^3P$	0, 1, 2	693069.3	
$2p(^2P^\circ)8p$	$8p' ^3P$	0, 1, 2	677276.5		$2p(^2P^\circ)13p$	$13p' ^3P$	0, 1, 2	694902.7	
$2p(^2P^\circ_{11/2})8p$	$8p' ^1D$	2	677458.7		$2p(^2P^\circ)13d$	$13d' ^3D^\circ$	1, 2, 3	695124.4	
$2p(^2P^\circ)8d$	$8d' ^3D^\circ$	1, 2, 3	677844.3						
					N v($2p^2P^\circ_{01/2}$)	Limit		705327.9	259.7
					N v($2p^2P^\circ_{11/2}$)	Limit		705586.6	

October 1970.

Atomic Energy Levels

N IV Observed Terms

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

Multiplet Table

Part B

NITROGEN

N IV ($Z = 7$)

I P 77.472 eV Limit $628466 \pm 3 \text{ cm}^{-1}$ 160.034 Å (Vac)

Anal A List A October 1970

REFERENCES

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

A R. Hallin, *Ark. Fys. (Stockholm)* **32**, No. 11, 201-210 (1966). I P, T, C L, I; W L, 300 Å-7702 Å

B D. J. Michels, *J. Opt. Soc. Am.* **61**, No. 5, 625-631 (1971), and private communication regarding intensity estimates.
T, CL, G D, Theory(I); W L, 159Å-463Å

C B. Edlén, *Nova Acta Reg. Soc. Sci. Uppsala [IV]* **9**, No. 6, 62-65 (1934). T, C L, I; W L, 181 Å-7127 Å

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

Multiplet Table

N IV—Continued

N IV—Continued

I A	Ref	Int	E P		J	Multiplet No.	I A	Ref	Int	E P		J	Multiplet No.
			Low	High						Low	High		
Vac							Vac						
167.074	P		0.00	74.21	0-1	$2s^2\ ^1S - 4d'\ ^1P^\circ$ UV 2.11	234.195	C	(600w)*	8.36	61.30	2-2	$2p\ ^3P^\circ - 3p'\ ^3P$
							234.172	P		8.34	61.28	1-1	UV 5.05
165.945	B	(50)	0.00	74.71	0-1	$2s^2\ ^1S - 9p\ ^1P^\circ$ UV 2.12	234.249	C	(600w)*	8.36	61.28	2-1	
							234.203	P		8.34	61.28	1-0	
							234.124	C	(600w)*	8.34	61.30	1-2	
164.794	B	(30)	0.00	75.23	0-1	$2s^2\ ^1S - 10p\ ^1P^\circ$ UV 2.13	233.762	P		8.34	61.38	1-0	$2p\ ^3P^\circ - 4s\ ^1S$ UV 5.06
163.949	B	(10d)	0.00	75.62	0-1	$2s^2\ ^1S - 11p\ ^1P^\circ$ UV 2.14	232.223	B	(200)	8.36	61.75	2-1	$2p\ ^3P^\circ - 3p'\ ^3S$
							232.145	B	(150)	8.34	61.75	1-1	UV 5.07
							232.112	B	(100)	8.33	61.75	0-1	
163.311	B	(1d)	0.00	75.92	0-1	$2s^2\ ^1S - 12p\ ^1P^\circ$ UV 2.15	231.326	P		8.36	61.95	2-2	$2p\ ^3P^\circ - 3p'\ ^1D$
							231.249	P		8.34	61.95	1-2	UV 5.08
162.816	B	(1d)	0.00	76.15	0-1	$2s^2\ ^1S - 13p\ ^1P^\circ$ UV 2.16	225.212	B	(800)	8.36	63.41	2-3	$2p\ ^3P^\circ - 4d\ ^3D$
							225.142	B	(800w)*	8.34	63.41	1-2	UV 6
							225.110	B		8.33	63.41	0-1	
923.220	A	16	8.36	21.79	2-2	$2p\ ^3P^\circ - 2p^2\ ^3P$	223.598	P		8.36	63.81	2-2	$2p\ ^3P^\circ - 4d\ ^1D$
923.057	A	14-	8.34	21.77	1-1	UV 3	223.526	P		8.34	63.81	1-2	UV 6.01
924.283	A	14+	8.36	21.77	2-1								
923.675	A	14	8.34	21.76	1-0		223.066	P		8.34	63.92	1-0	$2p\ ^3P^\circ - 3p'\ ^1S$ UV 6.02
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	$2p\ ^3P^\circ - 2p^2\ ^1D$	209.471	B	(400w)*	8.36	67.55	2-1	$2p\ ^3P^\circ - 5s\ ^3S$
822.299	P		8.34	23.42	1-2	UV 3.01	209.407	B		8.34	67.55	1-1	UV 6.03
							209.378	B		8.33	67.55	0-1	
594.895	P		8.34	29.18	1-0	$2p\ ^3P^\circ - 2p^2\ ^1S$ UV 3.02	206.028	B	(500)	8.36	68.54	2-3	$2p\ ^3P^\circ - 5d\ ^3D$
							205.968	B	(500w)*	8.34	68.54	1-2	UV 6.04
							205.940	B		8.33	68.54	0-1	
322.722	B	9	8.36	46.78	2-1	$2p\ ^3P^\circ - 3s\ ^3S$							
322.572	B	8	8.34	46.78	1-1	UV 4	198.821	B	(300)	8.36	70.72	2-1	$2p\ ^3P^\circ - 6s\ ^3S$
322.506	B	7	8.33	46.78	0-1		198.764	B	(250w)*	8.34	70.72	1-1	UV 6.05
							198.740	B		8.33	70.72	0-1	
310.962	P		8.34	48.21	1-0	$2p\ ^3P^\circ - 3s\ ^1S$ UV 4.01	197.000	B	(400)	8.36	71.29	2-	$2p\ ^3P^\circ - 6d\ ^3D$
							196.944	B	(400w)*	8.34	71.29	1-	UV 6.06
283.583	B	12	8.36	52.08	2-3	$2p\ ^3P^\circ - 3d\ ^3D$	196.921	B		8.33	71.29	0-1	
283.476	B	11	8.34	52.08	1-2	UV 5							
283.419	B	10	8.33	52.08	0-1		193.214	B	(350)	8.36	72.53	2-1	$2p\ ^3P^\circ - 7s\ ^3S$
							193.160	B	(300w)*	8.34	72.53	1-1	UV 6.07
276.439	P		8.36	53.21	2-2	$2p\ ^3P^\circ - 3d\ ^1D$	193.139	B		8.33	72.53	0-1	
276.329	P		8.34	53.21	1-2	UV 5.01							
241.857	P		8.36	59.62	2-1	$2p\ ^3P^\circ - 3p'\ ^1P$	192.859	B	(400w)*	8.36	72.64	2-3	$2p\ ^3P^\circ - 4p'\ ^3D$
241.773	P		8.34	59.62	1-1	UV 5.02	192.908	B		8.36	72.63	2-2	UV 6.08
241.736	P		8.33	59.62	0-1		192.888	B		8.34	72.62	1-1	
							192.941	B		8.36	72.62	2-1	
239.616	B	(500w)	8.36	60.10	2-3	$2p\ ^3P^\circ - 3p'\ ^3D$	191.951	B	(350)	8.36	72.95	2-	$2p\ ^3P^\circ - 7d\ ^3D$
239.632	B		8.34	60.08	1-2	UV 5.03	191.898	B	(350w)*	8.34	72.95	1-	UV 6.09
239.659	B		8.33	60.07	0-1		191.868	B		8.33	72.95	0-1	
239.708	B	(400w)*	8.36	60.08	2-2								
239.679	B		8.34	60.07	1-1		191.702	B	(400w)*	8.36	73.03	2-2	$2p\ ^3P^\circ - 4p'\ ^3P$
239.763	B		8.36	60.07	2-1		191.676	B		8.34	73.02	1-1	UV 6.10
							191.727	B		8.36	73.02	2-1	
							191.748	B		8.34	73.00	1-0	
237.991	B	(500)	8.36	60.45	2-1	$2p\ ^3P^\circ - 4s\ ^3S$	*191.651	B		8.34	73.03	1-2	
237.908	B	(400w)*	8.34	60.45	1-1	UV 5.04	*191.651	B		8.33	73.02	0-1	
237.873	B		8.33	60.45	0-1								

Multiplet Table

N IV—Continued

N IV—Continued

I A	Ref	Int	E P		J	Multiplet No.	I A	Ref	Int	E P		J	Multiplet No.
			Low	High						Low	High		
Vac							Vac						
189.437	B	(10)	8.36	73.81	2-1	$2p\ ^3P^{\circ}-4p'\ ^3S$	166.496	B	(20)	8.36	82.82	2-3	$2p\ ^3P^{\circ}-7p'\ ^3D$
189.386	B	(5)	8.34	73.81	1-1	UV 6.11	166.540	B	(75)	8.36	82.80	2-2	UV 6.28
189.365	B	(1)	8.33	73.81	0-1								
188.818	B	(300)	8.36	74.02	2-	$2p\ ^3P^{\circ}-8d\ ^3D$	166.377	B	(20)	8.36	82.88	2-2	$2p\ ^3P^{\circ}-7p'\ ^3P$
188.762	B}	(300w)*	8.34	74.02	1-	UV 6.12	166.337	B	(10)	8.34	82.88	1-2	UV 6.29
188.743	B}		8.33	74.02	0-1		164.048	B	(50)	8.36	83.93	2-3	$2p\ ^3P^{\circ}-8p'\ ^3D$
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	163.972	B	(2)	8.36	83.97	2-2	$2p\ ^3P^{\circ}-8p'\ ^3P$
188.583	B}		8.33	74.08	0-1								UV 6.31
187.194	B	(20)	8.36	74.59	2-1	$2p\ ^3P^{\circ}-9s\ ^3S$	162.423	B	(10)	8.36	84.69	2-3	$2p\ ^3P^{\circ}-9p'\ ^3D$
187.142	B	(10)	8.34	74.59	1-1	UV 6.14							UV 6.32
187.123	B	(10)	8.33	74.59	0-1		162.374	B	(2)	8.36	84.71	2-2	$2p\ ^3P^{\circ}-9p'\ ^3P$
186.759	B	(300d)	8.36	74.74	2-	$2p\ ^3P^{\circ}-9d\ ^3D$							UV 6.33
186.709	B}	(250d)*	8.34	74.74	1-	UV 6.15	161.286	B	(2d)	8.36	85.23	2-3	$2p\ ^3P^{\circ}-10p'\ ^3D$
186.690	B}		8.33	74.74	0-1								UV 6.34
185.623	B	(5)	8.36	75.15	2-1	$2p\ ^3P^{\circ}-10s\ ^3S$	161.256	B	(2d)	8.36	85.24	2-2	$2p\ ^3P^{\circ}-10p'\ ^3P$
185.568	B	(3)	8.34	75.15	1-1	UV 6.16							UV 6.35
185.306	B	(200d)	8.36	75.26	2-	$2p\ ^3P^{\circ}-10d\ ^3D$	160.451	B	(1d)	8.36	85.63	2-	$2p\ ^3P^{\circ}-11p'\ ^3P$
185.257	B}	(150d)*	8.34	75.26	1-	UV 6.17							UV 6.36
185.237	B}		8.33	75.26	0-1		159.833	B	(1d)	8.36	85.93	2-	$2p\ ^3P^{\circ}-12p'\ ^3P$
184.485	B	(2)	8.36	75.56	2-1	$2p\ ^3P^{\circ}-11s\ ^3S$							UV 6.37
184.437	B	(1)	8.34	75.56	1-1	UV 6.18	159.366	B	(1d)	8.36	86.15	2-	$2p\ ^3P^{\circ}-13p'\ ^3P$
184.247	B}	(75d)*	8.36	75.65	2-	$2p\ ^3P^{\circ}-11d\ ^3D$							UV 6.38
184.200	B}		8.34	75.65	1-	UV 6.19							
183.450	B}	(50d)*	8.36	75.94	2-	$2p\ ^3P^{\circ}-12d\ ^3D$	Air						
183.402	B}		8.34	75.94	1-	UV 6.20	2219.61	P		16.20	21.79	1-2	$2p\ ^1P^{\circ}-2p^2\ ^3P$
182.827	B	(30d)	8.36	76.17	2-	$2p\ ^3P^{\circ}-13d\ ^3D$	2225.78	P		16.20	21.77	1-1	UV 6.39
182.779	P		8.34	76.17	1-	UV 6.21	2229.38	P		16.20	21.76	1-0	
182.323	B	(20d)	8.36	76.36	2-	$2p\ ^3P^{\circ}-14d\ ^3D$	Vac						
182.275	P		8.34	76.36	1-	UV 6.22	1718.551	A	20	16.20	23.42	1-2	$2p\ ^1P^{\circ}-2p^2\ ^1D$
181.943	B	(10d)	8.36	76.50	2-	$2p\ ^3P^{\circ}-15d\ ^3D$							UV 7
181.895			8.34	76.50	1-	UV 6.23	955.335	A	20	16.20	29.18	1-0	$2p\ ^1P^{\circ}-2p^2\ ^1S$
177.602	B	(100w)*	8.36	78.17	2-3	$2p\ ^3P^{\circ}-5p'\ ^3D$							UV 8
177.646	B	(250)	8.36	78.15	2-2	UV 6.24	405.530	P		16.20	46.78	1-1	$2p\ ^1P^{\circ}-3s\ ^3S$
177.621	B	(100w)*	8.34	78.14	1-1								UV 8.01
177.163	B	(200)	8.36	78.34	2-2	$2p\ ^3P^{\circ}-5p'\ ^3P$	387.353	C	4	16.20	48.21	1-0	$2p\ ^1P^{\circ}-3s\ ^1S$
177.142	B}	(100w)*	8.34	78.33	1-1	UV 6.25							UV 9
177.182	B}		8.36	78.33	2-1		345.595	P		16.20	52.08	1-2	$2p\ ^1P^{\circ}-3d\ ^3D$
177.119	B}		8.34	78.34	1-2		345.600	P		16.20	52.08	1-1	UV 9.01
170.463	B	(50)	8.36	81.09	2-3	$2p\ ^3P^{\circ}-6p'\ ^3D$	335.052	B	11	16.20	53.21	1-2	$2p\ ^1P^{\circ}-3d\ ^1D$
170.505	B	(100)	8.36	81.07	2-2	UV 6.26							UV 10
170.249	B	(100)	8.36	81.18	2-2	$2p\ ^3P^{\circ}-6p'\ ^3P$	285.561	B	(600)	16.20	59.62	1-1	$2p\ ^1P^{\circ}-3p'\ ^1P$
170.208	B	(50)	8.34	81.18	1-2	$2p\ ^3P^{\circ}-6p'\ ^3P$							UV 11

