TERM ANALYSIS OF THE THIRD SPECTRUM OF IRON (Fe III)*

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ABSTRACT

The Fe III spectrum has been measured in the region from approximately 500 A to 6500 A, and its analysis has been carried as far as the observational data permit. Of the 34 theoretically possible terms of the $3d^6$ configuration, 32 have been found, the 2 high ^1S and ^1D terms being the only missing ones. Of the 74 theoretical levels for $3d^5 4s$, only 10 high-lying levels[1,3](SPD) have not been found. Of the configuration $3d^5 4p$, practically all theoretically possible levels corresponding to those found of $3d^5 4s$ have been established. The final tables contain 320 levels and approximately 1500 classified lines.

The permitted and forbidden transitions of Fe III play an important role in a wide variety of stellar and nebular spectra.

INTRODUCTION

This analysis of the third spectrum of iron was originally started with the limited aim of securing the metastable levels for astrophysical needs but was gradually extended far beyond this scope. The final result presented here comprises the classification of more than 1500 lines by which some 320 energy levels are established, and it is a practically complete analysis of the available observational data.

The investigation was started in 1937 and was performed at the Astrophysical Institute of the University of Liége and the Physics Laboratory of the University of Uppsala. Some spectrograms of vital importance for the analysis were also secured at the Spectroscopy Laboratory of Massachusetts Institute of Technology. The greatest part of the measurements and wave-length computations were made at Liége. In connection with astrophysical applications some of the results obtained up to August, 1939, have been published.[3] The analysis was afterward carried on and completed at Uppsala.

When the present analysis began, Bowen[4] had identified 3 important multiplets of Fe III, namely $3d^5D-4s^5P$, $4s^5S-4p^5P$, and $4s^7S-4p^7P$. Later, Green[5] found the additional multiplets a^5G-z^5H, a^5G-z^5G, part of a^5G-z^5F, and other fragmentary quintets, in all some 30 new lines. They were also independently found during the present work.

THE SPECTROGRAMS

The spectrograms used in this description of Fe III cover the region from approximately 500 A to 6500 A. With a grazing incidence spectrograph[6] at Uppsala, spectra of a vacuum spark between pure iron rods were taken on Schumann plates from the short-wave-length end up to 2300 A. They were evaluated from about 1300 A down and furnished the only observations below 1017 A. The dispersion varied from 3.6 A/mm at 700 A to 4.3 A/mm at 1100 A. In this region no Fe II lines appear in the spark, but considerable difficulty is caused by the overlapping of lines of higher ionization stages in the same or higher grating orders. Spectra taken with various amounts of self-inductance permitted, however, the Fe III lines to be rather unambiguously picked out.

[3] Edlén and Swings, Ap. J., **88**, 618, 1938; **90**, 378, 1939; Observatory, **62**, 234, 1939.

[4] Phys. Rev., **52**, 1153, 1937.

[5] Phys. Rev., **55**, 1209, 1939.　　　　[6] Described by G. Arvidsson, Ann. d. Phys., **12**, 787, 1932.

The best spectra for the long-wave-length part of the vacuum region were obtained with the normal-incidence vacuum spectrograph[7] of the Carnegie Institution of Washington, located in the Spectroscopy Laboratory of the Massachusetts Institute of Technology. With the grating normal falling at about 1850 A, it gives an almost constant dispersion of 4.2 A/mm and an excellent definition. A spark in nitrogen at 1/2 atm. pressure and Ilford Q-plates were used. For most of the exposures the slit was covered by a lithium fluorite window, in order to keep high vacuum in the spectrograph and to prevent the slit from being clogged by dust particles from the spark. This limited the spectra at about 1300 A. A few exposures taken without a window showed lines down to 1017 A; but the nitrogen, which was not specially purified, exerted a strong discontinuous absorption, as is clearly shown in Table 1 by the intensities in the region 1017–1143 A. The spark gap was 3–5 mm in length and was placed parallel to the slit at such a distance that different heights of the spark were stigmatically reproduced in the spectral lines. The *Fe* I and the *Fe* II lines were strongest in the middle of the spark, *Fe* III was somewhat strengthened at the poles and *Fe* IV appeared only near the poles; hence the different intensity distribution in the spectral lines provided a sharp distinction of the *Fe* III lines from the neighboring stages of ionization.

From 2023 A up through the visible region, spectra of the vacuum spark were taken with a Hilger E1 quartz-prism spectrograph,[8] supplemented with a small glass-prism spectrograph in the red. The main difficulty here is caused by the overlapping of the very rich spectra of *Fe* I and particularly *Fe* II. Though not contained in Dobbie's *Fe* II table,[9] many of the observed lines are probably high-excitation *Fe* II lines. As the experimental distinction between *Fe* III and the neighboring ionization stages is somewhat uncertain in these spectrograms, only the identified *Fe* III lines are included in Table 1. In the visible region of the prism spectra the measurements are rather uncertain, owing to low dispersion and overlapping of lines. A reobservation of this region with high dispersion is desirable. A few identified *Fe* III lines in the red end of the spectrum are evidently contained in King's measurements[10] of the spark in air; his wave lengths are given in Table 1.

Computed standard wave lengths of *Fe* II were used in the reduction of the measurements down to 1350 A. Further down the *Fe* III lines have been tied together step by step on the combination principle to form a system of working standards. It is connected to the system of computed *Fe* II standards through some lines measured on the M.I.T. plates, partly in the second order.

<div align="center">ANALYSIS</div>

The deepest electron configuration of *Fe* III is $3d^6$. The next higher is $3d^5\,4s$, of which the main part lies well above the $3d^6$ terms. The transitions to $3d^6$ from the lowest odd configuration $3d^5\,4p$ form the group of short wave lengths in Table 1, extending from 679 A to 1143 A. About 450 combinations of this type are included in Table 1, though many as parts of unresolved blends. This table contains also in the same region 9 unidentified faint lines, which probably belong to the same transition. The largest number of observed *Fe* III lines is due to the transition $3d^5\,4s-3d^5\,4p$, of which Table 1 contains nearly 1000 identified combinations. Except for a few sporadic identifications, they are comprised between 1700 A and 4000 A, and the main part of the strong lines is concentrated in the region 1800–2200 A.

No terms of higher electron configurations have been identified, except for such arising from the basic term $3d^5(^6S)$ of *Fe* IV. Among the various terms of the same con-

[7] K. T. Compton and J. C. Boyce, *Rev. Sci. Inst.*, **5**, 218, 1934.

[8] Cf. *Ap. J.*, **90**, 378, 1939.

[9] *Ann. Solar Phys. Obs.*, **5**, Part I, 1938.   [10] *Ap. J.*, **87**, 399, 1938.

figuration, those arising from ^6S are very predominant, especially for high n and l quantum numbers. Thus, $4p^7P - 4d^7D$, $4p^5P - 4d^5D$ and $4p^7P - 5s^7S$ form outstanding multiplets in the region 1400–1600 A. Within approximately the same limits a very large number of partly unresolved Fe III lines are observed, doubtless due to the same type of transition, which should give very numerous lines. These lines are clearly distinguished from the sharp lines of 4s—4p by their nebulous appearance in the nitrogen spark. An attempt to identify terms of the 4d and 5s configurations other than those built on ^6S proved fruitless. As in the case of the transition 4p—4d, the septet and the quintet multiplets of the (^6S) system of 4d—4f and 4f—5g mark the limits on the short- and long-wave-lengths sides, respectively, of dense-line groups of corresponding transitions. In the case of 4f—5g this group is reduced to a strong continuum from 4370 to 4315 A.

The prominent character of the (^6S) system made it possible to trace three members of the (^6S)ns series. In good agreement with a nearly hydrogen-like value for $5g^7G^5G$, this locates the series limit at 247200 cm^{-1}, or 30.50 volts above the ground level.

The main result of the present analysis consists of the very complete location of the terms of the configurations $3d^6$, $3d^5$ 4s and $3d^5$ 4p. Of 34 theoretically possible levels of $3d^6$, only the two high ^1D and ^1S are not found. They are expected at 75,000 and 100,000 cm^{-1}, respectively, and may not cause any observed lines. The configuration $3d^5$ 4s gives theoretically 74 levels, of which the 10 forming the high terms ^{1,3}(SPD) are still missing. The $^{1,3}S$ terms should fall around 100,000 cm^{-1}, and ^3S ought to give observable lines with w^3P. The very high ^{1,3}(PD) may be approximately located around 130,000 cm^{-1}. Of $3d^5$ 4p practically all terms are found, except those corresponding to the above-mentioned high ^{1,3}(PD). Altogether, 189 levels are identified, a few, however, marked as questionable in the term table.

In the main region for 4s—4p transitions practically no lines remain unidentified. It is remarkable that no terms of the configurations $3d^4$ 4s^2 or $3d^4$ 4s4p are found.

THE TABLE OF LINES

In Table 1, which contains some 1500 identified lines, are also included all unidentified lines observed with the grating spectrographs and experimentally classified as Fe III, except the diffuse group of 4p—4d, 5s at 1400–1600 A. The first column gives the wave length, above 2023 A in air and below in vacuum. The 7 lines above 5833 A from King's list[11] are marked with a K. King's intensities for these lines are given in brackets in the second column.

The second column gives estimates of the line intensity. The scale is fairly homogenous only for the grating plates. The various remarks following or replacing the intensity figure have the following meaning:

$$n = \text{nebulous,}$$

$$b = \text{broad, double, or more complex,}$$

$$unr = \text{unresolved}$$

$$m \text{ I or } m \text{ II} = \text{masked by } Fe \text{ I or } Fe \text{ II,}$$

$$bl \text{ I or } bl \text{ II} = \text{blended by } Fe \text{ I or } Fe \text{ II.}$$

$$blg = \text{blended by grating ghost}$$

A vertical arrow indicates that the line is winged or shaded. In the third column a wave number followed by a c is computed from the level values.

[11] *Loc. cit.*

THE TERM TABLE

Tables 2 and 3 contain the even and odd terms, respectively. The first column gives the electron configuration. In cases where two terms of the same kind of the configuration $3d^5$ appear as basic terms, the higher one is distinguished by a mark ′ (prime) attached to the term symbol. Thus the configuration of a^1F is given as $3d^5(^2F)4s$ and that of b^1F as $3d^5(^2F')4s$. The second column gives the term symbol according to the same system that was used by Curtis for the isoelectronic spectrum *Mn* II. This system is particularly suited to the present analysis of *Fe* III in separating the group of $3d^6$ terms from those of $3d^5 4s$ and pointing out the special character of the (^6S) system. When, however, the analysis revealed also the high ^3F, ^3P, and ^1G of the $3d^6$ configuration, it became necessary to make a distinction from the low terms of the same kind, and the prefix $3d'$ instead of $3d$ was attached to the high terms.