Multiplet Table

N IV — Continued

N IV — Continued

I A	Ref	Int	E P		J	Multiplet No.	I A	Ref	Int	E P		J	Multiplet No.
			Low	High						Low	High		
Vac							Vac						
282.565	P		16.20	60.08	1-2	2p ¹ P° — 3p' ³ D	209.842	B	(150w)	16.20	75.29	1-2	2p ¹ P° — 10d ¹ D
282.642	P		16.20	60.07	1-1	UV 11.01							UV 12.16
280.180	P		16.20	60.45	1-1	2p ¹ P° — 4s ³ S	208.510	B	(100d)	16.20	75.66	1-2	2p ¹ P° — 11d ¹ D
						UV 11.02							UV 12.17
274.946	P		16.20	61.30	1-2	2p ¹ P° — 3p' ³ P	207.500	B	(20d)	16.20	75.95	1-2	2p ¹ P° — 12d ¹ D
275.016			16.20	61.28	1-1	UV 11.03							UV 12.18
275.058			16.20	61.28	1-0								
274.451	B	(250)	16.20	61.38	1-0	2p ¹ P° — 4s ¹ S	206.707	B	(10d)	16.20	76.18	1-2	2p ¹ P° — 13d ¹ D
						UV 11.04							UV 12.19
272.219	P		16.20	61.75	1-1	2p ¹ P° — 3p' ³ S	200.340	B	(300)	16.20	78.09	1-1	2p ¹ P° — 5p' ¹ P
						UV 11.05							UV 12.20
270.994	B	(650)	16.20	61.95	1-2	2p ¹ P° — 3p' ¹ D	191.228	B	(100)	16.20	81.04	1-1	2p ¹ P° — 6p' ¹ P
						UV 12							UV 12.21
262.638	P		16.20	63.41	1-2	2p ¹ P° — 4d ³ D	190.625	B	(200)	16.20	81.24	1-2	2p ¹ P° — 6p' ¹ D
262.642	P		16.20	63.41	1-1	UV 12.01							UV 12.22
260.447	B	(600)	16.20	63.81	1-2	2p ¹ P° — 4d ¹ D	186.218	B	(50)	16.20	82.78	1-2	2p ¹ P° — 7p' ¹ P
						UV 12.02							UV 12.23
259.824	B	(450)	16.20	63.92	1-0	2p ¹ P° — 3p' ¹ S	185.853	B	(75)	16.20	82.91	1-2	2p ¹ P° — 7p' ¹ D
						UV 12.03							UV 12.24
240.363	B	(200)	16.20	67.78	1-0	2p ¹ P° — 5s ¹ S	183.146	B	(5d)	16.20	83.90	1-1	2p ¹ P° — 8p' ¹ P
						UV 12.04							UV 12.25
236.068	B	(550)	16.20	68.72	1-2	2p ¹ P° — 5d ¹ D	182.894	B	(10)	16.20	83.99	1-2	2p ¹ P° — 8p' ¹ D
						UV 12.05							UV 12.26
227.026	B	(100)	16.20	70.81	1-0	2p ¹ P° — 6s ¹ S	180.928	B	(5)	16.20	84.73	1-2	2p ¹ P° — 9p' ¹ D
						UV 12.06							UV 12.27
224.629	B	(450w)	16.20	71.40	1-2	2p ¹ P° — 6d ¹ D	179.554	B	(2)	16.20	85.25	1-2	2p ¹ P° — 10p' ¹ D
						UV 12.07							UV 12.28
220.280	B	(400)	16.20	72.49	1-1	2p ¹ P° — 4p' ¹ P	178.547	B	(1)	16.20	85.64	1-2	2p ¹ P° — 11p' ¹ D
						UV 12.08							UV 12.29
220.124	B	(50)	16.20	72.53	1-0	2p ¹ P° — 7s ¹ S							
						UV 12.09							
218.250	B	(400)	16.20	73.01	1-2	2p ¹ P° — 7d ¹ D	437.083	P		21.79	50.15	2-1	2p ² ³ P — 3p ¹ P°
						UV 12.10	436.845	P		21.77	50.15	1-1	UV 12.30
							436.706	P		21.76	50.15	0-1	
217.218	B	(500)	16.20	73.28	1-2	2p ¹ P° — 4p' ¹ D	434.235	P		21.79	50.34	2-2	2p ² ³ P — 3p ³ P°
						UV 12.11	434.067	P		21.77	50.33	1-1	UV 12.31
215.755	B	(75)	16.20	73.67	1-0	2p ¹ P° — 4p' ¹ S	434.302	P		21.79	50.33	2-1	
						UV 12.12	434.097	P		21.77	50.33	1-0	
							434.000	P		21.77	50.34	1-2	
214.843	B	(10)	16.20	73.91	1-0	2p ¹ P° — 8s ¹ S	433.930	P		21.76	50.33	0-1	
						UV 12.13							
214.291	B	(250)	16.20	74.06	1-2	2p ¹ P° — 8d ¹ D	345.062	B		21.79	57.72	2-2	2p ² ³ P — 3s' ³ P°
						UV 12.14	345.111	B		21.77	57.70	1-1	UV 13
							345.261	B		21.79	57.70	2-1	
							345.207	B	(600w)*	21.77	57.69	1-0	
211.679	B	(250d)	16.20	74.77	1-2	2p ¹ P° — 9d ¹ D	344.916	B		21.77	57.72	1-2	
						UV 12.15	345.025	B		21.76	57.70	0-1	

Multiplet Table

N IV — Continued

N IV — Continued

I A	Ref	Int	E P		J	Multiplet No.	I A	Ref	Int	E P		J	Multiplet No.
			Low	High						Low	High		
Vac							Vac						
336.365	P		21.79	58.65	2-1	$2p^2\ ^3P - 3s\ ^1P^\circ$	217.895	B	(500d)	21.79	78.69	2-	$2p^2\ ^3P - 5d'\ ^3P^\circ$
336.224	P		21.77	58.65	1-1	UV 13.01	217.836	P		21.77	78.69	1-	UV 15.06
336.141	P		21.76	58.65	0-1								
310.003	P		21.79	61.78	2-2	$2p^2\ ^3P - 3d'\ ^1D^\circ$	210.028	B	(200)	21.79	80.82	2-2	$2p^2\ ^3P - 6s'\ ^3P^\circ$
309.883	P		21.77	61.78	1-2	UV 13.02	210.056	P		21.77	80.79	1-1	UV 15.07
							210.111	B		21.79	80.79	2-1	
							210.092	B	(100w)*	21.77	80.78	1-0	
304.927	P		21.79	62.45	2-2	$2p^2\ ^3P - 4p\ ^3P^\circ$	209.976	B		21.77	80.82	1-2	
304.800	P		21.77	62.45	1-1	UV 13.03	210.024	P		21.76	80.79	0-1	
304.916	P		21.79	62.45	2-1								
304.793	P		21.77	62.45	1-0								
304.811	P		21.77	62.45	1-2		208.150	B		21.79	81.35	2-3	$2p^2\ ^3P - 6d'\ ^3D^\circ$
304.733	P		21.76	62.45	0-1		208.131	B	(400w)*	21.77	81.34	1-2	UV 15.08
							208.113	B		21.76	81.34	0-1	
303.124	B		21.79	62.69	2-3	$2p^2\ ^3P - 3d'\ ^3D^\circ$	208.185	P		21.79	81.34	2-2	
303.048	C		21.77	62.68	1-2	UV 14	208.144	P		21.77	81.34	1-1	
303.006	B	(500w)*	21.76	62.68	0-1		208.113	P		21.79	81.34	2-1	
303.162	B		21.79	62.68	2-2								
303.078	B		21.77	62.68	1-1		208.066	B	(400d)	21.79	81.37	2-	$2p^2\ ^3P - 6d'\ ^3P^\circ$
303.191	B		21.79	62.68	2-1		208.012	P		21.77	81.37	1-	UV 15.09
297.816	B	(700)	21.79	63.42	2-2	$2p^2\ ^3P - 3d'\ ^3P^\circ$	203.694	B	(50w)*	21.79	82.65	2-2	$2p^2\ ^3P - 7s'\ ^3P^\circ$
297.657	B		21.77	63.42	1-1	UV 15	203.728	P		21.77	82.63	1-1	UV 15.10
297.770	B		21.79	63.42	2-1		203.780	B	(50)	21.79	82.63	2-1	
297.634	B	(600w)*	21.77	63.43	1-0		203.642	B	(50w)*	21.77	82.65	1-2	
297.704	B		21.77	63.42	1-2								
297.595	C		21.76	63.42	0-1		202.595	B	(500w)	21.79	82.98	2-	$2p^2\ ^3P - 7d'\ ^3D^\circ$
													UV 15.11
248.461	B	(500w)*	21.79	71.69	2-2	$2p^2\ ^3P - 4s'\ ^3P^\circ$							
248.484	B	(500w)*	21.77	71.67	1-1	UV 15.01	202.485	B	(300d)	21.79	83.02		$2p^2\ ^3P - 7d'\ ^3P^\circ$
248.563	B		21.79	71.67	2-1								UV 15.12
248.540	B	(500)*	21.77	71.66	1-0								
248.383	B		21.77	71.69	1-2		199.857	B	(50)	21.79	83.82	2-2	$2p^2\ ^3P - 8s'\ ^3P^\circ$
248.433	B	(500w)*	21.76	71.67	0-1		199.806	B	(20)	21.77	83.82	1-2	UV 15.13
239.212	B		21.79	73.62	2-3	$2p^2\ ^3P - 4d'\ ^3D^\circ$	199.159	B	(450w)	21.79	84.04	2-	$2p^2\ ^3P - 8d'\ ^3D^\circ$
239.174	B	(450w)*	21.77	73.61	1-2	UV 15.02							UV 15.14
239.146	B		21.76	73.61	0-1								
239.243	B		21.79	73.61	2-2		199.087	B	(200d)	21.79	84.06	2-	$2p^2\ ^3P - 8d'\ ^3P^\circ$
239.188	P		21.77	73.61	1-1								UV 15.15
239.259	P		21.79	73.61	2-1								
238.802	B	(600)	21.79	73.71	2-2	$2p^2\ ^3P - 4d'\ ^3P^\circ$	197.343	B	(2)	21.79	84.61	2-	$2p^2\ ^3P - 9s'\ ^3P^\circ$
238.694	B		21.77	73.71	1-1	UV 15.03							UV 15.16
238.769	B		21.79	73.71	2-1								
238.683	B	(500w)*	21.77	73.72	1-0		196.866	B	(500w)	21.79	84.76	2-	$2p^2\ ^3P - 9d'\ ^3D^\circ$
238.731	B		21.77	73.71	1-2								UV 15.17
238.657	B		21.76	73.71	0-1		196.802	B	(100d)	21.79	84.79	2-	$2p^2\ ^3P - 9d'\ ^3P^\circ$
													UV 15.18
221.789	B	(450)	21.79	77.69	2-2	$2p^2\ ^3P - 5s'\ ^3P^\circ$							
221.810	P		21.77	77.67	1-1	UV 15.04							
221.871	B		21.79	77.67	2-1		195.610	B	(1)	21.79	85.17	2-2	$2p^2\ ^3P - 10s'\ ^3P^\circ$
221.854	B	(300w)*	21.77	77.66	1-0								UV 15.19
221.729	B		21.77	77.69	1-2								
221.774	P		21.76	77.67	0-1		195.258	B	(100d)	21.79	85.28	2-	$2p^2\ ^3P - 10d'\ ^3D^\circ$
													UV 15.20
218.088	B		21.79	78.64	2-3	$2p^2\ ^3P - 5d'\ ^3D^\circ$							
218.067	B	(400w)*	21.77	78.63	1-2	UV 15.05	195.202	B	(20d)	21.79	85.30	2-	$2p^2\ ^3P - 10d'\ ^3P^\circ$
218.044	B		21.76	78.62	0-1								UV 15.21
218.116	B		21.79	78.63	2-2								
218.079	P		21.77	78.62	1-1		194.083	B	(75d)	21.79	85.67		$2p^2\ ^3P - 11d'\ ^3D^\circ$
218.138	P		21.79	78.62	2-1								UV 15.22

Multiplet Table

N IV — Continued

N IV — Continued

I A	Ref	Int	E P		J	Multiplet No.	I A	Ref	Int	E P		J	Multiplet No.
			Low	High						Low	High		
Vac 192.533	B	(10d)	21.79	86.18		$2p^2\ ^3P - 13d'\ ^3D^\circ$ UV 15.23	Vac 250.121	B	(300)	23.42	72.99	2-2	$2p^2\ ^1D - 4d'\ ^1D^\circ$ UV 18.12
463.740	B	(650)	23.42	50.15	2-1	$2p^2\ ^1D - 3p\ ^1P^\circ$ UV 15.24	248.654	B	(450)	23.42	73.28	2-3	$2p^2\ ^1D - 4d'\ ^1F^\circ$ UV 18.13
460.532	P		23.42	50.34	2-2	$2p^2\ ^1D - 3p\ ^3P^\circ$	244.100	B	(300w)	23.42	74.21	2-1	$2p^2\ ^1D - 4d'\ ^1P^\circ$ UV 18.14
460.607	P		23.42	50.33	2-1	UV 15.25	227.446	P		23.42	77.91	2-1	$2p^2\ ^1D - 5s'\ ^1P^\circ$ UV 18.15
361.462	P		23.42	57.72	2-2	$2p^2\ ^1D - 3s'\ ^3P^\circ$	223.421 ^a	P	(500d)	23.42	78.91	2-1	$2p^2\ ^1D - 5d'\ ^1P^\circ$ UV 18.16
361.679	P		23.42	57.70	2-1	UV 15.26	214.414	B	(50d)	23.42	81.24	2-3	$2p^2\ ^1D - 6d'\ ^1F^\circ$ UV 18.17
351.931	C	(500w)	23.42	58.65	2-1	$2p^2\ ^1D - 3s'\ ^1P^\circ$ UV 16	213.443 ^a	P	(300d)	23.42	81.50	2-1	$2p^2\ ^1D - 6d'\ ^1P^\circ$ UV 18.19
323.178	B	(600w)	23.42	61.78	2-2	$2p^2\ ^1D - 3d'\ ^1D^\circ$ UV 17	207.812 ^a	P	(200d)	23.42	83.08	2-1	$2p^2\ ^1D - 7d'\ ^1P^\circ$ UV 18.20
317.664	P		23.42	62.45	2-2	$2p^2\ ^1D - 4p\ ^3P^\circ$	204.354 ^a	B	(150d)	23.42	84.10	2-1	$2p^2\ ^1D - 8d'\ ^1P^\circ$ UV 18.21
317.653	P		23.42	62.45	2-1	UV 17.01	201.988	B	(100d)	23.42	84.80	2-1	$2p^2\ ^1D - 9d'\ ^1P^\circ$ UV 18.22
315.708	P		23.42	62.69	2-3	$2p^2\ ^1D - 3d'\ ^3D^\circ$	200.316	P		23.42	85.31	2-1	$2p^2\ ^1D - 10d'\ ^1P^\circ$ UV 18.23
315.751	P		23.42	62.68	2-2	UV 17.02	591.180	P		29.18	50.15	0-1	$2p^2\ ^1S - 3p\ ^1P^\circ$ UV 18.24
315.785	P		23.42	62.68	2-1		586.104	P		29.18	50.33	0-1	$2p^2\ ^1S - 3p\ ^3P^\circ$ UV 18.25
315.060	B	(600)	23.42	62.77	2-3	$2p^2\ ^1D - 3d'\ ^1F^\circ$ UV 18	434.779	P		29.18	57.70	0-1	$2p^2\ ^1S - 3s'\ ^3P^\circ$ UV 18.26
314.324	B	(20)	23.42	62.86	2-1	$2p^2\ ^1D - 4p\ ^1P^\circ$ UV 18.01	420.769	B	(500)	29.18	58.65	0-1	$2p^2\ ^1S - 3s'\ ^1P^\circ$ UV 18.27
309.956	P		23.42	63.42	2-2	$2p^2\ ^1D - 3d'\ ^3P^\circ$	368.108	B	(450)	29.18	62.86	0-1	$2p^2\ ^1S - 4p\ ^1P^\circ$ UV 18.29
309.907	P		23.42	63.42	2-1	UV 18.02	353.056	B	(700)	29.18	64.30	0-1	$2p^2\ ^1S - 3d'\ ^1P^\circ$ UV 18.30
305.177	P		23.42	64.04	2-3	$2p^2\ ^1D - 4f\ ^3F^\circ$	317.596	B	(200)	29.18	68.22	0-1	$2p^2\ ^1S - 5p\ ^1P^\circ$ UV 18.31
305.185	P		23.42	64.04	2-2	UV 18.03	296.418	P		29.18	71.01	0-1	$2p^2\ ^1S - 6p\ ^1P^\circ$ UV 18.32
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							

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

Multiplet Table

N IV - Continued

N IV - Continued

I A	Ref	Int	E P		J	Multiplet No.	I A	Ref	Int	E P		J	Multiplet No.
			Low	High						Low	High		
Vac 289.479	B	(300)	29.18	72.01	0-1	$2p^2\ ^1S - 4s'\ ^1P^\circ$ UV 18.33	Air 6380.77	A	8	48.21	50.15	0-1	$3s\ ^1S - 3p\ ^1P^\circ$ 2
283.599	P		29.18	72.90	0-1	$2p^2\ ^1S - 7p\ ^1P^\circ$ UV 18.34	5835.11	P		48.21	50.33	0-1	$3s\ ^1S - 3p\ ^3P^\circ$ 2.01
275.354	B	(450)	29.18	74.21	0-1	$2p^2\ ^1S - 4d'\ ^1P^\circ$ UV 18.35	Vac 1306.909	P		48.21	57.70	0-1	$3s\ ^1S - 3s'\ ^3P^\circ$ UV 18.48
254.338	B	(100)	29.18	77.91	0-1	$2p^2\ ^1S - 5s'\ ^1P^\circ$ UV 18.36	1188.006	A	6	48.21	58.65	0-1	$3s\ ^1S - 3s'\ ^1P^\circ$ UV 18.49
249.316	B	(300d)	29.18	78.91	0-1	$2p^2\ ^1S - 5d'\ ^1P^\circ$ UV 18.37	846.215	P		48.21	62.86	0-1	$3s\ ^1S - 4p\ ^1P^\circ$ UV 18.50
236.954	B	(150d)	29.18	81.50	0-1	$2p^2\ ^1S - 6d'\ ^1P^\circ$ UV 18.38	770.678	P		48.21	64.30	0-1	$3s\ ^1S - 3d'\ ^1P^\circ$ UV 18.51
230.035	B	(100d)	29.18	83.08	0-1	$2p^2\ ^1S - 7d'\ ^1P^\circ$ UV 18.39	619.663	P		48.21	68.22	0-1	$3s\ ^1S - 5p\ ^1P^\circ$ UV 18.52
225.741	B	(50d)	29.18	84.10	0-1	$2p^2\ ^1S - 8d'\ ^1P^\circ$ UV 18.40	520.934	P		48.21	72.01	0-1	$3s\ ^1S - 4s'\ ^1P^\circ$ UV 18.53
222.893	B	(30d)	29.18	84.80	0-1	$2p^2\ ^1S - 9d'\ ^1P^\circ$ UV 18.41	476.909	P		48.21	74.21	0-1	$3s\ ^1S - 4d'\ ^1P^\circ$ UV 18.54
220.885	B	(2d)	29.18	85.31	0-1	$2p^2\ ^1S - 10d'\ ^1P^\circ$ UV 18.42							
Air 3670.35	P		46.78	50.15	1-1	$3s\ ^3S - 3p\ ^1P^\circ$ 0.01	Air 6438.53 6440.11	P P		50.15 50.15	52.08 52.08	1-2 1-1	$3p\ ^1P^\circ - 3d\ ^3D$ 2.02
3478.71	A	15	46.78	50.34	1-2	$3s\ ^3S - 3p\ ^3P^\circ$	4057.759	A	8	50.15	53.21	1-2	$3p\ ^1P^\circ - 3d\ ^1D$ 3
3482.99	A	14	46.78	50.33	1-1	1	Vac 1309.557	A	4	50.15	59.62	1-1	$3p\ ^1P^\circ - 3p'\ ^1P$ UV 18.55
3484.96	A	13	46.78	50.33	1-0								
Vac 1133.117	A	4	46.78	57.72	1-2	$3s\ ^3S - 3s'\ ^3P^\circ$	1248.868	P		50.15	60.08	1-2	$3p\ ^1P^\circ - 3p'\ ^3D$
1135.244	A	3	46.78	57.70	1-1	UV 18.43	1250.378	P		50.15	60.07	1-1	UV 18.56
1136.241	A	2	46.78	57.69	1-0		1203.587	P		50.15	60.45	1-1	$3p\ ^1P^\circ - 4s\ ^3S$ UV 18.57
791.045	P		46.78	62.45	1-2	$3s\ ^3S - 4p\ ^3P^\circ$							
791.095	P		46.78	62.45	1-1	UV 18.44	1112.600	P		50.15	61.30	1-2	$3p\ ^1P^\circ - 3p'\ ^3P$
791.167	P		46.78	62.45	1-0		1113.749	P		50.15	61.28	1-1	UV 18.58
							1114.446	P		50.15	61.28	1-0	
745.020	P		46.78	63.42	1-2	$3s\ ^3S - 3d'\ ^3P^\circ$	1104.542	P		50.15	61.38	1-0	$3p\ ^1P^\circ - 4s\ ^1S$ UV 18.59
744.737	P		46.78	63.42	1-1	UV 18.45							
744.566	P		46.78	63.43	1-0								
497.696	P		46.78	71.69	1-2	$3s\ ^3S - 4s'\ ^3P^\circ$	1069.255	P		50.15	61.75	1-1	$3p\ ^1P^\circ - 3p'\ ^3S$ UV 18.60
498.106	P		46.78	71.67	1-1	UV 18.46							
498.323	P		46.78	71.66	1-0		1050.602	P		50.15	61.95	1-2	$3p\ ^1P^\circ - 3p'\ ^1D$ UV 18.61
460.394	P		46.78	73.71	1-2	$3s\ ^3S - 4d'\ ^3P^\circ$							
460.272	P		46.78	73.71	1-1	UV 18.47							
460.217	P		46.78	73.72	1-0		908.057	P		50.15	63.81	1-2	$3p\ ^1P^\circ - 4d\ ^1D$ UV 18.62