The level values in the third column were computed in the following way. Since the main body of the level system, consisting of terms of $3d^5 4s$ and $3d^5 4p$ is well tied together by numerous combinations in a favorable wave-length region, it was first treated to form a central system, to which the $3d^6$ levels and the (^6S) system could afterward be attached. For the calculation of this central system, use was made of all the observed combinations with wave numbers between 60,000 and 25,000 cm⁻¹, which were judged to be unaffected by blends, close lines, or extreme faintness. These selected combinations amounted to about 400 and were all given equal weight. The levels were then obtained through successive approximations. Starting with a set of approximate odd-level values, each even level was computed from all its selected combinations, and the mean value was taken. Using these new values of the even levels, the odd levels were now computed in the same way, giving an improved set of odd-level values. The process was then repeated until no further change in the values took place. The (^6S) system was separately treated in a similar way and tied to the central system through the multiplet $a^5P - 4p^5P$. The $3d^6$ levels were individually tied up with the odd terms of the central system.

Term perturbations are frequent, especially among the odd terms. Some of the most striking cases may be pointed out. The group $z^5F^5S^5D$ is mixed up in the same way as Curtis found for *Mn* II. The multiplet intensities are very anomalous, the z^5S, for instance, combining with a^5G. The most astonishing example is, perhaps, the absence of $3d^5D_4 - z^5D_4$ in the otherwise strong multiplet. Multiplets involving z^3D, y^5D, and y^5P also show strange intensities, indicating strong mutual perturbations. The levels $z^3I_{7, 6}$ and $z^3K_{7, 6}$ are indistinguishable, as well as z^1D_2 and x^3F_2. The latter case combined with some exchange between a^5F and b^3D causes one of the few quintet-singlet combinations, $a^5F_1 - z^1D_2$. Two others are caused by the closeness of z^1I_6 and y^5G_6. Another exchange takes place between a^3F_2 and a^1D_2. The designation of term symbols as well as limits for the odd terms are ambiguous in several cases.

THE ASTRONOMICAL APPLICATIONS

A. *Permitted lines.*—Many lines that were previously unidentified in the early B stars (absorption) or in the shell stars of early type (absorption and emission) are due to *Fe* III. More than 100 such identifications, including some strong stellar lines, have been mentioned in our earlier notes[12] and in several subsequent papers.[13] These may be supplemented on the basis of the present paper. For example, the 3 emission lines with violet

[12] *Ap. J.*, **88**, 618, 1938; **90**, 378, 1939.

[13] Struve and Roach, *Ap. J.*, **90**, 727, 1939 (P Cygni); Baldwin, *Ap. J.*, **93**, 421, 1941 (ζ Tauri); Struve and Elvey, *Pub. A.S.P.*, **52**, 140, 1940 (γ Cassiopeiae); Swings and Struve, *Ap. J.*, **91**, 589, 1940 (γ Cas), and *Pub. A.S.P.*, **52**, 392, 1940 (region λ <3300 of P Cygni, which consists of one line of *He* I, four of *Si* III, and nineteen of *Fe* III).

absorption, observed in P Cygni[14] at $\lambda\lambda$ 4004.62, 4022.12, and 4038.74, are the leading lines of the $c^3F - z^3F°$ multiplet of Fe III. Similarly, the following other lines are due to Fe III: λ 3747.40 observed in P Cygni,[15] γ Cassiopeiae,[16] and ζ Tauri;[17] $\lambda\lambda$ 3954.38, 3969.43, and 4005.04, observed in absorption in B stars.[18]

No attempt will be made here to revise or complete the identifications of the numerous lists of stellar wave lengths in which Fe III plays a role. The Fe III lines may help in discussing the ionization conditions in stellar atmospheres of early type.[19] In certain stars, like P Cygni or γ Cassiopeiae (at the sharp-line stage of 1939), the Fe III lines constituted the most conspicuous features of the entire spectrum, except H and He I.

Two types of strong permitted Fe III lines appear in the astronomical region. In the first group the lower levels are even terms of the configuration $3d^5 4s$ situated between 65,000 and 100,000 cm^{-1}; these terms are all metastable or quasi-metastable. In the second group the lower levels are the high terms $4d^{5,7}D$, $4f^{5,7}F°$, $5s^{5,7}S$, $5p^{5,7}P°$, which are not metastable. In an extended atmosphere, excited by diluted radiation, the first group becomes considerably enhanced relative to the second. This is observed in P Cygni, γ Cassiopeiae, and ζ Tauri. The enhancement gives an estimate of the dilution factor; in various early-type shells this is the easiest way to ascertain the presence of dilution. For example, λ 4165 and λ 4372 (second group) are much stronger than λ 4419 (first group) in ordinary absorption B stars, whereas the opposite is true in P Cygni or γ Cassiopeiae.

In P Cygni the emission spectrum of Fe III is not of the recombination type; it is presumably emitted by fluorescence excited by the underlying radiation.

B. *Forbidden lines.*—Since our first announcement[20] of the assignment of the unidentified lines $\lambda\lambda$ 4658.1, 4701.5, 4733.6, 4755.0, and 4770 observed by Merrill in RY Scuti, to the $^5D - {}^3F$ transition of [Fe III], this multiplet has been extended and the $^5D - {}^3P$ transition has also been observed. The $^5D - {}^3H$ multiplet gives only very faint lines. As for $^5D - {}^3D$ and $^5D - {}^7S$, whose wave lengths are in the region $\lambda\lambda$ 3200–3400, they have not yet been observed; no trace of them appears on McDonald Observatory spectrograms of the Orion nebula taken for this purpose. Some of the observations of [Fe III] are summarized in Table 4. Besides the objects mentioned in this table, the [Fe III] lines were also strong and characteristic features in various novae; for example, DO Aquilae[21] (in 1925) and Nova RT Serpentis 1909.[22] All slow novae, after the η Carinae stage, pass through stages showing [Fe III], the relative intensities of [Fe II] and [Fe III] giving an indication of the ionization conditions. Typical stellar comparison spectra are η Carinae ([Fe II] only), MWC 17 ([Fe II] and [Fe III] present simultaneously), DO Aquilae in 1931 ([Fe III] stronger than in MWC 17), and RY Scuti ([Fe III] only).

Merrill has recently found[23] that the [Fe III] lines reached considerable intensity in the variable star BF Cygni, but no detailed description of this spectrum has been published.

[14] O. Struve, *Ap. J.*, **81**, 73, 1935.

[15] Struve and Roach, *loc. cit.*

[16] Baldwin, *Ap. J.*, **87**, 573, 1938.

[17] Baldwin, *Ap. J.*, **93**, 421, 1941.

[18] Kühlborn, *Veröff. Univ. Stern. Berlin-Babelsberg*, **12**, Heft I, 1938; λ 3954.38 is also present in P Cygni.

[19] See, e.g., J. L. Greenstein, *Ap. J.*, **91**, 438, 1940 (v Sagittarii).

[20] *Observatory*, **62**, 234, 1939.

[21] Vorontsov-Velyaminov, *Ap. J.*, **92**, 283, 1940.

[22] In 1931 Joy observed strong bright lines at $\lambda\lambda$ 4658, 4701, and 4733 in RT Serpentis; these [Fe III] lines had become very faint in 1940 and were replaced by [Fe V] and [Fe VI].

[23] *Pub. A.A.S.*, **10**, 168, 1942.

The observation of [*Fe* III] lines—for which the transition probabilities have not yet been computed—helped considerably in predicting which of all the predicted [*Fe* v] lines should be the strongest. AX Persei showed recently these strongest [*Fe* v] transitions.[24]

Most objects in which [*Fe* III] has been observed are distant stars or binaries having a late-type companion. Of the two most characteristic forbidden lines—λ 4658 ($^5D_4 - {}^3F_4$), and λ 5270 ($^5D_3 - {}^3P_2$)—the former is intrinsically stronger and is observed as such when the star is not heavily reddened, as in BF Cygni.[25] Interstellar reddening reduces λ 4658 relative to λ 5270, and it may happen that λ 5270 becomes appreciably stronger than λ 4658. This is the case for the star MWC 349,[26] which is located in a dark region of the Milky Way and is reddened to a considerable extent; in this star λ 5270 and even λ 5010 are stronger than λ 4658.

[24] Struve and Swings, in preparation; *Ap. J.*, **91**, 613, 1940.

[25] Private communication of Dr. P. W. Merrill.

[26] Swings and Struve, *Ap. J.*, **95**, 159, 1942.