Multiplet Table

N IV — Continued

N IV — Continued

I A	Ref	Int	E P		J	Multiplet No.	I A	Ref	Int	E P		J	Multiplet No.
			Low	High						Low	High		
Vac 900.516	P		50.15	63.92	1-0	$3p\ ^1P^\circ - 3p'\ ^1S$ UV 18.63	Vac 948.540 948.244 948.155	A A A	5 4 2	50.34 50.33 50.33	63.41 63.41 63.41	2-3 1-2 0-1	$3p\ ^3P^\circ - 4d\ ^3D$ UV 18.79
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	720.510 720.327 720.244	P P P		50.34 50.33 50.33	67.55 67.55 67.55	2-1 1-1 0-1	$3p\ ^3P^\circ - 5s\ ^3S$ UV 18.80
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	1323.98 1325.685 1326.964	A A A	2 1 0	52.08 52.08 52.08	61.44 61.43 61.42	3-4 2-3 1-2	$3d\ ^3D - 3d'\ ^3F^\circ$ UV 18.81
555.126	P		50.15	72.49	1-1	$3p\ ^1P^\circ - 4p'\ ^1P$ UV 18.68	1195.852 1195.567 1195.400	P P P		52.08 52.08 52.08	62.45 62.45 62.45	3-2 2-1 1-0	$3d\ ^3D - 4p\ ^3P^\circ$ UV 18.82
554.137	P		50.15	72.53	1-0	$3p\ ^1P^\circ - 7s\ ^1S$ UV 18.69	1168.599 1169.063 1169.478	A A A	3 2 1	52.08 52.08 52.08	62.69 62.68 62.68	3-3 2-2 1-1	$3d\ ^3D - 3d'\ ^3D^\circ$ UV 18.83
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	1036.16	A	8w	52.08	64.05		$3d\ ^3D - 4f\ ^3F^\circ$ UV 18.84
527.259	P		50.15	73.67	1-0	$3p\ ^1P^\circ - 4p'\ ^1S$ UV 18.72	1446.114	A	5	53.21	61.78	2-2	$3d\ ^1D - 3d'\ ^1D^\circ$ UV 18.85
521.845	P		50.15	73.91	1-0	$3p\ ^1P^\circ - 8s\ ^1S$ UV 18.73	1296.600	A	5	53.21	62.77	2-3	$3d\ ^1D - 3d'\ ^1F^\circ$ UV 18.86
518.600	P		50.15	74.06	1-2	$3p\ ^1P^\circ - 8d\ ^1D$ UV 18.74	1284.218	A	3	53.21	62.86	2-1	$3d\ ^1D - 4p\ ^1P^\circ$ UV 18.87
Air 7122.98 7109.40 7103.28 7127.27 7111.30 7129.18	A A A A A P	5 3 2 1 1	50.34 50.33 50.33 50.34 50.33 50.34	52.08 52.08 52.08 52.08 52.08 52.08	2-3 1-2 0-1 2-2 1-1 2-1	$3p\ ^3P^\circ - 3d\ ^3D$ 4	Air 5204.29 5200.40 5205.15 5245.61 5226.69 5272.35	A A A A A P	5 4 3 3 3 3	57.72 57.70 57.69 57.72 57.70 57.72	60.10 60.08 60.07 60.08 60.07 60.07	2-3 1-2 0-1 2-2 1-1 2-1	$3s'\ ^3P^\circ - 3p'\ ^3D$ 5
Vac 1270.280 1272.160 1273.47 1272.74 1273.716 1274.285	A A A A A P	5 4 3 2 2	50.34 50.33 50.33 50.34 50.33 50.34	60.10 60.08 60.07 60.08 60.07 60.07	2-3 1-2 0-1 2-2 1-1 2-1	$3p\ ^3P^\circ - 3p'\ ^3D$ UV 18.75	3463.37 3454.70 3474.55 3461.36 3443.59 3445.20	A A A A A A	6 2 3 2 3 2	57.72 57.70 57.72 57.70 57.70 57.69	61.30 61.28 61.28 61.28 61.30 61.28	2-2 1-1 2-1 1-0 1-2 0-1	$3s'\ ^3P^\circ - 3p'\ ^3P$ 7
1225.719 1225.192 1224.960	A A A	4 3 1	50.34 50.33 50.33	60.45 60.45 60.45	2-1 1-1 0-1	$3p\ ^3P^\circ - 4s\ ^3S$ UV 18.76	3075.19 3059.60 3052.20	P P P		57.72 57.70 57.69	61.75 61.75 61.75	2-1 1-1 0-1	$3s'\ ^3P^\circ - 3p'\ ^3S$ 7.01
1131.488 1132.225	P P		50.34 50.33	61.30 61.28	2-2 1-1	$3p\ ^3P^\circ - 3p'\ ^3P$ UV 18.77							
1086.691 1086.269 m1086.084	A A P	2 1 N1	50.34 50.33 50.33	61.75 61.75 61.75	2-1 1-1 0-1	$3p\ ^3P^\circ - 3p'\ ^3S$ UV 18.78	12727.43	P		58.65	59.62	1-1	$3s'\ ^1P^\circ - 3p'\ ^1P$ 7.02

Multiplet Table

N IV - Continued

N IV - Continued

I A	Ref	Int	E P		J	Multiplet No.	I A	Ref	Int	E P		J	Multiplet No.
			Low	High						Low	High		
Air 4538.32	P		58.65	61.38	1-0	$3s' \ ^1P^\circ - 4s \ ^1S$ 7.03	Vac 1702.006 1699.03 1696.86	A A A	5 4 3	61.44 61.43 61.42	68.73 68.73 68.73	4- 3- 2-	$3d' \ ^3F^\circ - 5g \ ^3G$ UV 18.91
3747.54	A	6	58.65	61.95	1-2	$3s' \ ^1P^\circ - 3p' \ ^1D$ 8	1246.51 1244.92 m1243.73	A A P	2 1 N v	61.44 61.43 61.42	71.39 71.39 71.39	4- 3- 2-	$3d' \ ^3F^\circ - 6g \ ^3G$ UV 18.92
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	Air 6119.23	P		61.78	63.81	2-2	$3d' \ ^1D^\circ - 4d \ ^1D$ 16
3823.95	A	0	59.62	62.86	1-1	$3p' \ ^1P - 4p \ ^1P^\circ$ 10	5288.25	P		61.95	64.30	2-1	$3p' \ ^1D - 3d' \ ^1P^\circ$ 17
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	$3p' \ ^3D - 3d' \ ^3F^\circ$	12870.47	P		62.45	63.41	2-3	$4p \ ^3P^\circ - 4d \ ^3D$
9182.16	P		60.08	61.43	2-3	10.01	12892.88	P		62.45	63.41	1-2	18
9165.07	P		60.07	61.42	1-2		12916.03	P		62.45	63.41	0-1	
9311.55	P		60.10	61.43	3-3		2430.41	A	3	62.45	67.55	2-1	$4p \ ^3P^\circ - 5s \ ^3S$
9247.04	P		60.08	61.42	2-2		2431.07	A	2	62.45	67.55	1-1	UV 18.93
9378.29	P		60.10	61.42	3-2		2431.55	A	0	62.45	67.55	0-1	
4786.92	P		60.10	62.69	3-3	$3p' \ ^3D - 3d' \ ^3D^\circ$	2035.57	A	5	62.45	68.54	2-3	$4p \ ^3P^\circ - 5d \ ^3D$
4762.09	P		60.08	62.68	2-2	11	2036.10	A	4	62.45	68.54	1-2	UV 18.94
4747.96	P		60.07	62.68	1-1		2036.42	A	1	62.45	68.54	0-1	
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	$3p' \ ^3D - 3d' \ ^3P^\circ$	2080.34	A	6	62.77	68.73	3-4	$3d' \ ^1F^\circ - 5g \ ^1G$ UV 18.95
3707.39	P		60.08	63.42	2-1	12							
3689.94	P		60.07	63.43	1-0		Vac 1438.37	A	3	62.77	71.39	3-4	$3d' \ ^1F^\circ - 6g \ ^1G$ UV 18.96
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	3p	60.10	64.05	3-4	$3p' \ ^3D - 4f \ ^3F^\circ$	Air 2318.09	A	6w	63.41	68.76		$4d \ ^3D - 5f \ ^3F^\circ$ UV 18.97
3127.41	A	2p	60.08	64.04	2-3	12.01							
3118.79	A	1p	60.07	64.04	1-2								
6219.89	A	4	60.45	62.45	1-2	$4s \ ^3S - 4p \ ^3P^\circ$	2421.65	A	3	63.42	68.54	2-3	$3d' \ ^3P^\circ - 5d \ ^3D$
6215.43	A	3	60.45	62.45	1-1	12.02	2424.73	A	2	63.42	68.54	1-2	UV 18.98
6212.41	A	1	60.45	62.45	1-0		2426.54	A	1	63.43	68.54	0-1	
5843.84	P		61.30	63.42	2-2	$3p' \ ^3P - 3d' \ ^3P^\circ$	2809.35	A	2	63.81	68.22	2-1	$4d \ ^1D - 5p \ ^1P^\circ$ UV 18.99
5795.09	P		61.28	63.42	1-1	15	2477.69	A	8	63.81	68.81	2-3	$4d \ ^1D - 5f \ ^1F^\circ$ UV 18.991
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		2646.956 2646.176 2645.654	A A A	12 11 10	64.05 64.04 64.04	68.73 68.73 68.73	4- 3- 2-	$4f \ ^3F^\circ - 5g \ ^3G$ UV 19

Multiplet Table

N IV—Continued

N IV—Continued

I A	Ref	Int	E P		J	Multiplet No.	I A	Ref	Int	E P		J	Multiplet No.
			Low	High						Low	High		
Vac 1688.11 1687.82 1687.60	A A A	3 2 1	64.05 64.04 64.04	71.39 71.39 71.39	4- 3- 2-	4f ³ F°—6g ³ G UV 20	Air 2884.77	A	4w	68.73	73.02		5g ³ G—7h ³ H° UV 21
							4707.31	A	4h	68.76	71.39		5f ³ F°—6g ³ G 21
Air 3078.25	A	6	64.70	68.73	3-4	4f ¹ F°—5g ¹ G 19	7582.40	A	2wl	71.39	73.02		6g ³ G—7h ³ H° 22
4606.33	A	6	68.73	71.42		5g ³ G—6h ³ H° 20	7702.96	A	4ws	71.42	73.03		6h ³ H°—7i ³ I 23

NSRDS-NBS 3, SECTION 4

NITROGEN, $Z = 7$

A N v Atomic Energy Levels

B N v Multiplet Table

Atomic Energy Levels

Part A

NITROGEN

N v

Li I sequence; 3 electrons

 $Z = 7$ Ground state $1s^2 2s^2 S_{01/2}$ $2s^2 S_{01/2}$ **789537.2 $\pm$ 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 $789516 \pm 24 \text{ cm}^{-1}$ 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 $+0.002 \text{ Å}$ 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 $21 \pm 9 \text{ cm}^{-1}$, may result from some sort of Stark Effect. The predicted intervals are small for these terms.

REFERENCES

S. G. Tilford, J. Opt. Soc. Am. **53**, No. 9, 1051-1054 (1963). I P, T, C LR. Hallin, Ark. Fys. (Stockholm) **31**, No. 36, 511-526 (1966). I P, T, C L, G D, Stark Effect

N v

N v

Config.	Desig.	J	Level	Interval	Config.	Desig.	J	Level	Interval
2s	2s 2S	$0\frac{1}{2}$	0.0		4p	4p $^2P^\circ$	$0\frac{1}{2}$ $1\frac{1}{2}$	615141.0 615173.8	32.8
2p	2p $^2P^\circ$	$0\frac{1}{2}$ $1\frac{1}{2}$	30463.2 80721.9	258.7	4d	4d 2D	$1\frac{1}{2}$ $2\frac{1}{2}$	617916.3 617925.5	9.2
3s	3s 2S	$0\frac{1}{2}$	456126.6		4f	4f $^2F^\circ$	$2\frac{1}{2}$ $3\frac{1}{2}$	618059.3 618064.1	[4.8]
3p	3p $^2P^\circ$	$0\frac{1}{2}$ $1\frac{1}{2}$	477765.7 477842.0	76.3	5s	5s 2S	$0\frac{1}{2}$	673886.2	
3d	3d 2D	$1\frac{1}{2}$ $2\frac{1}{2}$	484404.3 484426.3	22.0	5p	5p $^2P^\circ$	$0\frac{1}{2}$ $1\frac{1}{2}$	678300.4 678316.5	16.1
4s	4s 2S	$0\frac{1}{2}$	606348.8						

A7 v-1

Atomic Energy Levels

N v — Continued

N v — Continued

Config.	Desig.	J	Level	Interval	Config.	Desig.	J	Level	Interval
5d	5d ² D	1½ 2½	[679712.7] 679717.6	[4.9]	9s	9s ² S	0½	[754677.0]	
5f	5f ² F°	2½, 3½	679790.4		9p	9p ² P°	0½ 1½	[755411.5] [755414.3]	[2.8]
5g	5g ² G	3½, 4½	679802.3		9d	9d ² D	1½ 2½	755608 755633	25
6s	6s ² S	0½	709939.2		9f	9f ² F°	2½, 3½	[755666.5]	
6p	6p ² P°	0½ 1½	712463.2 712472.6	9.4	9g	9g ² G	3½, 4½	[755667.9]	
6d	6d ² D	1½ 2½	713279.3 713281.5	2.2	9h	9h ² H°	4½, 5½	[755668.4]	
6f	6f ² F°	2½, 3½	713324.7		9i	9i ² I	5½, 6½	[755668.6]	
6g	6g ² G	3½, 4½	713328.9		9k	9k ² K°	6½, 7½	[755668.7]	
6h	6h ² H°	4½, 5½	713334.8		9l	9l ² L	7½, 8½	[755668.8]	
7s	7s ² S	0½	731425.4		10s	10s ² S	0½	[761382.7]	
7p	7p ² P°	0½ 1½	[733003.3] [733009.2]	[5.9]	10p	10p ² P°	0½ 1½	[761916.3] [761918.3]	[2.0]
7d	7d ² D	1½ 2½	[733515.4] [733517.2]	[1.8]	10d	10d ² D	1½ 2½	762048 762071	23
7f	7f ² F°	2½, 3½	733542.7		10f	10f ² F°	2½, 3½	[762102.1]	
7g	7g ² G	3½, 4½	[733549.0]		10g	10g ² G	3½, 4½	[762103.1]	
7h	7h ² H°	4½, 5½	[733549.9]		10h	10h ² H°	4½, 5½	[762103.5]	
7i	7i ² I	5½, 6½	[733550.4]		10i	10i ² I	5½, 6½	[762103.6]	
8s	8s ² S	0½	[745255.6]		10k	10k ² K°	6½, 7½	[762103.7]	
8p	8p ² P°	0½ 1½	[746306.0] [746309.9]	[3.9]	10l	10l ² L	7½, 8½	[762103.8]	
8d	8d ² D	1½ 2½	[746648.5] [746649.7]	[1.2]	11p	11p ² P°	0½, 1½	766687	
8f	8f ² F°	2½, 3½	[746669.2]		11d	11d ² D	1½, 2½	766866	
8g	8g ² G	3½, 4½	[746671.3]		12p	12p ² P°	0½, 1½	770347	
8h	8h ² H°	4½, 5½	[746671.9]		12d	12d ² D	1½, 2½	770483	
8i	8i ² I	5½, 6½	[746672.2]		13p	13p ² P°	0½, 1½	773174	
8k	8k ² K°	6½, 7½	[746672.4]		13d	13d ² D	1½, 2½	773282	
					14p	14p ² P°	0½, 1½	775465	
					14d	14d ² D	1½, 2½	775581	
					15p	15p ² P°	0½, 1½	777230	

Atomic Energy Levels

N v –Continued

N v –Continued

Config.	Desig.	<i>J</i>	Level	Interval	Config.	Desig.	<i>J</i>	Level	Interval
15 <i>d</i>	15 <i>d</i> ² D	1½, 2½	777490		17 <i>d</i>	17 <i>d</i> ² D	1½, 2½	780117	
16 <i>p</i>	16 <i>p</i> ² P°	0½, 1½	778634		18 <i>d</i>	18 <i>d</i> ² D	1½, 2½	781067	
16 <i>d</i>	16 <i>d</i> ² D	1½, 2½	778847						
17 <i>p</i>	17 <i>p</i> ² P°	0½, 1½	779855		N VI (¹S₀)	Limit		789537.2 ± 3.0	

July 1970.

Multiplet Table

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

REFERENCES

- A R. Hallin, Ark. Fys. (Stockholm) **31**, No. 36, 511-526 (1966). I P, T, C L, G D, I; W L 140 Å to 7618 Å
- 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

N v

I A	Ref	Int	E P		J	Multiplet No.	I A	Ref	Int	E P		J	Multiplet No.
			Low	High						Low	High		
Vac							Vac						
1238.821‡	A	20	0.00	10.01	$0\frac{1}{2}-1\frac{1}{2}$	$2s\ ^2S - 2p\ ^2P^\circ$	131.254	B	(5)	0.00	94.46	$0\frac{1}{2}-$	$2s\ ^2S - 10p\ ^2P^\circ$
1242.804	A	19	0.00	9.98	$0\frac{1}{2}-0\frac{1}{2}$	UV 1							UV 3.06
209.274	P	(80)	0.00	59.24	$0\frac{1}{2}-1\frac{1}{2}$	$2s\ ^2S - 3p\ ^2P^\circ$	130.431	B	(4)	0.00	95.05	$0\frac{1}{2}-$	$2s\ ^2S - 11p\ ^2P^\circ$
209.308	P	(80)	0.00	59.23	$0\frac{1}{2}-0\frac{1}{2}$	UV 2							UV 3.07
162.556	P	(48)	0.00	76.27	$0\frac{1}{2}-1\frac{1}{2}$	$2s\ ^2S - 4p\ ^2P^\circ$	129.811	B	(3)	0.00	95.51	$0\frac{1}{2}-$	$2s\ ^2S - 12p\ ^2P^\circ$
162.564	P		0.00	76.27	$0\frac{1}{2}-0\frac{1}{2}$	UV 3							UV 3.08
147.424	P	(24)	0.00	84.10	$0\frac{1}{2}-1\frac{1}{2}$	$2s\ ^2S - 5p\ ^2P^\circ$	129.337	B	(2)	0.00	95.86	$0\frac{1}{2}-$	$2s\ ^2S - 13p\ ^2P^\circ$
147.427	P		0.00	84.10	$0\frac{1}{2}-0\frac{1}{2}$	UV 3.01							UV 3.09
140.356	P	(16)	0.00	88.33	$0\frac{1}{2}-1\frac{1}{2}$	$2s\ ^2S - 6p\ ^2P^\circ$	128.954	B	(1)	0.00	96.14	$0\frac{1}{2}-$	$2s\ ^2S - 14p\ ^2P^\circ$
140.358	P		0.00	88.33	$0\frac{1}{2}-0\frac{1}{2}$	UV 3.02							UV 3.10
136.429	B	(8)	0.00	90.88	$0\frac{1}{2}-$	$2s\ ^2S - 7p\ ^2P^\circ$	128.662	B	(1)	0.00	96.36	$0\frac{1}{2}-$	$2s\ ^2S - 15p\ ^2P^\circ$
						UV 3.03							UV 3.11
133.994	B	(7)	0.00	92.53	$0\frac{1}{2}-$	$2s\ ^2S - 8p\ ^2P^\circ$	128.430	B	(0)	0.00	96.54	$0\frac{1}{2}-$	$2s\ ^2S - 16p\ ^2P^\circ$
						UV 3.04							UV 3.12
132.383	B	(6)	0.00	93.66	$0\frac{1}{2}-$	$2s\ ^2S - 9p\ ^2P^\circ$	128.229	B	(0)	0.00	96.69	$0\frac{1}{2}-$	$2s\ ^2S - 17p\ ^2P^\circ$
						UV 3.05							UV 3.13

Multiplet Table

N v —Continued

N v —Continued

I A	Ref	Int	E P		J	Multiplet No.	I A	Ref	Int	E P		J	Multiplet No.
			Low	High						Low	High		
Vac							Vac						
266.379	A	(84)	10.01	56.55	$1\frac{1}{2}-0\frac{1}{2}$	$2p^2P^\circ-3s^2S$	143.241	B	(1)	10.01	96.56	$1\frac{1}{2}-$	$2p^2P^\circ-16d^2D$
266.196	A	(80)	9.98	56.55	$0\frac{1}{2}-0\frac{1}{2}$	UV 4							UV 24
247.706	A	(100)	10.01	60.06	$1\frac{1}{2}-2\frac{1}{2}$	$2p^2P^\circ-3d^2D$	142.981	B	(0)	10.01	96.72	$1\frac{1}{2}-$	$2p^2P^\circ-17d^2D$
247.561	A	(85)	9.98	60.06	$0\frac{1}{2}-1\frac{1}{2}$	UV 5							UV 25
190.249	P	(32)	10.01	75.18	$1\frac{1}{2}-0\frac{1}{2}$	$2p^2P^\circ-4s^2S$	142.797	B	(0)	10.01	96.84	$1\frac{1}{2}-$	$2p^2P^\circ-18d^2D$
190.155	P	(20)	9.98	75.18	$0\frac{1}{2}-0\frac{1}{2}$	UV 5.01							UV 26
186.149	P	(62)	10.01	76.61	$1\frac{1}{2}-2\frac{1}{2}$	$2p^2P^\circ-4d^2D$							
186.063	P	(52)	9.98	76.61	$0\frac{1}{2}-1\frac{1}{2}$	UV 6							
168.587	P	(12)	10.01	83.55	$1\frac{1}{2}-0\frac{1}{2}$	$2p^2P^\circ-5s^2S$	Air						
168.514	P	(5)	9.98	83.55	$0\frac{1}{2}-0\frac{1}{2}$	UV 7	4603.73	A	12	56.55	59.24	$0\frac{1}{2}-1\frac{1}{2}$	$3s^2S-3p^2P^\circ$
166.946	P	(52)	10.01	84.27	$1\frac{1}{2}-2\frac{1}{2}$	$2p^2P^\circ-5d^2D$	4619.98	A	10	56.55	59.23	$0\frac{1}{2}-0\frac{1}{2}$	1
166.875	P	(44)	9.98	84.27	$0\frac{1}{2}-1\frac{1}{2}$	UV 8							
158.928	P	(7)	10.01	88.02	$1\frac{1}{2}-0\frac{1}{2}$	$2p^2P^\circ-6s^2S$	Vac						
158.862	P	(4)	9.98	88.02	$0\frac{1}{2}-0\frac{1}{2}$	UV 9	628.744	A	5	56.55	76.27	$0\frac{1}{2}-1\frac{1}{2}$	$3s^2S-4p^2P^\circ$
158.088	P	(36)	10.01	88.43	$1\frac{1}{2}-2\frac{1}{2}$	$2p^2P^\circ-6d^2D$	628.874	A	3	56.55	76.27	$0\frac{1}{2}-0\frac{1}{2}$	UV 27
158.024	P	(24)	9.98	88.43	$0\frac{1}{2}-1\frac{1}{2}$	UV 10	450.072	P	3*	56.55	84.10	$0\frac{1}{2}-1\frac{1}{2}$	$3s^2S-5p^2P^\circ$
153.683	B	(6)	10.01	90.68	$1\frac{1}{2}-0\frac{1}{2}$	$2p^2P^\circ-7s^2S$	450.105	P	3*	56.55	84.10	$0\frac{1}{2}-0\frac{1}{2}$	UV 28
153.624	B	(3)	9.98	90.68	$0\frac{1}{2}-0\frac{1}{2}$	UV 11	390.102	P		56.55	88.33	$0\frac{1}{2}-1\frac{1}{2}$	$3s^2S-6p^2P^\circ$
153.192	B	(28)	10.01	90.94	$1\frac{1}{2}-2\frac{1}{2}$	$2p^2P^\circ-7d^2D$	390.116	P		56.55	88.33	$0\frac{1}{2}-0\frac{1}{2}$	UV 29
153.136	B	(18)	9.98	90.94	$0\frac{1}{2}-1\frac{1}{2}$	UV 12							
150.488	B	(5)	10.01	92.40	$1\frac{1}{2}-0\frac{1}{2}$	$2p^2P^\circ-8s^2S$	Air						
150.429	B	(2)	9.98	92.40	$0\frac{1}{2}-0\frac{1}{2}$	UV 13	15185.80	P		59.24	60.06	$1\frac{1}{2}-2\frac{1}{2}$	$3p^2P^\circ-3d^2D$
150.171	B	(14)	10.01	92.57	$1\frac{1}{2}-2\frac{1}{2}$	$2p^2P^\circ-8d^2D$	15061.34	P		59.23	60.06	$0\frac{1}{2}-1\frac{1}{2}$	1.01
150.116	B	(7)	9.98	92.57	$0\frac{1}{2}-1\frac{1}{2}$	UV 14							
148.387	B	(4)	10.01	93.57	$1\frac{1}{2}-0\frac{1}{2}$	$2p^2P^\circ-9s^2S$	Vac						
148.328	B	(1)	9.98	93.57	$0\frac{1}{2}-0\frac{1}{2}$	UV 15	778.172	A	2	59.24	75.18	$1\frac{1}{2}-0\frac{1}{2}$	$3p^2P^\circ-4s^2S$
148.168	B	(7)	10.01	93.68	$1\frac{1}{2}-2\frac{1}{2}$	$2p^2P^\circ-9d^2D$	777.712	A	1	59.23	75.18	$0\frac{1}{2}-0\frac{1}{2}$	UV 30
148.116	B	(4)	9.98	93.68	$0\frac{1}{2}-1\frac{1}{2}$	UV 16	713.860	A	8	59.24	76.61	$1\frac{1}{2}-2\frac{1}{2}$	$3p^2P^\circ-4d^2D$
146.921	B	(3)	10.01	94.40	$1\frac{1}{2}-0\frac{1}{2}$	$2p^2P^\circ-10s^2S$	713.518	A	6	59.23	76.61	$0\frac{1}{2}-1\frac{1}{2}$	UV 31
146.767	B	(6)	10.01	94.48	$1\frac{1}{2}-2\frac{1}{2}$	$2p^2P^\circ-10d^2D$	510.096	P		59.24	83.55	$1\frac{1}{2}-0\frac{1}{2}$	$3p^2P^\circ-5s^2S$
146.716	B	(3)	9.98	94.48	$0\frac{1}{2}-1\frac{1}{2}$	UV 18	509.896	P		59.23	83.55	$0\frac{1}{2}-0\frac{1}{2}$	UV 32
145.742	B	(5)	10.01	95.08	$1\frac{1}{2}-$	$2p^2P^\circ-11d^2D$	495.356	P		59.24	84.27	$1\frac{1}{2}-2\frac{1}{2}$	$3p^2P^\circ-5d^2D$
144.978	B	(4)	10.01	95.53	$1\frac{1}{2}-$	$2p^2P^\circ-12d^2D$	495.180	P		59.23	84.27	$0\frac{1}{2}-1\frac{1}{2}$	UV 33
144.392	B	(3)	10.01	95.87	$1\frac{1}{2}-$	$2p^2P^\circ-13d^2D$	430.857	P		59.24	88.02	$1\frac{1}{2}-0\frac{1}{2}$	$3p^2P^\circ-6s^2S$
143.914	B	(2)	10.01	96.16	$1\frac{1}{2}-$	$2p^2P^\circ-14d^2D$	430.714	P		59.23	88.02	$0\frac{1}{2}-0\frac{1}{2}$	UV 34
143.520	B	(1)	10.01	96.39	$1\frac{1}{2}-$	$2p^2P^\circ-15d^2D$	424.75	A	2	59.24	88.43	$1\frac{1}{2}-2\frac{1}{2}$	$3p^2P^\circ-6d^2D$
						UV 23	424.61	A	1	59.23	88.43	$0\frac{1}{2}-1\frac{1}{2}$	UV 35
							394.348	P		59.24	90.68	$1\frac{1}{2}-0\frac{1}{2}$	$3p^2P^\circ-7s^2S$
							394.228	P		59.23	90.68	$0\frac{1}{2}-0\frac{1}{2}$	UV 36
							391.123	P		59.24	90.94	$1\frac{1}{2}-2\frac{1}{2}$	$3p^2P^\circ-7d^2D$
							391.008	P		59.23	90.94	$0\frac{1}{2}-1\frac{1}{2}$	UV 37
							764.840	P		60.06	76.27	$2\frac{1}{2}-1\frac{1}{2}$	$3d^2D-4p^2P^\circ$
							764.896	P		60.06	76.27	$1\frac{1}{2}-0\frac{1}{2}$	UV 38