TABLE 1

THE SPECTRUM OF Fe III

λ_{air} A	Int.	ν_{vac} cm^{-1}	Combination	λ_{air} A	Int.	ν_{vac} cm^{-1}	Combination
K 6032.30....	7 (8n)	16572.8	$5s^5S_2 - 5p^5P_3$	3753.18....	3	26636.53	$b^1G_4 - y^1H_5$
K 5999.30....	5 (4n)	16664.0	$5s^5S_2 - 5p^5P_2$	....	m II	26677.6 c	$c^3G_5 - v^3F_4$
K 5978.90....	5 n(2n)	16720.9	$5s^5S_2 - 5p^5P_1$	3700.14....	2	27018.34	$b^1G_4 - x^1G_4$
K 5953.65....	6 (3n)	16791.8	$4d^5D_4 - 5p^5P_3$	3690.60....	4	27088.18	$b^1G_4 - x^1F_3$
5929.5.....	5	16860.2	$5s^7S_3 - 5p^7P_2$	3620.27....	3	27614.40	$b^3G_5 - z^5D_4$
K 5920.0.....	7 b(4N)	16887.2	$4d^5D_{32} - 5p^5P_2$	3611.72....	3	27679.77	$b^3F_3 - z^2F_2$
5901.0.....	3	16941.6	$4d^5D_{210} - 5p^5P_1$	3603.88....	9	27739.99	$b^3F_2 - z^2F_2$
K 5891.5.....	6 (10N)	16968.9	$5s^7S_3 - 5p^7P_3$	3600.93....	10	27762.71	$b^3F_3 - z^2F_3$
K 5833.65....	10 (10N)	17137.2	$5s^7S_3 - 5p^7P_4$	3599.49....	3	27773.82	$b^3F_4 - z^2F_3$
5573.3.....	4	17937.7	$c^3G_5 - y^3H_6$	3593.15....	4	27822.82	$b^3F_2 - z^2F_3$
5485.6.....	3	18224.5	$c^3G_4 - y^3H_5$	3587.53....	3	27866.41	$b^3F_3 - z^2F_4$
5460.8.....	3	18307.3	$c^3G_3 - y^3H_4$	3586.12....	9	27877.36	$b^3F_4 - z^2F_4$
5306.6.....	4	18839.2	$4d^7D_3 - 5p^7P_2$	3525.17....	3	28359.35	$c^3D_2 - x^3P_2$
5302.5.....	6	18853.8	$4d^7D_2 - 5p^7P_2$	3515.57....	4	28436.79	$a^1G_4 - z^3G_5$
5299.9.....	5	18863.0	$4d^7D_1 - 5p^7P_2$	3514.87....	2	28442.45	$b^3G_5 - z^2F_4$
5282.1.....	7	18926.6	$4d^7D_4 - 5p^7P_3$	3506.93....	5	28506.84	$c^3F_2 - z^3G_3$
5276.2.....	7 bl II	18947.8	$4d^7D_3 - 5p^7P_3$	3504.40....	2	28527.42	$c^3F_3 - z^3G_3$
5272.0.....	3	18962.9	$4d^7D_2 - 5p^7P_3$	3501.75....	8	28549.01	$\{b^3G_3 - z^2F_3 ; c^3F_3 - z^3G_4\}$
5243.3.....	10	19066.7	$4d^7D_5 - 5p^7P_4$	3500.29....	7	28560.92	$c^3F_4 - z^3G_5$
5235.3.....	5 bl II	19095.8	$4d^7D_4 - 5p^7P_4$	3499.57....	7	28566.80	$b^3G_4 - z^2F_4$
5156.0.....	4	19389.5	$a^5D_4 - 4p^5P_3$	3496.29....	4	28593.59	$y^5D_4 - 4d^5D_4$
4927.56....	2	20288.4	$c^3F_4 - z^5G_5$	3488.92....	3	28653.99	$c^3D_1 - x^3P_1$
4570.34....	4	21874.1	$b^1D_2 - z^1D_2$	3454.35....	2	28940.75	$b^1G_4 - u^3G_3$
4569.82....	4	21876.6	$b^1G_4 - y^1G_4$	....	m I	28957.9 c	$c^3F_4 - z^3D_3$
4430.95....	7	22562.2	$a^5P_2 - 4p^5P_3$	3432.97....	3	29120.98	$b^1D_2 - z^1P_1$
4419.59....	10	22620.2	$a^5P_3 - 4p^5P_3$	3421.97....	3	29214.58	$a^3F_2 - z^5G_2$
4395.78....	6	22742.7	$a^5P_1 - 4p^5P_2$	3419.49....	3	29235.77	$\{a^3F_3 - z^5G_3 ; c^3F_3 - z^2D_2\}$
4372.4.....	20 bn	22864	$4f^5F - 5g^5G$	3410.74....	3	29310.77	$\{c^3D_3 - y^5G_4 ; c^3D_2 - x^3D_1\}$
Strong continuous radiation from λ 4372 to λ 4315				3406.18....	2	29350.01	$c^3D_3 - x^3D_2$
4310.37....	12 n	23193.4	$4f^7F_6 - 5g^7G_7$	3403.51....	2	29373.03	$c^3D_2 - x^3D_2$
4304.81....	10 n	23223.3	$4f^7F_5 - 5g^7G_6$	3396.71....	8	29431.84	$a^3H_6 - z^2H_6$
4296.86....	10 n	23266.3	$4f^7F_4 - 5g^7G_5$	3382.19....	6	29558.18	$c^3G_5 - v^2G_5$
4286.13....	10 n	23324.5	$4f^7F_3 - 5g^7G_4$	3373.51....	2	29634.23	$a^3H_6 - z^2H_5$
4273.42....	7 n	23393.9	$4f^7F_2 - 5g^7G$	3367.54....	3	29686.77	$a^3H_4 - z^2H_4$
4205.92....	2	23769.3	$b^3G_5 - z^5G_5$	3360.84....	6	29745.95	$c^3G_4 - v^3G_4$
4184.09....	4	23893.4	$b^3G_4 - z^5G_5$	3359.18....	3	29760.65	$c^3G_5 - v^3G_4$
4168.41....	4	23983.2	$5p^7P_3 - 5d^7D_3$	3358.74....	4	29764.55	$c^3G_3 - v^2G_3$
4166.86....	9	23992.1	$5p^7P_4 - 5d^7D_4$	3357.40....	4	29776.43	$\{c^3D_3 - w^3D_3 ; c^3G_4 - v^3G_3\}$
4164.79....	20	24004.1	$5p^7P_4 - 5d^7D_5$	3354.79....	2	29799.59	$c^3D_2 - w^3D_3$
4140.51....	6	24144.8	$5p^7P_3 - 5d^7D_2$	3347.70....	8	29862.70	$a^3H_5 - z^2H_5$
4139.37....	8	24151.5	$5p^7P_3 - 5d^7D_3$	3339.36....	10	29937.28	$a^5F_1 - z^5G_2$
4137.93....	10	24159.9	$5p^7P_3 - 5d^7D_4$	3333.27....	3	29991.98	$\{a^3H_6 - z^2H_4 ; c^3G_4 - t^3F_4\}$
4122.98....	8	24247.5	$5p^7P_2 - 5d^7D_1$	3331.62....	5	30006.83	$c^3G_5 - t^3F_4$
4122.06....	8	24252.9	$5p^7P_2 - 5d^7D_2$	3329.89....	7	30022.42	$a^3H_4 - z^2H_4$
4120.97....	8	24259.3	$5p^7P_2 - 5d^7D_3$	3324.72....	3	30069.1	$y^5F_5 - 4d^5D_4$
4081.19....	7	24495.8	$5p^7P_4 - 6s^7S_3$	3315.80....	3	30149.99	$c^3G_3 - t^3F_2$
4053.28....	5	24664.4	$5p^7P_3 - 6s^7S_3$	3307.53....	5	30225.37	$a^5F_2 - z^5G_2$
4039.12....	3	24750.9	$c^3F_2 - z^3F_2$	3306.94....	4	30230.76	$c^3G_4 - t^3F_3$
4035.54....	4	24772.9	$5p^7P_2 - 6s^7S_3$	3305.22....	10	30246.49	$a^5F_2 - z^5G_3$
4025.07....	3	24837.3	$a^1G_4 - z^3F_4$	3300.20....	4	30292.50	$y^5F_4 - 4d^5D_3$
4022.36....	4	24854.0	$c^3F_3 - z^3F_3$	3294.50....	4	30344.91	$a^1F_3 - z^3F_3$
....	m I	24961.5 c	$c^3F_4 - z^3F_4$	3292.04....	8 bl I	30367.6	$a^5F_3 - z^5G_3$
4003.41....	4	24971.7	$(a^3H_4 - z^5G_4)$	3288.81....	15	30397.41	$a^5F_3 - z^5G_4$
3980.14....	3	25117.7	$5p^5P_1 - 5d^5D_0$	3283.75....	2	30444.25	$a^5F_4 - z^5G_3$
3979.42....	5	25122.2	$5p^5P_1 - 5d^5D_1$	3283.30....	2	30448.42	$a^1F_3 - z^3F_4$
3978.43....	4	25128.5	$5p^5P_1 - 5d^5D_2$	3280.58....	6	30473.66	$a^5F_4 - z^5G_4$
3976.88....	4	25138.25	$c^3G_5 - w^3G_5$	3276.08....	15	30515.52	$a^5F_4 - z^5G_5$
....	m I	25185.4 c	$5p^5P_2 - 5d^5D_2$	3274.95....	3	30526.05	$y^5F_3 - 4d^5D_2$
3968.78....	8	25189.6	$5p^5P_2 - 5d^5D_3$	3273.53....	6 bl II	30539.3	$a^5F_5 - z^5G_5$
3954.38....	12	$\{25281.3 ; 25285.2$ c$\}$	$\{5p^5P_3 - 5d^5D_{4(3)} ; c^3G_4 - w^3G_4\}$	3270.23....	2 n	30570.1	$c^3D_1 - w^3D_1$
3947.10....	4	25327.91	$\{b^3G_4 - z^5H_4 ; c^3G_3 - w^3G_3\}$				
3945.08....	3	25340.88	$c^3G_4 - w^3G_3$				
3828.44....	2	26112.92	$c^3G_4 - y^1F_3$				
3793.52....	3	26353.29	$c^3G_4 - v^3F_3$				
3786.94 ...	4	26399.07	$c^3G_3 - v^3F_2$				