Multiplet Table

N v — Continued

Nv — Continued

I A	Ref	Int	E P		J	Multiplet No.	I A	Ref	Int	E P		J	Multiplet No.
			Low	High						Low	High		
Vac 748.291 748.195	A A	9 8	60.06 60.06	76.63 76.63	$2\frac{1}{2}-3\frac{1}{2}$ $1\frac{1}{2}-2\frac{1}{2}$	$3d^2D - 4f^2F^\circ$ UV 39	Air 2590.81 2591.44	A A	2 1	83.55 83.55	88.33 88.33	$0\frac{1}{2}-1\frac{1}{2}$ $0\frac{1}{2}-0\frac{1}{2}$	$5s^2S - 6p^2P^\circ$ UV 55
515.757 515.741	P P		60.06 60.06	84.10 84.10	$2\frac{1}{2}-1\frac{1}{2}$ $1\frac{1}{2}-0\frac{1}{2}$	$3d^2D - 5p^2P^\circ$ UV 40							
511.834	A	5	60.06	84.28		$3d^2D - 5f^2F^\circ$ UV 41	3161.38 3159.75	A A	3 2	84.10 84.10	88.02 88.02	$1\frac{1}{2}-0\frac{1}{2}$ $0\frac{1}{2}-0\frac{1}{2}$	$5p^2P^\circ - 6s^2S$ 2
436.85	A	4	60.06	88.44		$3d^2D - 6f^2F^\circ$ UV 42	2859.16 2858.03	A A	5l 4	84.10 84.10	88.43 88.43	$1\frac{1}{2}-2\frac{1}{2}$ $0\frac{1}{2}-1\frac{1}{2}$	$5p^2P^\circ - 6d^2D$ UV 56
Air 11327.57 11368.92	P P		75.18 75.18	76.27 76.27	$0\frac{1}{2}-1\frac{1}{2}$ $0\frac{1}{2}-0\frac{1}{2}$	$4s^2S - 4p^2P^\circ$ 1.02	Vac 1882.92 1882.36	A A	1 0	84.10 84.10	90.68 90.68	$1\frac{1}{2}-0\frac{1}{2}$ $0\frac{1}{2}-0\frac{1}{2}$	$5p^2P^\circ - 7s^2S$ UV 57
Vac 1389.514 1389.822	A A	3 2	75.18 75.18	84.10 84.10	$0\frac{1}{2}-1\frac{1}{2}$ $0\frac{1}{2}-0\frac{1}{2}$	$4s^2S - 5p^2P^\circ$ UV 43	1811.62 1811.08	A A	1l 0l	84.10 84.10	90.94 90.94	$1\frac{1}{2}-2\frac{1}{2}$ $0\frac{1}{2}-1\frac{1}{2}$	$5p^2P^\circ - 7d^2D$ UV 58
942.278 942.361	P P		75.18 75.18	88.33 88.33	$0\frac{1}{2}-1\frac{1}{2}$ $0\frac{1}{2}-0\frac{1}{2}$	$4s^2S - 6p^2P^\circ$ UV 44	Air 2974.52	A	6p	84.27	88.44		$5d^2D - 6f^2F^\circ$ UV 59
1703.218 *1702.258	A A	4 3*	76.27 76.27	83.55 83.55	$1\frac{1}{2}-0\frac{1}{2}$ $0\frac{1}{2}-0\frac{1}{2}$	$4p^2P^\circ - 5s^2S$ UV 45	Vac 1857.88 1857.69	A A	3l 3l	84.27 84.27	90.95 90.95	$2\frac{1}{2}-1\frac{1}{2}$ $1\frac{1}{2}-2\frac{1}{2}$	$5d^2D - 7f^2F^\circ$ UV 60
1549.336 1548.647	A P	6	76.27 76.27	84.27 84.27	$1\frac{1}{2}-2\frac{1}{2}$ $0\frac{1}{2}-1\frac{1}{2}$	$4p^2P^\circ - 5d^2D$ UV 46	Air 2980.78	A	8wl	84.28	88.44		$5f^2F^\circ - 6g^2G$ UV 61
1055.229 1054.871	P P		76.27 76.27	88.02 88.02	$1\frac{1}{2}-0\frac{1}{2}$ $0\frac{1}{2}-0\frac{1}{2}$	$4p^2P^\circ - 6s^2S$ UV 47	Vac 1860.37	A	6w	84.28	90.95		$5f^2F^\circ - 7g^2G$ etc. UV 62 etc.
1019.278 1018.973	P P		76.27 76.27	88.43 88.43	$1\frac{1}{2}-2\frac{1}{2}$ $0\frac{1}{2}-1\frac{1}{2}$	$4p^2P^\circ - 6d^2D$ UV 48	1495.5	A	2w	84.28	92.57		$5f^2F^\circ - 8g^2G$ etc. UV 63 etc.
1655.879 1656.065	P P	2* 2*	76.61 76.61	84.10 84.10	$2\frac{1}{2}-1\frac{1}{2}$ $1\frac{1}{2}-0\frac{1}{2}$	$4d^2D - 5p^2P^\circ$ UV 49	Air 2981.31	A	10wl	84.28	88.44		$5g^2G - 6h^2H^\circ$ UV 64
1616.328	A	9wl	76.61	84.28		$4d^2D - 5f^2F^\circ$ UV 50	Vac 1860.37	A	6w	84.28	90.95		$5g^2G - 7h^2H^\circ$ etc. UV 65 etc.
1048.20	A	2w	76.61	88.44		$4d^2D - 6f^2F^\circ$ UV 51	1495.5	A	2w	84.28	92.57		$5g^2G - 8h^2H^\circ$ etc. UV 66 etc.
1621.966	A	1	76.63	84.27		$4f^2F^\circ - 5d^2D$ UV 52	Air 4333.38 4334.49	P P		88.02 88.02	90.88 90.88	$0\frac{1}{2}-1\frac{1}{2}$ $0\frac{1}{2}-0\frac{1}{2}$	$6s^2S - 7p^2P^\circ$ 3
1619.688	A	12wl	76.63	84.28		$4f^2F^\circ - 5g^2G$ UV 53							
1049.65	A	3w	76.63	88.44		$4f^2F^\circ - 6g^2G$ UV 54							

Multiplet Table

Nv - Continued

Nv - Continued

I A	Ref	Int	E P		J	Multiplet No.	I A	Ref	Int	E P		J	Multiplet No.
			Low	High						Low	High		
Air							Air						
5274.66	P		88.33	90.68	$1\frac{1}{2}-0\frac{1}{2}$	$6p^2P^\circ-7s^2S$	4944.49	P		88.44	90.95		$6g^2G-7h^2H^\circ$
5272.04	P		88.33	90.68	$0\frac{1}{2}-0\frac{1}{2}$	4							etc. 10 etc.
4750.57	P		88.33	90.94	$1\frac{1}{2}-2\frac{1}{2}$	$6p^2P^\circ-7d^2D$							
4748.86	P		88.33	90.94	$0\frac{1}{2}-1\frac{1}{2}$	5	4944.71	P		88.44	90.95		$6h^2H^\circ-7i^2I$
													etc. 10.01 etc.
5067.60	P		88.43	90.88	$2\frac{1}{2}-1\frac{1}{2}$	$6d^2D-7p^2P^\circ$							
5068.40	P		88.43	90.88	$1\frac{1}{2}-0\frac{1}{2}$	6							
4933.36	P		88.43	90.95	$2\frac{1}{2}$	$6d^2D-7f^2F^\circ$	6716.95	P		90.68	92.53	$0\frac{1}{2}-1\frac{1}{2}$	$7s^2S-8p^2P^\circ$
4932.68	P		88.43	90.95	$1\frac{1}{2}-2\frac{1}{2}$	7	6718.71	P		90.68	92.53	$0\frac{1}{2}-0\frac{1}{2}$	11
4951.32	P		88.44	90.94	$-2\frac{1}{2}$	$6f^2F^\circ-7d^2D$							
4951.76	P		88.44	90.94	$2\frac{1}{2}-1\frac{1}{2}$	8	7329.09	P		90.88	92.57	$1\frac{1}{2}-2\frac{1}{2}$	$7p^2P^\circ-8d^2D$
							7326.57	P		90.88	92.57	$0\frac{1}{2}-1\frac{1}{2}$	12
4944.56	A	9w	88.44	90.95		$6f^2F^\circ-7g^2G$							
						etc. 9 etc.							
2998.43	A	5w	88.44	92.57		$6f^2F^\circ-8g^2G$	7618.46	A	5w	90.95	92.57		$7g^2G-8h^2H^\circ$
						etc. 9.01 etc.							etc. 13 etc.

NSRDS-NBS 3, SECTION 4

NITROGEN, $Z = 7$

A N VI Atomic Energy Levels

B N VI Multiplet Table

Atomic Energy Levels

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 $1s^2\ ^1S_0 - 2p\ ^3P_1^\circ$, 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 $2p\ ^3P_{2,1}^\circ$. The third line of the group is blended with N III. For this reason, Edlén's estimated value is quoted for $2p\ ^3P_0^\circ$ and entered in brackets in the table. The difference, o-c, is only $-6\ \text{cm}^{-1}$.

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, $3438480\ \text{cm}^{-1}$ 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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Atomic Energy Levels

N VI					N VI				
Config.	Desig.	<i>J</i>	Level	Interval	Config.	Desig.	<i>J</i>	Level	Internal
1s ²	1s ² ¹ S	0	0	[10] 290	1s 3 <i>p</i>	3 <i>p</i> ¹ P ^o	1	4016390	
1s 2s	2s ³ S	1	3385890		1s 4 <i>p</i>	4 <i>p</i> ³ P ^o	0, 1, 2	4202620	
1s 2 <i>p</i>	2 <i>p</i> ³ P ^o	0	[3438310]		1s 4 <i>d</i>	4 <i>d</i> ³ D	1, 2, 3	4205820	
		1	3438320		1s 4 <i>p</i>	4 <i>p</i> ¹ P ^o	1	4206810	
		2	3438610		1s 5 <i>p</i>	5 <i>p</i> ³ P ^o	1, 2, 3	4293080	
1s 2 <i>p</i>	2 <i>p</i> ¹ P ^o	1	3473790		1s 5 <i>d</i>	5 <i>d</i> ³ D	1, 2, 3	4294570	
1s 3 <i>p</i>	3 <i>p</i> ³ P ^o	0, 1, 2	4006160						
1s 3 <i>d</i>	3 <i>d</i> ³ D	1, 2, 3	4013460	N VII (² S _{01/2})	Limit		4452758		

July 1970

Multiplet Table

Part B

NITROGEN

N VI ($Z = 7$)

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

Anal C List A July 1970

REFERENCES

- A F. Tyrén, Nova Acta Reg. Soc. Sci. Uppsala [IV] **12**, No. 1, 24-26 (1940). IP, T, CL; WL 23 Å to 29 Å
- B K. Bockasten, R. Hallin, K. B. Johansson and P. Tsui, Phys. Lett. **8**, No. 3, 181-182 (1964). CL, I; WL 1896 Å to 1907 Å
- C B. C. Fawcett, F. E. Irons, Proc. Phys. Soc. (London) **89**, Part 4, No. 566, 1063-1064 (1966). CL; WL 97 Å to 173 Å
- * and § Blend N III and N VI