TABLE 1—*Continued*

λ_{air} A	Int.	ν_{vac} cm⁻¹	Combination	λ_{air} A	Int.	ν_{vac} cm⁻¹	Combination
3266.88....	20	30601.45	$a^5F_5-z^5G_6$	2908.651...	5	34370.17	$b^3F_3-y^3D_3$
3264.22....	2	30626.39	$c^3D_2-w^3F_2$	2907.701...	12	34831.39	$b^3F_4-y^3D_3$
3263.04....	1	30637.46	$c^3D_1-w^3F_2$	2907.497...	10	34383.80	$a^5F_5-z^5D_4$
3262.44....	6	30643.10	$c^3G_5-x^1G_4$	2905.80....	8 bl II	34403.9	$\begin{cases}b^3D_1-z^5S_2\\b^1F_3-z^1D_2\end{cases}$
3256.54....	2	30698.62	$c^3G_4-x^1F_3$	2904.431...	12	34420.10	$b^3F_3-y^3D_2$
3255.49....	2	30708.52	$y^5F_2-4d^5D_2$	2902.47....	9 bl II	34443.3	$b^3D_1-z^5F_1$
3239.04....	2 bl I	30864.5	$c^3D_3-w^3D_2$	2899.386...	4	34479.99	$\begin{cases}b^3D_1-z^5F_2\\b^3F_2-y^3D_2\end{cases}$
3238.74....	2	30867.3	$c^3D_3-w^3F_3$	2898.77....	3 bl II	34487.4	$b^3D_2-z^5S_2$
3218.34....	6	31062.98	$b^1G_4-w^1G_4$	2895.464...	3	34526.69	$\begin{cases}b^3D_2-z^5F_1\\a^3H_4-z^3H_4\end{cases}$
3215.60....	8	31089.45	$b^3D_1-z^5G_2$	2895.076...	8 bl II	34531.32	$b^3F_2-y^3D_1$
3206.98....	4	31173.01	$b^3D_2-z^5G_2$	2893.792...	5	34546.63	$c^3D_2-y^1F_3$
3204.76....	6	31194.60	$b^3D_2-z^5G_3$	2892.318...	3	34564.23	$b^3D_2-z^5F_2$
3201.90....	1	31222.5	$b^3D_3-z^5G_3$	2890.000...	3	34591.96	$b^3D_3-z^5F_2$
3198.81....	5	31252.62	$b^3D_3-z^5G_4$	2875.711...	2	34763.83	$c^3D_3-v^3F_3$
3189.74....	3	31341.49	$a^1G_4-y^3D_3$	2873.795...	4	34787.01	$c^3D_2-v^3F_3$
3178.03....	10	31456.97	$b^3F_3-z^3G_4$	2868.136...	5	34855.64	$c^3D_1-v^3F_2$
3176.00....	10	31477.07	$b^3F_4-z^3G_5$	2865.54....	3	34887.2	$a^5F_2-z^3F_3$
3174.09....	10	31496.01	$b^3F_2-z^3G_3$	2858.664...	7 bl II	34971.14	$b^3F_4-y^3F_4$
3164.67....	3	31589.76	$a^5F_2-z^5H_3$	2854.190...	4	35025.95	$a^3F_3-z^3P_2$
3143.36....	2	31803.91	$a^3F_3-z^5D_3$	2851.130...	4	35063.53	$b^1F_3-x^3F_2$
3136.43....	10	31874.18	$b^3F_4-z^3D_3$	2850.834...	3	35067.18	$z^5F_4-4d^5D_3$
3120.84....	2	32033.40	$b^3G_5-z^3G_4$	2850.581...	3	35070.29	$\begin{cases}z^5F_4-4d^5D_4\\b^3G_4-y^3D_3\end{cases}$
3120.03....	3 bl II	32041.7	$b^3G_5-z^3G_5$	2850.288...	7	35073.90	$c^3D_3-v^3F_4$
3118.75....	5 bl II	32054.9	$c^3F_4-y^3F_4$	2843.779...	4	35154.17	$b^3F_3-y^3F_3$
3111.609...	8	32128.42	$a^5F_4-z^5H_5$	2842.869...	2	35165.43	$b^3F_4-y^3F_3$
3110.85....	3	32136.26	$b^3G_4-z^3G_3$	2838.924...	2	35214.28	$b^3F_2-y^3F_3$
3110.052...	8	32144.51	$b^3F_3-z^3D_2$	2838.38....	5	35221.0	$z^5F_5-4d^5D_4$
3108.85....	3	32156.94	$a^3F_4-z^5F_5$	2836.107...	4 bl II	35249.26	$b^3F_2-y^3F_2$
3107.950...	6	32166.25	$b^3G_4-z^3G_5$	2821.665...	2	35429.67	$a^3I_6-z^5H_5$
3099.05....	2	32258.62	$c^3D_3-x^3G_3$	2818.624...	6	35467.88	$b^1D_2-x^1F_3$
3096.86....	2	32281.43	$c^3D_2-x^3G_3$	2816.600...	3	35493.38	$(c^3D_2-v^3D_2)$
3084.09....	6	32415.1	$b^3F_3-y^5D_2$	2813.241...	10 bl I	35535.74	$b^3G_5-y^3F_4$
....	m I	32419.3	$b^3F_2-z^3D_1$	2813.17....	3	35536.6	$c^3D_3-v^3D_3$
3070.072...	5	32563.10	$b^3G_4-z^3D_3$	2803.441...	6 bl II	35659.97	$b^3G_4-y^3F_4$
3055.55....	5	32717.8	$a^5F_1-z^5D_0$	2792.29....	2	35802.4	$a^3I_7-z^5H_7$
3054.134...	6	32733.02	$a^5F_1-z^5D_1$	2789.698...	5	35835.63	$b^3D_2-z^3F_3$
3050.463...	5	32772.41	$a^5F_1-z^5D_2$	2788.258...	6	35854.13	$b^3G_4-y^3F_3$
3045.877...	3	32821.75	$c^3G_4-u^3G_4$	2778.868...	5	35975.29	$b^3G_3-y^3F_2$
3035.802...	3	32930.67	$b^3G_3-z^3D_2$	2773.306...	8	36047.43	$b^1D_2-x^1D_2$
3027.46....	3	33021.4	$a^5F_2-z^5D_1$	2772.344...	3	36059.93	$b^3D_3-z^5P_3$
3026.985...	6	33026.59	$a^3H_6-z^3G_5$	2767.92....	2	36117.6	$c^3D_3-u^3F_4$
3023.85....	8	33060.9	$a^5F_2-z^5D_2$	2745.935...	2	36406.73	$c^3D_2-u^3F_3$
3022.00....	3	33081.0	$c^3G_5-u^3G_5$	2741.952...	2	36459.61	$a^5F_3-z^3P_2$
3018.744...	6	33116.75	$a^5F_2-z^5D_3$	2728.473...	3	36639.71	$c^3D_1-u^3F_2$
3015.230...	7	33155.33	$a^5F_4-z^5F_5$	2720.381...	5	36748.70	$a^3H_5-y^3F_4$
3013.125...	20	33178.50	$a^5F_5-z^5F_5$	2706.17....	2 n	36941.6	$4d^7D_3-4f^7F_2$
3008.506...	5	33229.44	$a^5F_3-z^5F_4$	2705.10....	7 n	36956.2	$4d^7D_2-4f^7F_2$
3007.802...	6	33237.21	$a^5F_3-z^5D_3$	2704.43....	3 n	36965.4	$4d^7D_1-4f^7F_2$
3007.2.....	20 bn	$\begin{cases}33244\\33246.6\ c\end{cases}$	$\begin{cases}4d^5D-4f^5F\\a^3H_5-z^3G_4\end{cases}$	2701.13....	8 n	37010.6	$4d^7D_3-4f^7F_3$
3006.122...	4	33255.79	$a^3H_4-z^3G_3$	2700.02....	8 n	37025.8	$4d^7D_2-4f^7F_3$
3002.99....	5	33290.5	$a^5F_1-z^5F_1$	2698.41....	7 n	37047.9	$4d^7D_4-4f^7F_4$
3001.589...	12	33306.01	$a^5F_4-z^5F_4$	....	bl II	37062.2 c	$4d^7D_5-4f^7F_5$
2977.572...	5	33574.65	$a^3F_3-z^3F_3$	2696.89....	7 n	37068.8	$4d^7D_3-4f^7F_4$
2977.222...	6	33578.59	$a^5F_2-z^5F_1$	2695.929...	3	37081.99	$a^3F_4-y^5F_4$
2973.896...	5	33616.15	$a^5F_2-z^5F_2$	2695.34....	9 n	37090.1	$4d^7D_4-4f^7F_5$
2963.230...	8	33737.13	$a^5F_3-z^5F_2$	2695.13....	10 n	37093.0	$4d^7D_5-4f^7F_6$
2958.286...	6	33793.51	$a^3F_2-z^3F_2$	....	m I	37314.8 c	$b^3F_3-z^3P_2$
2955.060...	4	33830.40	$a^5F_3-z^5F_3$	2678.810...	6	37318.95	$b^1F_3-z^1G_4$
2951.639...	3	33869.61	$b^3D_1-z^5D_0$	2677.417...	3	37338.36	$a^5F_2-y^5F_1$
2950.295...	4	33885.04	$b^3D_1-z^5D_1$	2662.331...	4	37549.91	$a^3F_2-z^3G_3$
2948.388...	8	33906.96	$a^5F_4-z^5F_3$	2660.815...	4	37571.32	$b^3D_2-z^3P_1$
2946.864...	3	33924.49	$b^3D_1-z^5D_2$	2659.614...	4	37588.22	$a^5F_3-y^5F_2$
2942.989...	4	33969.15	$b^3D_2-z^5D_1$	2646.751...	6	37770.94	$a^5F_3-y^5F_3$
2939.55....	7 bl II	34008.9	$b^3D_2-z^5D_2$	2645.39....	9 bl II	37790.4	$a^3F_4-z^3G_5$
2939.066...	2	34014.50	$a^3F_3-z^3H_4$	2641.408...	5	37847.33	$a^5F_4-y^5F_3$
2934.779...	3	34064.18	$b^3D_2-z^5D_3$				
2932.337...	5	34092.55	$b^3D_3-z^5D_3$				
2923.902...	8	34190.90	$a^3F_4-z^3F_4$				
2915.980...	2	34283.78	$\begin{cases}a^3F_4-z^5P_3\\a^5F_3-z^5D_4\end{cases}$				