N VI							N VI						
I A	Ref	Int	E P		J	Multiplet No.	I A	Ref	Int	E P		J	Multiplet No.
			Low	High						Low	High		
Vac 29.084	A		0.00	426.29	0-1	$1s^2\ ^1S - 2p\ ^3P^\circ_1$	Vac 161.22	C		419.79	496.69	1-	$2s\ ^3S - 3p\ ^3P^\circ_6$
28.787‡	A		0.00	430.68	0-1	$1s^2\ ^1S - 2p\ ^1P^\circ_2$	122.44	C		419.79	521.05	1-	$2s\ ^3S - 4p\ ^3P^\circ_7$
24.898	A		0.00	497.96	0-1	$1s^2\ ^1S - 3p\ ^1P^\circ_3$	110.23	C		419.79	532.26	1-	$2s\ ^3S - 5p\ ^3P^\circ_8$
23.771	A		0.00	521.56	0-1	$1s^2\ ^1S - 4p\ ^1P^\circ_4$	173.92	C		426.31	497.59		$2p\ ^3P^\circ - 3d\ ^3D_9$
							130.32	C		426.31	521.44		$2p\ ^3P^\circ - 4d\ ^3D_{10}$
1896.82	B	3	419.79	426.32	1-2	$2s\ ^3S - 2p\ ^3P^\circ_5$	116.81	C		426.31	532.45		$2p\ ^3P^\circ - 5d\ ^3D_{11}$
1907.34	B	2	419.79	426.29	1-1								
*1907.87§	B	2	419.79	426.29	1-0								

NSRDS-NBS 3, SECTION 4

NITROGEN, $Z = 7$

A N VII Atomic Energy Levels

B N VII Multiplet Table

Atomic Energy Levels

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 $^{14}\text{N VII}$ 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	$4p^2P^\circ$	$0\frac{1}{2}$	5043853	6
2p	$2p^2P^\circ$	$0\frac{1}{2}$	4034761	45	4s	$4s^2S$	$0\frac{1}{2}$	5043859	104
2s	$2s^2S$	$0\frac{1}{2}$	4034806		4p, 4d	$4d^2D$	$1\frac{1}{2}$	5043963	36
2p	$2p^2P^\circ$	$1\frac{1}{2}$	4035641	835	4d, 4f	$4d^2D$	$2\frac{1}{2}$	5043999	19
					4f	$4f^2F^\circ$	$3\frac{1}{2}$	5044018	
3p	$3p^2P^\circ$	$0\frac{1}{2}$	4782263		5p	$5p^2P^\circ$	$0\frac{1}{2}$	5164916	3
3s	$3s^2S$	$0\frac{1}{2}$	4782276	13	5s	$5s^2S$	$0\frac{1}{2}$	5164919	54
3d	$3d^2D$	$1\frac{1}{2}$	4782523	247	5p, 5d	$5d^2D$	$1\frac{1}{2}$	5164973	18
3p	$3p^2P^\circ$	$1\frac{1}{2}$	4782524	1	5d, 5f	$5d^2D$	$2\frac{1}{2}$	5164991	10
3d	$3d^2D$	$2\frac{1}{2}$	4782610	86	5f, 5g	$5g^2G$	$3\frac{1}{2}$	5165001	5
					5g	$5g^2G$	$4\frac{1}{2}$	5165006	

Atomic Energy Levels

NVII – Continued**N VII—Continued**

Config.	Desig.	<i>J</i>	Level	Interval	Config.	Desig.	<i>J</i>	Level	Interval
6 <i>p</i>	6 <i>p</i> ² P°	0½	5230673		11 <i>p</i>	11 <i>p</i> ² P°	0½	5335641	
6 <i>s</i>	6 <i>s</i> ² S	0½	5230675	2	11 <i>s</i>	11 <i>s</i> ² S	0½	5335642	1
6 <i>d</i>	6 <i>d</i> ² D	1½	5230705	30	etc.		10½	to 51	9
6 <i>p</i>	6 <i>p</i> ² P°	1½	5230706	1					
6 <i>d</i> , 6 <i>f</i>	6 <i>d</i> ² D	2½	5230716	10	12 <i>p</i>	12 <i>p</i> ² P°	0½	5342741	1
6 <i>f</i> , 6 <i>g</i>	6 <i>g</i> ² G	3½	5230722	6	12 <i>s</i>	12 <i>s</i> ² S	0½	5342742	7
6 <i>g</i> , 6 <i>h</i>	6 <i>g</i> ² G	4½	5230725	3	etc.		11¼	to 49	
6 <i>h</i>	6 <i>h</i> ² H°	5½	5230727	2					
					13 <i>s</i> , 13 <i>p</i>	13 <i>s</i> ² S	0½	5348267	
7 <i>p</i>	7 <i>p</i> ² P°	0½	5270319		etc.		12½	to 72	5
7 <i>s</i>	7 <i>s</i> ² S	0½	5270320	1					
7 <i>p</i> , 7 <i>d</i>	7 <i>d</i> ² D	1½	5270340	20	14 <i>s</i> , 14 <i>p</i>	14 <i>s</i> ² S	0½	5352651	
7 <i>d</i> , 7 <i>f</i>	7 <i>d</i> ² D	2½	5270346	6	etc.		13½	to 55	4
7 <i>f</i> , 7 <i>g</i>	7 <i>g</i> ² G	3½	5270350	4					
7 <i>g</i> , 7 <i>h</i>	7 <i>g</i> ² G	4½	5270352	2	15 <i>s</i> , 15 <i>p</i>	15 <i>s</i> ² S	0½	5356187	
7 <i>h</i> , 7 <i>i</i>	7 <i>i</i> ² I	5½	5270353	1	etc.		14½	to 91	4
7 <i>i</i>	7 <i>i</i> ² I	6½	5270354	1					
					16 <i>s</i> , 16 <i>p</i>	16 <i>s</i> ² S	0½	5359082	
8 <i>p</i>	8 <i>p</i> ² P°	0½	5296049	1	etc.		15½	to 85	3
8 <i>s</i>	8 <i>s</i> ² S	0½	5296050	13					
8 <i>p</i> , 8 <i>d</i>	8 <i>d</i> ² D	1½	5296063	5	17 <i>s</i> , 17 <i>p</i>	17 <i>s</i> ² S	0½	5361481	
8 <i>d</i> , 8 <i>f</i>	8 <i>d</i> ² D	2½	5296068	2	etc.		16½	to 83	2
8 <i>f</i> , 8 <i>g</i>	8 <i>g</i> ² G	3½	5296070	1					
8 <i>g</i> , 8 <i>h</i>	8 <i>g</i> ² G	4½	5296071	1	18 <i>s</i> , 18 <i>p</i>	18 <i>s</i> ² S	0½	5363491	
8 <i>h</i> , 8 <i>i</i>	8 <i>i</i> ² I	5½	5296072	1	etc.		17½	to 93	2
8 <i>i</i> , 8 <i>k</i>	8 <i>i</i> ² I	6½	5296073	1					
8 <i>k</i>	8 <i>k</i> ² K°	7½	5296073	0	19 <i>s</i> , 19 <i>p</i>	19 <i>s</i> ² S	0½	5365192	
					etc.		18½	to 94	2
9 <i>p</i>	9 <i>p</i> ² P°	0½	5313689	1					
9 <i>s</i>	9 <i>s</i> ² S	0½	5313690	9	20 <i>s</i> , 20 <i>p</i>	20 <i>s</i> ² S	0½	5366645	
9 <i>p</i> , 9 <i>d</i>	9 <i>d</i> ² D	1½	5313699	3	etc.		19½	to 46	1
9 <i>d</i> , 9 <i>f</i>	9 <i>d</i> ² D	2½	5313702	2					
9 <i>f</i> , 9 <i>g</i>	9 <i>g</i> ² G	3½	5313704	1					
9 <i>g</i> , 9 <i>h</i>	9 <i>g</i> ² G	4½	5313705	0					
9 <i>h</i> , 9 <i>i</i>	9 <i>i</i> ² I	5½	5313705	1					
9 <i>i</i> , 9 <i>k</i>	9 <i>i</i> ² I	6½	5313706	0					
9 <i>k</i> , 9 <i>l</i>	9 <i>l</i> ² L	7½	5313706	0					
9 <i>l</i>	9 <i>l</i> ² L	8½	5313706	0					
10 <i>p</i>	10 <i>p</i> ² P°	0½	5326306						
10 <i>s</i>	10 <i>s</i> ² S	0½	5326307	1					
10 <i>d</i>	10 <i>d</i> ² D	1½	5326313	6					
10 <i>p</i>	10 <i>p</i> ² P°	1½	5326314	1					
10 <i>d</i> , 10 <i>f</i>	10 <i>d</i> ² D	2½	5326316	2					
10 <i>f</i> , 10 <i>g</i>	10 <i>g</i> ² G	3½	5326317	1					
10 <i>g</i> , 10 <i>h</i>	10 <i>g</i> ² G	4½	5326318	1					
10 <i>h</i> , 10 <i>i</i>	10 <i>i</i> ² I	5½	5326318	0					
10 <i>i</i> , 10 <i>k</i>	10 <i>i</i> ² I	6½	5326319	1					
10 <i>k</i> , 10 <i>l</i>	10 <i>l</i> ² L	7½	5326319	0					
10 <i>l</i> , 10 <i>m</i>	10 <i>l</i> ² L	8½	5326319	0					
10 <i>m</i>	10 <i>m</i> ² M°	9½	5326319	0					

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		J	Multiplet No.	I A	Ref	Int	E P		J	Multiplet No.
			Low	High						Low	High		
Vac							Vac						
24.7792	A		0.00	500.34	$0\frac{1}{2}-1\frac{1}{2}$	$1s^2S - 2p^2P^\circ$	18.6976	A		0.00	663.08	$0\frac{1}{2}-$	$1s^2S - 13p^2P^\circ$
24.7846	A		0.00	500.23	$0\frac{1}{2}-0\frac{1}{2}$	1							12
20.9095	A		0.00	592.94	$0\frac{1}{2}-1\frac{1}{2}$	$1s^2S - 3p^2P^\circ$	18.6823	A		0.00	663.63	$0\frac{1}{2}-$	$1s^2S - 14p^2P^\circ$
20.9106	A		0.00	592.91	$0\frac{1}{2}-0\frac{1}{2}$	2							13
19.8257	A		0.00	625.36	$0\frac{1}{2}-1\frac{1}{2}$	$1s^2S - 4p^2P^\circ$	18.6700	A		0.00	664.07	$0\frac{1}{2}-$	$1s^2S - 15p^2P^\circ$
19.8261	A		0.00	625.34	$0\frac{1}{2}-0\frac{1}{2}$	3							14
19.3612	A		0.00	640.36	$0\frac{1}{2}-1\frac{1}{2}$	$1s^2S - 5p^2P^\circ$	18.6599	A		0.00	664.42	$0\frac{1}{2}-$	$1s^2S - 16p^2P^\circ$
19.3614	A		0.00	640.35	$0\frac{1}{2}-0\frac{1}{2}$	4							15
19.1179	A		0.00	648.51	$0\frac{1}{2}-1\frac{1}{2}$	$1s^2S - 6p^2P^\circ$	18.6516	A		0.00	664.72	$0\frac{1}{2}-$	$1s^2S - 17p^2P^\circ$
19.1180	A		0.00	648.50	$0\frac{1}{2}-0\frac{1}{2}$	5							16
18.9741	A		0.00	653.42	$0\frac{1}{2}-1\frac{1}{2}$	$1s^2S - 7p^2P^\circ$	18.6446	A		0.00	664.97	$0\frac{1}{2}-$	$1s^2S - 18p^2P^\circ$
18.9742	A		0.00	653.42	$0\frac{1}{2}-0\frac{1}{2}$	6							17
18.8819	A		0.00	656.61	$0\frac{1}{2}-1\frac{1}{2}$	$1s^2S - 8p^2P^\circ$	18.6387	A		0.00	665.18	$0\frac{1}{2}-$	$1s^2S - 19p^2P^\circ$
18.8820	A		0.00	656.61	$0\frac{1}{2}-0\frac{1}{2}$	7							18
18.8193	A		0.00	658.80	$0\frac{1}{2}-$	$1s^2S - 9p^2P^\circ$	18.6336	A		0.00	665.36	$0\frac{1}{2}-$	$1s^2S - 20p^2P^\circ$
						8							19
18.7747	A		0.00	660.36	$0\frac{1}{2}-$	$1s^2S - 10p^2P^\circ$							
						9							
18.7419	A		0.00	661.52	$0\frac{1}{2}-$	$1s^2S - 11p^2P^\circ$	133.934	A		500.34	592.91	$1\frac{1}{2}-0\frac{1}{2}$	$2p^2P^\circ - 3s^2S$
						10	133.777	A		500.23	592.91	$0\frac{1}{2}-0\frac{1}{2}$	20
18.7170	A		0.00	662.40	$0\frac{1}{2}-$	$1s^2S - 12p^2P^\circ$	133.874	A		500.34	592.95	$1\frac{1}{2}-2\frac{1}{2}$	$2p^2P^\circ - 3d^2D$
						11	133.732	A		500.23	592.94	$0\frac{1}{2}-1\frac{1}{2}$	21
							133.890	A		500.34	592.94	$1\frac{1}{2}-1\frac{1}{2}$	

Multiplet Table

N VII — Continued

N VII — Continued

I A	Ref	Int	E P		J	Multiplet No.	I A	Ref	Int	E P		J	Multiplet No.
			Low	High						Low	High		
Vac							Vac						
99.185	A		500.34	625.34	$1\frac{1}{2}-0\frac{1}{2}$	$2p^2P^\circ-4s^2S$	75.701	A		500.30	664.07		$2p^2P^\circ-15d^2D$
99.098	A		500.23	625.34	$0\frac{1}{2}-0\frac{1}{2}$	22							etc. 42 etc.
99.134	A		500.30	625.36		$2p^2P^\circ-4d^2D$							
						etc. 23 etc.							
88.552	A		500.34	640.35	$1\frac{1}{2}-0\frac{1}{2}$	$2p^2P^\circ-5s^2S$	133.740	A		500.24	592.24	$0\frac{1}{2}-1\frac{1}{2}$	$2s^2S-3p^2P^\circ$
88.483	A		500.23	640.35	$0\frac{1}{2}-0\frac{1}{2}$	24	133.787	A		500.24	592.91	$0\frac{1}{2}-0\frac{1}{2}$	43
88.515	A		500.30	640.36		$2p^2P^\circ-5d^2D$	99.093	A		500.24	625.36	$0\frac{1}{2}-1\frac{1}{2}$	$2s^2S-4p^2P^\circ$
						etc. 25 etc.	99.103	A		500.24	625.34	$0\frac{1}{2}-0\frac{1}{2}$	44
83.680	A		500.34	648.50	$1\frac{1}{2}-0\frac{1}{2}$	$2p^2P^\circ-6s^2S$	88.482	A		500.24	640.36	$0\frac{1}{2}-1\frac{1}{2}$	$2s^2S-5p^2P^\circ$
83.618	A		500.23	648.50	$0\frac{1}{2}-0\frac{1}{2}$	26	88.487	A		500.24	640.35	$0\frac{1}{2}-0\frac{1}{2}$	45
83.648	A		500.30	648.51		$2p^2P^\circ-6d^2D$	83.619	A		500.24	648.51	$0\frac{1}{2}-1\frac{1}{2}$	$2s^2S-6p^2P^\circ$
						etc. 27 etc.	83.621	A		500.24	648.50	$0\frac{1}{2}-0\frac{1}{2}$	46
80.993	A		500.34	653.42	$1\frac{1}{2}-0\frac{1}{2}$	$2p^2P^\circ-7s^2S$	80.937	A		500.24	653.42	$0\frac{1}{2}-1\frac{1}{2}$	$2s^2S-7p^2P^\circ$
80.935	A		500.23	653.42	$0\frac{1}{2}-0\frac{1}{2}$	28	80.938	A		500.24	653.42	$0\frac{1}{2}-0\frac{1}{2}$	47
80.963	A		500.30	653.42		$2p^2P^\circ-7d^2D$	79.286	A		500.24	656.61	$0\frac{1}{2}-1\frac{1}{2}$	$2s^2S-8p^2P^\circ$
						etc. 29 etc.	79.287	A		500.24	656.61	$0\frac{1}{2}-0\frac{1}{2}$	48
79.339	A		500.34	656.61	$1\frac{1}{2}-0\frac{1}{2}$	$2p^2P^\circ-8s^2S$	78.193	A		500.24	658.80	$0\frac{1}{2}-1\frac{1}{2}$	$2s^2S-9p^2P^\circ$
79.284	A		500.23	656.61	$0\frac{1}{2}-0\frac{1}{2}$	30	78.132	A		500.24	658.80	$0\frac{1}{2}-0\frac{1}{2}$	49
79.311	A		500.30	656.61		$2p^2P^\circ-8d^2D$	77.429	A		500.24	660.36	$0\frac{1}{2}-$	$2s^2S-10p^2P^\circ$
						etc. 31 etc.							50
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	382.651	A		592.94	625.34	$1\frac{1}{2}-0\frac{1}{2}$	$3p^2P^\circ-4s^2S$
78.217	A		500.30	658.80		$2p^2P^\circ-9d^2D$	382.269	A		592.91	625.34	$0\frac{1}{2}-0\frac{1}{2}$	51
						etc. 33 etc.	261.510	A		592.94	640.35	$1\frac{1}{2}-0\frac{1}{2}$	$3p^2P^\circ-5s^2S$
77.479	A		500.34	660.36	$1\frac{1}{2}-0\frac{1}{2}$	$2p^2P^\circ-10s^2S$	261.331	A		592.91	640.35	$0\frac{1}{2}-0\frac{1}{2}$	52
77.427	A		500.23	660.36	$0\frac{1}{2}-0\frac{1}{2}$	34	223.139	A		592.94	648.50	$1\frac{1}{2}-0\frac{1}{2}$	$3p^2P^\circ-6s^2S$
77.453	A		500.30	660.36		$2p^2P^\circ-10d^2D$	223.009	A		592.91	648.50	$0\frac{1}{2}-0\frac{1}{2}$	53
						etc. 35 etc.	205.004	A		592.94	653.42	$1\frac{1}{2}-0\frac{1}{2}$	$3p^2P^\circ-7s^2S$
76.923	A		500.34	661.52	$1\frac{1}{2}-0\frac{1}{2}$	$2p^2P^\circ-11s^2S$	204.894	A		592.91	653.42	$0\frac{1}{2}-0\frac{1}{2}$	54
76.871	A		500.23	661.52	$0\frac{1}{2}-0\frac{1}{2}$	36	194.732	A		592.94	656.61	$1\frac{1}{2}-0\frac{1}{2}$	$3p^2P^\circ-8s^2S$
76.897	A		500.30	661.52		$2p^2P^\circ-11d^2D$	194.633	A		592.91	656.61	$0\frac{1}{2}-0\frac{1}{2}$	55
						etc. 37 etc.	188.265	A		592.94	658.80	$1\frac{1}{2}-0\frac{1}{2}$	$3p^2P^\circ-9s^2S$
76.505	A		500.34	662.40	$1\frac{1}{2}-0\frac{1}{2}$	$2p^2P^\circ-12s^2S$	188.173	A		592.91	658.80	$0\frac{1}{2}-0\frac{1}{2}$	56
76.454	A		500.23	662.40	$0\frac{1}{2}-0\frac{1}{2}$	38	183.897	A		592.94	660.36	$1\frac{1}{2}-0\frac{1}{2}$	$3p^2P^\circ-10s^2S$
76.480	A		500.30	662.40		$2p^2P^\circ-12d^2D$	183.809	A		592.91	660.36	$0\frac{1}{2}-0\frac{1}{2}$	57
						etc. 39 etc.							
76.158	A		500.30	663.08		$2p^2P^\circ-13d^2D$	382.136	A		592.91	625.36	$0\frac{1}{2}-1\frac{1}{2}$	$3s^2S-4p^2P^\circ$
						etc. 40 etc.	382.297	A		592.91	625.34	$0\frac{1}{2}-0\frac{1}{2}$	58
75.904	A		500.30	663.63		$2p^2P^\circ-14d^2D$	261.303	A		592.91	640.36	$0\frac{1}{2}-1\frac{1}{2}$	$3s^2S-5p^2P^\circ$
						etc. 41 etc.	261.342	A		592.91	640.35	$0\frac{1}{2}-0\frac{1}{2}$	59

Multiplet Table

N VII — Continued

N VII — Continued

I A	Ref	Int	E P		J	Multiplet No.	I A	Ref	Int	E P		J	Multiplet No.
			Low	High						Low	High		
Vac							Vac						
223.000	A		592.91	648.51	$0\frac{1}{2}-1\frac{1}{2}$	$3s^2S - 6p^2P^\circ$	396.677	A		625.36	656.61		$4d^2D - 8f^2F^\circ$
223.017	A		592.91	648.50	$0\frac{1}{2}-0\frac{1}{2}$	60							etc. 78 etc.
204.891	A		592.91	653.42	$0\frac{1}{2}-1\frac{1}{2}$	$3s^2S - 7p^2P^\circ$	370.741	A		625.36	658.80		$4d^2D - 9f^2F^\circ$
204.900	A		592.91	653.42	$0\frac{1}{2}-0\frac{1}{2}$	61							etc. 79 etc.
382.445	A		592.95	625.36		$3d^2D - 4f^2F^\circ$	354.177	A		625.36	660.36		$4d^2D - 10f^2F^\circ$
						etc. 62 etc.							etc. 80 etc.
261.449	A		592.95	640.36		$3d^2D - 5f^2F^\circ$	1522.024	A		640.36	648.50	$1\frac{1}{2}-0\frac{1}{2}$	$5p^2P^\circ - 6s^2S$
						etc. 63 etc.	1520.704	A		640.35	648.50	$0\frac{1}{2}-0\frac{1}{2}$	81
223.106	A		592.95	648.51		$3d^2D - 6f^2F^\circ$	949.244	A		640.36	653.42	$1\frac{1}{2}-0\frac{1}{2}$	$5p^2P^\circ - 7s^2S$
						etc. 64 etc.	948.731	A		640.35	653.42	$0\frac{1}{2}-0\frac{1}{2}$	82
204.980	A		592.95	653.42		$3d^2D - 7f^2F^\circ$	762.910	A		640.36	656.61	$1\frac{1}{2}-0\frac{1}{2}$	$5p^2P^\circ - 8s^2S$
						etc. 65 etc.	762.579	A		640.35	656.61	$0\frac{1}{2}-0\frac{1}{2}$	83
194.713	A		592.95	656.61		$3d^2D - 8f^2F^\circ$	672.418	A		640.36	658.80	$1\frac{1}{2}-0\frac{1}{2}$	$5p^2P^\circ - 9s^2S$
						etc. 66 etc.	672.160	A		640.35	658.80	$0\frac{1}{2}-0\frac{1}{2}$	84
188.248	A		592.95	658.80		$3d^2D - 9f^2F^\circ$	619.832	A		640.36	660.36	$1\frac{1}{2}-0\frac{1}{2}$	$5p^2P^\circ - 10s^2S$
						etc. 67 etc.	619.613	A		640.35	660.36	$0\frac{1}{2}-0\frac{1}{2}$	85
183.881	A		592.95	660.36		$3d^2D - 10f^2F^\circ$							
						etc. 68 etc.							
826.747	A		625.36	640.35	$1\frac{1}{2}-0\frac{1}{2}$	$4p^2P^\circ - 5s^2S$	1521.41	A		640.36	648.51		$5d^2D - 6f^2F^\circ$
825.996	A		625.34	640.35	$0\frac{1}{2}-0\frac{1}{2}$	69							etc. 86 etc.
535.584	A		625.36	648.50	$1\frac{1}{2}-0\frac{1}{2}$	$4p^2P^\circ - 6s^2S$	949.134	A		640.36	653.42		$5d^2D - 7f^2F^\circ$
535.269	A		625.34	648.50	$0\frac{1}{2}-0\frac{1}{2}$	70							etc. 87 etc.
441.780	A		625.36	653.42	$1\frac{1}{2}-0\frac{1}{2}$	$4p^2P^\circ - 7s^2S$	762.884	A		640.36	656.61		$5d^2D - 8f^2F^\circ$
441.565	A		625.34	653.42	$0\frac{1}{2}-0\frac{1}{2}$	71							etc. 88 etc.
396.688	A		625.36	656.61	$1\frac{1}{2}-0\frac{1}{2}$	$4p^2P^\circ - 8s^2S$	Vac			640.36	658.80		$5d^2D - 9f^2F^\circ$
396.515	A		625.34	656.61	$0\frac{1}{2}-0\frac{1}{2}$	72	672.420	A					etc. 89 etc.
370.745	A		625.36	658.80	$1\frac{1}{2}-0\frac{1}{2}$	$4p^2P^\circ - 9s^2S$	619.844	A		640.36	660.36		$5d^2D - 10f^2F^\circ$
370.594	A		625.34	658.80	$0\frac{1}{2}-0\frac{1}{2}$	73							etc. 90 etc.
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		$4d^2D - 5f^2F^\circ$	Air						
						etc. 75 etc.	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
535.510	A		625.36	648.51		$4d^2D - 6f^2F^\circ$	Vac			648.51	656.61	$1\frac{1}{2}-0\frac{1}{2}$	$6p^2P^\circ - 8s^2S$
						etc. 76 etc.	1530.362	A		648.50	656.61	$0\frac{1}{2}-0\frac{1}{2}$	92
441.753	A		625.36	653.42		$4d^2D - 7f^2F^\circ$	1205.052	A		648.51	658.80	$1\frac{1}{2}-0\frac{1}{2}$	$6p^2P^\circ - 9s^2S$
						etc. 77 etc.	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

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