540 B. EDLÉN AND P. SWINGS

TABLE 1—*Continued*

λ_{air} A	Int.	ν_{vac} cm^{-1}	Combination	λ_{air} A	Int.	ν_{vac} cm^{-1}	Combination
2633.819...	4	37956.38	$a^3F_3-z^3D_2$	2329.905...	9	42907.02	$a^3D_1-z^3P_1$
2630.527...	2	38003.88	$a^5F_3-y^5F_4$	2329.730...	2	42910.24	$a^3G_3-z^5G_4$
2625.268...	3	38080.01	$a^5F_4-y^5F_4$	2327.668...	4	42948.26	$a^3G_4-z^5G_5$
2617.92....	2	38186.9	$a^3F_4-z^3D_3$	2326.948...	10	42961.55	$b^3G_3-y^3H_4$
2617.149...	8	38198.13	$a^1G_4-z^1H_5$	2324.359...	8 bl II	43009.38	$c^3D_2-w^3P_1$
2616.888...	2	38201.94	$b^3D_1-y^5F_1$	2323.786...	4	43019.98	$c^3D_1-w^3P_1$
2608.682...	5	38322.10	$c^3F_4-z^1H_5$	2321.71....	10 bl II	43058.5	$a^1H_5-z^1I_6$
2608.112...	7	38330.48	$a^5F_5-y^5F_5$	2319.466...	8 (1)	43100.10	$a^1G_4-w^3F_4$
2603.186...	3	38403.00	$c^3D_3-t^3F_4$	2319.220...	10 (2)	43104.65	$a^3D_1-z^3P_0$
2602.35....	2	38415.3	$b^3D_2-y^5F_2$	2318.102...	5	43125.46	$a^3P_1-z^5F_2$
2595.622...	8	38514.91	$a^3I_7-z^3H_6$	2315.70....	10 bl II	43170.2	$a^3P_2-z^5S_2$
2594.67....	4 bl II	38529.0	$a^3F_2-y^5D_2$	2315.30....	5 bl II	43177.7	$b^3D_1-y^3F_2$
2592.533...	2	38560.80	$a^5F_2-z^3G_3$	2311.580...	4	43247.13	$a^3P_2-z^5F_2$
2590.043...	3	38597.86	$b^3D_2-y^5F_3$	2310.806...	3	43261.61	$b^3D_2-y^3F_2$
2584.038...	6	38687.55	$c^3F_3-x^3F_3$	2309.578...	4	43284.60	$a^1G_4-w^3F_3$
2583.739...	3	38692.04	$c^3F_2-x^3F_2$	2306.571...	5	43341.04	$a^3P_2-z^5F_3$
2582.37....	8 bl II	38712.5	$a^3I_6-z^3H_5$	2303.203...	3	43404.41	$c^3F_3-w^3F_3$
2575.798...	2	38811.30	$a^5F_5-z^3G_5$	2303.012...	7	43408.01	$c^3F_4-w^3F_3$
2574.838...	7	38825.78	$a^3I_5-z^3H_4$	2302.808...	8	43411.86	$b^1F_3-y^1F_3$
2558.172...	2	39078.70	$a^3F_3-y^5P_3$	2295.859...	15 (3)	43543.23	$a^1F_3-z^1D_2$
2556.207...	5	39108.74	$a^5F_3-z^3D_3$	2293.056...	10	43596.46	$c^3D_3-w^3P_2$
2552.937...	5	39158.84	$b^1F_3-z^1F_3$	2291.850...	6	43619.40	$c^3D_2-w^3P_2$
2551.098...	6	39187.06	$a^1H_5-z^1H_5$	2290.126...	5	43652.22	$b^1F_3-v^3F_3$
2545.750...	3	39269.37	$a^5F_2-z^3D_2$	2284.979...	5 n	43750.56	$a^3D_1-y^5F_2$
2537.934...	2	39390.30	$a^5F_3-z^3D_2$	2278.432...	6	43876.26	$b^3F_3-z^1G_4$
2537.537...	4	39396.46	$c^3F_4-x^3F_4$	2277.820...	8	43888.04	$b^3F_4-z^1G_4$
2531.890...	5	39484.33	$a^5F_2-z^3D_1$	2277.159...	4	43900.78	$a^3H_4-y^3H_5$
2520.162...	5	39668.06	$a^5F_4-y^5D_3$	2276.870...	8	43906.35	$a^3D_2-y^5F_3$
2512.902...	2	39782.66	$a^5F_4-y^5D_4$	2274.00....	8 bl II	43961.8	$b^1F_3-v^3F_4$
2511.418...	6 bl II	39806.16	$a^5F_5-y^5D_4$	2267.42....	10 (1)	44089.3	$a^1H_5-w^3F_4$
2507.244...	2	39872.42	$a^3D_2-z^5F_2$	2265.54....	4 bl II	44125.9	$b^3F_2-y^3G_3$
2502.903...	3	39941.57	$a^3D_3-z^5S_2$	2262.888...	3	44177.61	$a^1F_3-x^3F_3$
2501.526...	4	39963.55	$b^3D_3-z^3D_3$	2261.592...	12 (2)	44202.92	$a^1F_3-x^3F_2$
2496.696...	3	40040.86	$a^1H_5-y^3H_5$	2260.547...	7	44223.37	$a^3G_3-z^5H_3$
2487.922...	3	40182.07	$(a^3F_3-y^3D_3)$	2259.406...	2	44245.69	$a^3F_3-y^3P_2$
2487.191...	4	40193.87	$a^5F_2-y^5P_1$	2259.140...	2	44250.90	$a^1G_4-x^3H_5$
2485.741...	3	40217.32	$b^3D_2-z^3D_2$	2257.406...	8	44284.88	$a^3D_3-y^5F_4$
2484.820...	2	40232.22	$a^3F_3-y^3D_2$	2253.712...	3	44357.46	$b^1F_3-v^3D_2$
2469.126...	3	40487.93	$b^3D_2-y^5P_3$	2252.463...	4	44382.05	$a^3G_4-z^5H_4$
2462.978...	3	40588.98	$a^5F_4-y^5P_3$	2252.268...	5	44385.89	$a^3G_3-z^5H_4$
2456.571...	2	40694.82	$a^3F_4-y^3D_3$	2245.776...	4	44514.20	$b^3F_2-y^5G_2$
2447.374...	7 bl II	40847.74	$a^1G_4-z^1G_4$	2243.845...	4	44552.50	$b^3F_2-x^3D_3$
2439.963...	3	40971.80	$c^3F_4-z^1G_4$	2243.405...	8 (1)	44561.23	$a^3G_4-z^5H_5$
2438.174...	8	41001.86	$4s^5S_2-4p^7P_2$	2241.54....	12 (3) bl II	44598.3	$a^1D_2-z^1D_2$
2431.325...	5	41117.36	$a^3H_6-z^3I_7$	2238.155...	10 (2)	44665.75	$c^3F_4-x^3G_5$
....	m II	41160.1	$a^3H_5-z^3I_6$	2235.908...	10 (1)	44710.64	$c^3F_3-x^3G_4$
2421.514...	5	41283.93	$a^3F_4-y^3F_4$	2235.699...	6	44714.82	$\begin{cases}c^3F_4-x^3G_4 \\ a^3P_2-z^5P_3\end{cases}$
2421.376...	2	41286.28	$b^3D_2-y^5P_2$	2233.654...	6	44755.75	$b^3F_3-y^5G_4$
2420.405...	3	41302.84	$a^3F_2-y^3F_2$	2233.172...	4	44765.40	$b^3G_4-y^3G_3$
2419.742...	2	41314.17	$b^3D_3-y^5P_2$	2232.690...	10 (1)	44775.06	$c^3F_2-x^3G_3$
2418.568...	7	41334.22	$4s^5S_2-4p^7P_3$	2232.548...	8	44757.87	$(a^1F_3-y^3H_4)$
2406.409...	3	41543.05	$b^1G_4-v^1F_3$	2232.430...	10	44780.28	$a^3G_5-z^5H_6$
2403.551...	6	41592.44	$a^3H_4-z^3I_5$	2231.670...	4	44795.54	$c^3F_3-x^3G_3$
2389.533...	8	41836.42	$a^1H_5-z^1G_4$	2229.267...	10	44843.81	$b^3F_4-y^5G_5$
2376.725...	5	42061.85	$a^3H_5-z^3K_6$	2228.881...	4	44851.58	$b^3G_3-y^3G_3$
2373.904...	5	42111.84	$a^3H_6-z^3K_7$	2227.848...	7	44872.37	$a^3P_1-z^5P_2$
2363.51....	7 bl II	42297.0	$b^3G_4-x^3F_3$	2221.830...	10 (1)	44993.91	$a^3P_2-z^5P_2$
2362.401...	3	42316.86	$c^3F_4-w^3D_3$	2221.337...	2	45003.89	$a^1H_5-x^3H_4$
....	m II	42354.81	$b^3G_5-y^3H_6$	2220.611...	3	45018.60	$a^3P_1-z^5P_1$
2353.820...	4	42471.12	$b^3D_3-y^3D_3$	2217.485...	5	45082.07	$b^3F_4-y^3G_4$
2352.616...	3	42492.85	$b^3D_2-y^3D_2$	2214.616...	4	45140.45	$a^3P_2-z^5P_1$
2346.961...	3 bl II	42595.22	$a^3D_2-z^3P_2$	2210.073...	6	45233.23	$\begin{cases}a^1D_2-x^3F_3 \\ b^3F_4-w^3D_3\end{cases}$
2339.913...	5	42723.52	$b^1F_3-y^1D_2$	2209.739...	5 bl II	45240.07	$\begin{cases}a^1H_5-x^3H_5 \\ b^3G_3-y^5G_2\end{cases}$

From here to λ 2023 intensities in parentheses refer to the M.I.T. grating spectrograms

λ_{air} A	Int.	ν_{vac} cm^{-1}	Combination	λ_{air} A	Int.	ν_{vac} cm^{-1}	Combination
2338.961...	10 (3)	42740.91	$a^3D_3-z^3P_2$	2208.85....	10 (3) bl II	45258.3	$a^1D_2-x^3F_2$
2338.59 ...	.4	42747.7	$a^3P_2-z^5D_3$	2207.847...	2	45278.84	$\begin{cases}b^3G_3-x^3D_3 \\ c^3F_2-z^1P_1\end{cases}$
2336.768...	10 bl II	42781.02	$b^3G_4-y^3H_5$				
2331.539...	3	42876.95	$a^3G_4-z^5G_3$				
....	bl II	42879.8 c	$a^3D_2-z^3P_1$				

TABLE 1—*Continued*

λ_{air} A	Int.	ν_{vac} cm⁻¹	Combination	λ_{air} A	Int.	ν_{vac} cm⁻¹	Combination
2202.458...	8	45389.60	$a^3D_3-z^3D_3$	2144,282...	8 (5)	46620.92	$a^5D_4-z^5F_5$
2196.240...	2	45518.10	$b^3F_4-x^5F_4$	2143.827...	7 (2)	46630.81	$\{a^5D_3-z^5F_4 / a^5D_1-z^5D_2$
2195.866...	5	45525.86	$a^3D_2-z^3D_2$	2143.76....	3	46632.3	$a^5D_0-z^5D_1$
2195.532...	6	45532.78	$b^3G_4-y^5G_5$	2143.470...	8 (5)	46638.57	$a^5D_{3(2)}-z^5D_3$
2195.081...	5	45542.13	$b^3G_4-y^5G_4$	2143.045...	7 (2)	46647.82	$a^3D_2-y^5P_3$
2193.294...	5	45579.23	$a^1H_5-x^3G_4$	2142.533...	3	46658.98	$a^3H_6-z^1I_6$
2192.875...	4	45587.95	$a^3G_4-z^5F_5$	2140.427...	4 (1n)	46704.88	$b^3G_5-w^3F_4$
2191.215...	8	45622.48	$a^3G_5-z^5F_5$	2139.461...	2	46725.96	$b^3F_3-x^5D_4$
2190.075...	3	45646.22	$b^3G_5-y^3G_4$	2137.365...	8 (5)	46771.79	$a^5D_4-z^5F_4$
2189.154...	2	45665.42	$a^3H_5-z^1G_4$	2137.009...	5	46779.58	$a^5D_4-z^5D_3$
2188.732...	4	45674.22	$b^3G_5-z^1I_6$	2136.360...	5 (1)	46793.78	$a^3D_3-y^5P_3$
2187.667...	5 bl II	45696.47	$a^3H_4-z^1G_4$	2135.523...	4	46812.12	$a^3H_6-y^3G_5$
2186.876...	6 n bl II	45712.99	$b^3F_4-x^5F_5$	2134.861...	9 (5)	46826.63	$a^1I_6-z^3I_5$
2186.207...	2	45726.97	$a^3D_2-y^5D_3$	2133.358...	2	46859.61	$a^3H_5-y^3G_4$
2185.654...	5	45738.54	$a^3G_4-z^5F_4$	2132.089...	1	46887.50	$a^3H_5-z^1I_6$
2185.54....	3	45740.9	$\{a^1H_5-x^3H_6 / a^3D_2-z^3D_1$	2131.951...	3	46890.55	$a^3H_4-y^3G_4$
2185.264...	5	45746.70	$a^3G_4-z^5D_3$	2130.829...	3	46915.23	$b^3G_3-w^3F_4$
2185.080...	3	45750.55	$a^3G_3-z^5D_3$	2129.683...	5	46940.47	$a^1G_4-y^1F_3$
2184.114...	4	45770.78	$b^3G_4-y^3G_4$	2129.238...	2	46950.27	$b^3F_4-x^5D_3$
2183.980...	6	45773.59	$a^3G_5-z^5F_4$	2127.634...	2	46985.66	$a^1H_5-y^3I_5$
2182.889...	4	45796.48	$a^3D_2-y^5D_2$	2125.170...	4	47040.14	$c^3F_2-y^1F_3$
2182.040...	4	45814.29	$b^1F_3-w^3H_4$	2124.976 ..	3	47044.43	$\{b^3F_3-x^3H_4 / b^1F_3-y^3G_4 / a^3H_5-y^5G_6$
2181.407...	4	45827.58	$b^3G_5-y^3G_5$				
2181.210...	2	45831.71	$b^3G_5-y^5G_6$	2124.225...	4	47061.06	$\{c^3F_3-y^1F_3 / b^3F_3-x^5D_2 / a^5D_{32}-z^5S_2$
2180.410...	12 (4)	45848.53	$a^3P_1-z^3P_2$	2124.075...	2	47064.38	$c^3F_4-y^1F_3$
2179.258...	6	45872.76	$a^3D_3-y^5D_3$	2123.590...	8 (1)	47075.13	$a^3F_2-z^1D_2$
2179.071...	3	45876.69	$b^3D_1-y^3P_0$	2122.021...	5 (0)	47109.92	$a^5D_1-z^5S_2$
2178.677...	5	45884.99	$a^3H_4-y^3G_3$	2120.767...	4 (0)	47137.79	$\{b^3F_2-x^5D_1 / a^5D_{3,2}-z^5F_2$
2175.972...	2	45942.03	$a^3D_3-y^5D_2$				
2174.658...	15 (7)	45969.78	$a^3P_2-z^3P_2$	2120.239...	5 (1)	47149.53	$a^5D_1-z^5F_1$
2173.829...	7 (1)	45987.31	$a^3D_3-y^5D_4$	2118.567...	6 (3)	47186.73	$a^5D_1-z^5F_2$
2171.293...	2	46041.02	$b^3F_2-w^3D_1$	2118.415...	5 (2)	47190.11	$a^5D_0-z^5F_1$
2171.045...	12 (4)	46046.28	$a^3P_0-z^3P_1$	2116.588...	7 (5)	47230.85	$a^5D_2-z^5F_3$
2169.709...	5	46074.63	$c^3F_4-w^3G_5$	2114.339...	3	47281.08	$\{c^3F_2-v^3F_3 / a^3P_2-y^5F_3$
2168.106...	3	46108.68	$b^3F_2-w^3F_2$				
2166.952...	12 (4)	46133.25	$a^3P_1-z^3P_1$	2113.891...	6 (4b)	47291.10	$\{b^1F_3-t^3F_4 / b^3F_4-x^3H_5$
2166.604...	5	46140.65	$b^3F_4-w^3F_4$	2113.344...	5 (2)	47303.33	$a^1H_5-y^1G_4$
2165.327...	4	46167.86	$a^1G_4-w^3G_3$				
2165.071...	4	46173.32	$a^3G_3-z^5S_2$	2112.496...	4	47322.31	$a^1H_5-y^3I_6$
2164.059...	4	46194.90	$b^3D_2-y^3P_1$	2112.282...	2	47327.11	$a^1I_6-z^3K_6$
2163.475...	2	46207.37	$b^3G_4-x^5F_4$	2111.795...	4 (1)	47338.04	$c^3F_2-v^3F_2$
2162.283...	5	46232.85	$c^3F_3-w^3G_4$	2108.676...	5	47408.04	$a^3F_3-x^3F_3$
2161.478...	3	46250.07	$a^3G_3-z^5F_2$	2108.217...	2	47418.35	$a^1D_2-x^3P_2$
2161.270...	10 (4)	46254.52	$a^3P_2-z^3P_1$	2107.324...	10 (10)	47438.44	$a^3G_3-z^3F_2$
2160.655...	6	46267.68	$c^3F_2-w^3G_3$	2106.360...	3 (1)	47460.17	$b^1F_3-t^3F_2$
2158.690...	3	46309.79	$b^3F_3-w^3D_2$	2105.020...	5 (2)	47490.37	$a^1G_4-v^3F_4$
2158.472...	12 (4)	46314.46	$a^1G_4-y^1G_4$	2103.799...	12 (12)	47517.92	$a^3G_4-z^3F_3$
2158.006...	3	46324.46	$b^3F_4-w^3F_3$	2103.647...	5 (3)	47521.36	$a^3G_3-z^3F_3$
2157.710...	12 (4)	46330.83	$a^3P_1-z^3P_0$	2100.961...	8 (4)	47582.11	$b^3F_4-x^3G_5$
2157.287...	3	46339.91	$a^3G_4-z^5F_3$	2099.718...	1	47610.27	$c^3F_3-v^3F_4$
2157.109...	2	46343.73	$a^3G_3-z^5F_3$	2099.531...	2	47614.51	$c^3F_4-v^3F_4$
2156.750...	2	46351.45	$c^3F_2-y^1D_2$	2099.332...	6 (4)	47619.02	$b^3F_3-x^3G_4$
2156.183...	5	46363.63	$a^1F_3-x^3P_2$	2099.231...	5 (3)	47621.32	$a^3G_4-z^3F_4$
2155.870...	5 bl II	46370.35	$b^3F_2-w^3D_2$	2098.816...	3	47630.73	$b^3F_4-x^3G_4$
2154.420...	2	46401.56	$b^3G_4-x^5F_5$	2097.692...	12 (12)	47656.24	$a^3G_5-z^3F_4$
2153.320	3	46425.26	$a^1I_6-z^3I_6$	2097.480...	15 (15)	47661.06	$a^3G_5-z^3H_6$
2152.706...	6 (1)	46438.51	$c^3F_4-y^1G_4$	2096.430...	6 (4)	47684.92	$b^3D_3-z^3F_4$
2151.776...	15 (8)	46458.58	$a^1F_3-z^1G_4$	2095.688...	4 (1)	47701.82	$a^1D_2-y^3G_3$
2149.558...	2	46506.50	$b^3D_2-y^3P_2$	2095.593...	2	47703.98	$b^3F_3-x^3G_3$
2148.254...	5	46534.72	$b^3D_3-y^3P_2$	2095.327...	3 (1)	47710.04	$a^3F_2-x^3F_3$
2147.904...	7 (1)	46542.32	$a^5D_2-z^5D_1$	2095.143...	3 (1)	47714.23	$a^3G_4-z^5P_3$
2146.339...	6 (1b)	46576.25	$\{a^3H_4-y^5G_4 / a^5D_1-z^5D_0$	2093.504...	4 (1)	47751.57	$a^3D_2-y^3D_3$
2146.062...	8 (4b)	46582.26	$a^5D_{23}-z^5D_2$	2092.945...	6 (5)	47764.32	$b^3F_2-x^3G_3$
2145.616...	6 (0)	46591.94	$a^5D_1-z^5D_1$				
2144.743...	7 (3)	46610.90	$a^1I_6-z^3I_7$				

TABLE 1—*Continued*

λ_{air} A	Int.	ν_{vac} cm^{-1}	Combination
2091.488...	2	47797.58	$a^5F_1 - z^1D_2$
2091.312...	7 (7)	47801.60	$a^3D_2 - y^3D_2$
2090.240...	6 (6)	47826.12	$a^5D_4 - z^5D_4$
2090.139...	12 (13)	⎰47828.45 / 47828.6 c	$a^3G_4 - z^3H_5$ / $a^3D_1 - y^3D_2$
2090.053...	7 (6)	47830.40	$b^3G_3 - x^3H_4$
2089.089...	6 (3)	47852.48	$a^3D_2 - y^3D_1$
2088.625...	5 (2)	47863.10	$a^3G_5 - z^3H_5$
2087.907...	7 (6)	47879.56	$a^3D_1 - y^3D_1$
2087.132...	8 (9)	47897.33	$a^3D_3 - y^3D_3$
2086.128...	4 (1)	47920.38	$a^3F_4 - x^3F_3$
2085.839...	5 (3)	47927.01	$b^1F_3 - x^1G_4$
2084.968...	5 (4)	47947.05	$a^3D_3 - y^3D_2$
2084.515...	3 (2)	47957.47	$a^3G_4 - z^3H_4$
2084.349...	10 (12)	47961.29	$a^3G_3 - z^3H_4$
2083.530...	6 (5)	47980.13	$b^3G_4 - x^3H_5$
2082.788...	1	47997.22	$b^1F_3 - x^1F_3$
2082.377...	3 (1)	48006.69	$c^3F_3 - v^3D_2$
2079.307...	3	48077.57	$c^3F_4 - v^3D_3$
2078.989...	14 (18)	48084.92	$4s^5S_2 - 4p^5P_3$
2077.755...	4 (2)	48113.47	$a^3F_3 - x^3F_4$
2077.089...	1	48128.89	$a^1D_2 - x^3D_3$
2076.916...	1	48132.90	$a^3H_4 - w^3F_3$
2076.316...	3 (1)	48146.81	$b^3G_5 - x^3G_5$
2074.240...	3	48194.99	$b^3G_5 - x^3G_4$
2071.889...	2	48249.67	$a^1D_2 - y^5G_3$
2070.976...	2 (0)	48270.94	$b^3G_4 - x^3G_5$
2070.539...	8 (9)	48281.12	$a^1I_6 - z^1H_5$
2069.808...	2 (1)	48298.17	$a^1F_3 - z^1F_3$
2068.243...	12 (17)	48334.72	$4s^5S_2 - 4p^5P_2$
2067.302...	6 (7)	48356.72	$b^3G_5 - x^3H_6$
2065.268...	3 (2)	48404.33	$b^3G_4 - x^3G_3$
2062.983...	3 (2)	48457.95	$a^5F_1 - x^3F_2$
2062.083...	3 (3)	48479.09	$a^1H_5 - v^3F_4$
2061.751...	9 (12)	48486.89	$a^3D_3 - y^3F_4$
2061.552...	10 (15)	48491.57	$4s^4S_2 - 4p^5P_1$
2059.677...	7 (9)	48535.70	$a^3D_2 - y^3F_3$
2058.560...	8 (11)	48562.05	$a^1I_6 - z^1K_7$
2058.201...	3 (3)	48570.52	$a^3D_2 - y^3F_3$
2057.921...	4 (4)	48577.13	$b^1F_3 - x^1D_2$
2057.058...	6 (7)	48597.50	$a^3D_1 - y^3F_2$
2056.145...	7 (9)	48619.07	$a^3P_2 - z^3D_3$
2055.855...	6 (6)	48625.93	$a^3F_4 - x^3F_4$
2054.480...	4 (3)	48658.46	$c^3F_4 - u^3F_4$
2053.521...	3 (2)	48681.18	$a^3D_3 - y^3F_3$
2052.269...	3 (2)	48710.89	$a^1F_3 - w^3F_4$
2051.847...	2	48720.90	$a^5F_2 - x^3F_3$
2050.739...	7 (7)	48747.22	$a^5D_4 - z^5P_3$
2049.384...	7 (7)	48779.44	$a^3P_1 - z^3D_2$
2047.126...	2 (1)	48833.25	⎰$a^1I_6 - y^3H_6$ / $a^3H_5 - x^3H_4$
2046.784...	2 (1b)	48841.40	$a^5F_3 - x^3F_3$
2046.043...	1 (1)	48859.04	$a^1D_2 - w^3D_3$
2045.830...	5 (5)	48864.18	$a^3H_4 - x^3H_4$
2044.970...	4 (4b)	48884.72	$a^5D_3 - z^5P_2$
2044.541...	1 (1)	48894.97	$a^1F_3 - w^3F_3$
2044.302...	4 (4)	48900.69	$a^3P_2 - z^3D_2$
2044.034...	3 (3)	48907.10	$a^3P_0 - z^3D_1$
2043.478...	3 (2)	48920.40	$c^3F_3 - u^3F_3$
2042.236...	2 (2)	48950.14	$b^3D_1 - z^1D_2$
2040.760...	2 (3)	48985.55	$a^3P_0 - y^5D_1$
2040.538...	4 (5)	48990.89	$b^3F_4 - w^3G_5$
2040.407...	3 (3)	48994.03	$a^3P_1 - z^3D_1$
2039.507...	6 (8)	49015.64	$a^1H_5 - y^1I_6$
2038.908...	2 (3)	49030.04	$a^5D_2 - z^5P_1$
2038.742...	2 (2)	49034.03	$b^3D_2 - z^1D_2$
2038.621...	1 (1)	49036.93	$b^3F_4 - y^3I_5$

λ_{air} A	Int.	ν_{vac} cm^{-1}	Combination
2038.092...	3 (3)	49049.66	$a^3P_1 - y^5D_2$
2037.578...	1 (2)	49062.03	$b^3D_3 - z^1D_2$
2037.292...	4 (6)	49068.92	$a^3H_5 - x^3H_5$
2037.145...	2 (3)	49072.43	$a^3P_1 - y^5D_1$
2036.845...	2 (2)	49079.71	$a^5D_1 - z^5P_1$
2036.006...	2 (2)	49099.92	$a^3H_4 - x^3H_5$
2035.939...	2 (3)	49101.54	$a^3P_2 - y^5D_3$
2035.103...	2 (2b)	49121.70	$c^3F_2 - u^3F_2$
2034.695...	4 (5)	49131.55	$a^3H_6 - x^3G_5$
2034.537...	1 (1)	49135.36	$a^1I_6 - y^3H_5$
2034.296...	3 (4)	49141.18	$b^3F_3 - w^3G_4$
2030.767...	2 (2)	49226.57	....
2029.522...	2 (3)	49256.76	$b^3F_2 - w^3G_3$
2026.038...	4 (7)	49341.44	$a^3H_6 - x^3H_6$
2025.557...	3 (5)	49353.15	$a^1D_2 - z^1F_3$
2025.292...	.. (1)	49359.63	$a^3H_5 - x^3G_5$
2023.289...	1 (4)	49408.48	$a^3H_5 - x^3G_4$

From here to λ 1382 wave lengths and intensities are obtained from M.I.T. grating spectrograms only. Wave lengths in vacuum

λ_{air} A	Int.	ν_{vac} cm^{-1}	Combination
2022.685...	1	49439.24	$a^3H_4 - x^3G_4$
2019.225...	3	49523.95	$a^3H_4 - x^3G_3$
2017.946...	4	49555.34	$b^3G_5 - w^3G_5$
2017.363...	3	49569.66	$a^3H_5 - x^3H_6$
2015.720...	3	49610.06	$b^3D_1 - x^3F_0$
2015.453...	1	49616.63	$a^3P_0 - y^5P_1$
2013.330...	4	49668.96	$b^3D_2 - x^3F_3$
2012.539...	3	49688.48	$a^3F_3 - z^1G_4$
2012.310...	1	49694.13	$b^3D_2 - x^3F_2$
2012.192...	4	49697.05	$b^3D_3 - x^3F_3$
2011.031...	3	49725.74	$b^3G_4 - y^3I_5$
2009.118...	4	49773.08	$a^5P_1 - z^5D_0$
2008.494...	6	49788.55	$a^5P_1 - z^5D_1$
2006.914...	3	49827.75	$a^5P_1 - z^5D_2$
2006.360...	4	49841.50	$b^3G_4 - w^3G_4$
2006.095...	1	49848.09	$a^3P_1 - y^5P_2$
2005.731...	4	49857.13	$a^5P_2 - z^5D_1$
2005.613...	1	49860.07	$a^5D_2 - z^3P_2$
2004.143...	8	⎰49896.64 / 49896.9 c	$a^5P_2 - z^5D_2$ / $b^3G_4 - w^3G_3$
2003.233...	2	49919.31	$b^3G_5 - y^1G_4$
2003.124...	3	49922.02	$b^1D_2 - v^1F_3$
2002.473...	5	49938.25	$b^3G_5 - y^3I_6$
2002.009...	1	49949.8	$a^1D_2 - w^3F_3$
2001.909...	4	49952.32	$a^5P_2 - z^5D_3$
2001.814...	3	49954.69	$a^5P_3 - z^5D_2$
2000.688...	4	49982.81	$b^3G_3 - w^3G_3$
2000.228...	9	49994.30	$a^3I_5 - z^3I_6$
1999.893...	3	50002.68	$a^5P_3 - z^5F_4$
1999.588...	9	50010.30	⎰$a^3I_6 - z^3I_6$ / $a^5P_3 - z^5D_3$
1999.100...	1	50022.5	$a^3P_2 - y^5P_3$
1996.420...	12	50089.66	$a^5G_{2(3)} - z^5G_2$
1995.563...	12	50111.17	$a^5G_3 - z^5G_3$
1995.266...	7	50118.63	$a^5G_4 - z^5G_3$
1994.366...	1	50141.2	$a^5G_3 - z^5G_4$
1994.073...	13	50148.62	$a^5G_4 - z^5G_4$
1993.262...	7	50169.02	$a^5G_5 - z^5G_4$
1992.858...	6	50179.19	$a^3F_2 - y^3G_3$
1992.427...	1	50190.04	$a^5G_4 - z^5G_5$
1992.196...	9	50195.86	$a^3I_6 - z^3I_7$
1992.017...	9	⎰50200.37 / 50200.8 c	$a^3I_7 - z^3I_7$ / $a^3F_4 - z^1G_4$
1991.613...	14	50210.56	$a^5G_5 - z^5G_5$
1989.975...	7	50251.89	$a^5G_6 - z^5G_5$
1987.810...	3	50306.02	$a^5P_1 - z^5S_2$
1987.503...	15	50314.39	$a^5G_6 - z^5G_6$
1987.006...	1	50326.97	$b^3F_2 - v^3F_2$

TABLE 1—*Continued*

λ_{vac} A	Int.	ν_{vac} cm^{-1}	Combination	λ_{vac} A	Int.	ν_{vac} cm^{-1}	Combination
1985.105...	3	50375.17	$a^5P_2-z^5S_2$	1941.633 ..	3	51503.04	$a^3D_2-y^3P_1$
1984.288...	9	50395.91	$a^3I_5-z^3I_5$	1940.769 ..	4	51525.97	$a^1G_4-x^1F_3$
1984.027...	7	50402.54	$b^3D_3-x^2F_4$	1940.631...	2	51529.6	$a^3D_1-y^3P_1$
1983.676...	2	50411.46	$a^3I_6-z^3I_5$	1940.018...	8	51545.91	{ $a^5D_4-y^5F_4$ / $a^3F_4-w^3D_3$
1983.123...	0	50425.5	$a^3F_3-y^5G_3$	1939.107...	1	51570.12	$a^5F_1-x^3D_1$
1982.805...	8	50433.60	$a^5P_3-z^5S_2$	1938.901...	10 ↑	{ 51574.5 c / 51575.61	$b^3F_4-u^3F_4$ / $a^3F_4-y^3G_5$
1982.076...	6	50452.15	$a^5P_2-z^5F_2$	1938.775...	4 ↑	{ 51578.96 / 51579.8 c	$a^5F_2-y^5G_2$ / $c^2F_4-x^1G_4$
1980.392...	2	50495.05	$c^3F_4-v^3G_5$	1937.996...	4	51599.69	$c^3G_4-v^3H_5$
1979.002...	1	50530.52	$b^3F_4-v^3F_4$	1937.345...	14	51617.03	$a^5G_3-z^5H_4$
1978.626...	2	50540.12	$a^3H_6-w^3G_5$	1937.077...	3	51624.17	$a^5G_4-z^5H_4$
1978.417...	4	50545.46	$a^5P_2-z^5F_3$	1936.806...	4 bl ıı	51631.4	$b^3G_5-y^1I_6$
1976.126...	8	50604.06	$a^5P_3-z^5F_3$	1932.818...	5	{ 51737.92 / 51738.4 c	$a^5F_2-y^5G_3$ / $a^5F_3-x^2D_3$
1973.578...	0	50669.39	$b^3G_4-y^1F_3$	1931.507...	14	51773.05	$a^5D_4-y^5F_5$
1972.638...	2	50693.54	$c^3F_3-v^3G_4$	1931.309...	1	51778.35	{ $c^3D_2-s^3F_2$ / $a^1F_3-w^3G_3$
1972.245...	2	50703.64	$c^3F_2-v^3G_3$	1930.917 ..	2 bl ıı	51788.9	{ $c^3D_1-s^3F_2$ / $a^3H_4-y^1F_3$
1968.625...	2	50796.88	$a^1H_5-w^3H_6$	1930.387...	15	51803.08	$a^5G_4-z^5H_5$
1967.352...	4	50829.74	$b^1G_4-w^1H_5$	1930.184...	2 b	51808.5	$a^1H_5-t^3F_4$
1966.740...	8	50845.56	$a^3H_4-y^3I_5$	1929.941...	2	51815.06	$a^3D_2-y^3P_2$
1966.201...	2 bl ıı	50859.5	$a^5D_2-y^5F_1$	1929.632...	1	51823.35	$a^5G_5-z^5H_5$
1966.074...	3	50862.78	....	1929.413...	4 b	51829.2	{ $b^3F_3-u^3F_3$ / $a^3F_2-z^1F_3$
1965.309...	8	50882.58	$a^3F_3-y^3G_4$	1928.991...	1	51840.57	$b^3F_4-u^3F_3$
1964.776...	8	50896.39	$a^3I_5-z^3K_6$	1928.837...	4	51844.71	$a^1D_2-z^1P_1$
1964.260...	7	50909.76	{ $a^5D_1-y^5F_1$ / $b^3G_4-v^3F_3$	1928.642...	4	51849.95	$a^3I_5-z^1H_5$
1964.169...	8	50912.12	$a^3I_6-z^3K_6$	1928.265...	5 b	51860.1	{ $a^5F_3-y^5G_3$ / $a^3F_3-w^3F_2$
1964.019...	5 b	50916.0	{ $b^2F_3-v^3D_2$ / $a^3I_7-z^3K_6$	1928.178...	4	51862.43	$a^1F_3-y^1D_2$
1963.461...	1	50930.47	$a^3H_5-w^3G_4$	1927.679...	2	51875.85	....
1963.209...	1	50937.01	$a^3F_4-y^5G_3$	1927.436...	5	51882.39	{ $c^3G_4-r^2F_4$ / $b^3D_3-x^3P_2$
1962.958...	4	50943.53	$c^2F_4-t^3F_4$	1926.898...	3	51896.88	$c^3G_5-r^2F_4$
1962.717...	5	50949.78	$a^5D_0-y^5F_1$	1926.304...	18	51912.89	$4s^7P_3-4p^7P_2$
1961.724...	1	50975.57	$b^3F_2-v^3D_2$	1926.013...	10 bl ıı	51920.7	{ $a^5P_2-z^5P_3$ / $a^5F_2-x^3D_2$
1961.456...	1	50982.53	$b^3F_3-v^3D_3$	1925.855...	3	51924.99	$a^1F_3-y^1G_4$
1961.230...	6	50988.41	$a^5D_2-y^5F_2$	1925.271...	4	51940.74	$a^3F_3-w^3F_4$
1961.010...	5	50994.13	$b^3F_4-v^3D_3$	1924.532...	6	51960.68	$a^3D_3-y^3P_2$
1960.318...	13	51012.13	$a^3I_7-z^3K_8$	1924.119...	4	51971.84	$b^1F_3-w^1G_4$
1959.324...	8	51038.01	$a^5D_1-y^5F_2$	1923.877...	7	51978.37	$a^5P_3-z^5P_3$
1959.026...	3	51045.77	$b^3F_2-v^3D_1$	1923.003...	7	52002.00	$a^5F_3-y^5G_4$
1958.732...	4	51053.44	$b^3G_3-v^3F_2$	1922.789...	15	52007.79	$a^5G_5-z^5H_6$
1958.583...	11	51057.32	$a^5P_3-z^5D_4$	1922.132...	1	52025.56	$a^3F_4-x^5F_5$
1957.938...	6	51074.14	$a^1G_4-y^1H_5$	1921.990...	1	52029.41	$a^3H_4-v^3F_3$
1957.375...	2	51088.83	$c^3F_2-t^3F_2$	1921.132...	2	52052.64	$c^3D_3-s^3F_3$
1957.137...	3	51095.04	$b^3G_5-v^3F_4$	1920.752...	2	52062.94	$a^1H_5-y^1H_5$
1955.943...	0	51126.23	$a^3P_2-y^3D_3$	1920.260...	2	52076.28	$c^3D_2-s^3F_3$
1954.975...	8	51151.55	$a^3H_5-y^3I_6$	1920.186...	4	52078.29	$a^5F_4-y^5G_4$
1954.769...	4	51156.94	$a^3F_4-y^5G_5$	1919.572...	4	52094.94	$a^3F_2-w^3D_1$
1954.223...	10 b	51171.2	$a^5D_{23}-y^5F_3$	1918.966...	3	52111.40	$b^3F_2-u^3F_2$
1953.968...	4	51177.91	$c^3F_3-t^3F_3$	....	.... ↑	{ 52121.9 c / 52124.59	$a^3F_3-w^3D_2$ / $a^3F_3-w^3F_3$
1953.821...	1	51181.76	$c^3F_4-t^3F_3$	1918.480...	7 ↑		
1953.488...	10	{ 51190.49 / 51191.0 c	$a^3I_6-z^3K_7$ / $a^3G_4-z^3G_3$	1918.284...	7 ↑	52129.92	$a^5P_1-z^5P_2$
1953.322...	13	51194.84	{ $a^3G_3-z^3G_3$ / $a^3I_7-z^3K_7$	1917.960...	6	52138.73	{ $b^3D_2-x^3P_1$ / $b^3D_2-u^3F_4$
1953.202...	4	51197.98	$c^3F_4-y^1H_5$	1917.665...	2	52146.75	$a^3I_6-z^1K_7$
1952.648...	11	51212.51	$a^3G_4-z^3G_4$	1917.453...	9	52152.52	$a^1I_6-z^1I_6$
1952.514...	3	51216.0	$a^2G_3-z^3G_4$	1917.351...	8)	52155.29	$a^5F_4-y^5G_5$
1952.362...	2 b	51220.0	{ $b^3G_4-v^3F_4$ / $a^3G_4-z^3G_5$	1917.26....	4)	52157.8	$c^3G_4-r^3F_3$
1951.318...	3	51247.41	$a^3G_5-z^3G_4$	1917.087...	2	52162.47	$a^3F_2-w^3F_2$
1951.007...	12	51255.58	$a^3G_5-z^3G_5$	1916.507...	5	52178.26	$a^5F_5-y^5G_5$
1950.334...	10	51273.27	$a^3H_6-y^3I_7$	1915.750...	2	52198.88	$a^5P_2-z^5P_2$
1949.666...	3	51290.83	$a^5F_1-y^5G_2$	1915.083...	15	52217.06	$a^5G_6-z^5H_7$
1949.462...	2	51296.20	$a^3D_1-y^3P_0$	1914.056...	19	52245.08	$4s^7S_3-4p^7P_3$
1948.280...	3	51327.32	$b^1G_4-v^1G_4$?	1913.622...	4	52256.92	$a^5P_3-z^5P_2$
1946.769...	3	51367.16	$c^3G_3-v^3H_4$	1913.386...	1	52263.37	$b^3G_4-u^3F_4$
1946.321...	0	51378.98	$c^3G_4-v^3H_4$				
1945.724...	2	51394.75	$a^3F_4-y^3G_4$				
1945.342...	12	51404.84	$a^5D_3-y^5F_4$				
1943.715...	2	51447.87	....				
1943.481...	14 ↓	{ 51454.07 / 51455.9 c	$a^5G_{2(3)}-z^5H_3$ / $a^1G_4-x^1G_4$				

TABLE 1—*Continued*

λ_{vac} A	Int.	ν_{vac} cm^{-1}	Combination	λ_{vac} A	Int.	ν_{vac} cm^{-1}	Combination
1912.920...	4	52276.10	$a^5P_1 - z^5P_1$	1887.471...	8	52980.95	$\begin{cases} a^5G_4 - z^5F_4 \\ a^5G_3 - z^5D_3 \end{cases}$
1911.703...	2 b	52309.4	$\begin{cases} a^3H_5 - v^3F_4 \\ a^1I_6 - y^5G_6 \end{cases}$	1887.197...	8	52988.64	$a^5G_4 - z^5D_3$
1911.338...	7	52319.37	$a^1H_5 - x^1H_5$	1887.09....	1	52991.6	$a^5D_2 - y^5D_3$
1910.401...	6	52345.03	$a^5P_2 - z^5P_1$	1886.757...	12	53001.00	$a^5G_5 - z^5F_4$
1910.172...	1	52351.31	$c^3D_2 - t^3D_1$	1886.607...	5	53005.21	$a^5D_2 - z^3D_1$
1909.846...	2	52360.24	$b^1G_4 - u^1F_3?$	1885.947...	5	53023.76	$a^5F_4 - x^5F_5$
1909.782...	2	52361.99	$c^3D_1 - t^3D_1$	1885.125...	9	53046.88	$a^5F_5 - x^5F_5$
1907.741...	4	52418.02	$a^3I_6 - y^3H_6$	1884.596...	8	53061.77	$a^5D_{32} - y^5D_2$
1907.577...	10 $\downarrow$	$\begin{cases} 52422.52 \\ 52423.9\ c \end{cases}$	$a^3I_7 - y^3H_6$ / $a^3F_2 - w^3D_2$	1884.253...	2 b	53071.4	$b^3G_4 - w^3H_4$
1906.814...	6	$\begin{cases} 52443.50 \\ 52444.6\ c \end{cases}$	$\begin{cases} b^3D_1 - y^5G_2 \\ a^5F_5 - z^1I_6 \\ a^1H_5 - x^1G_4 \end{cases}$	1883.816...	3	53083.74	$a^5D_2 - y^5D_1$
1906.457...	6	52453.32	$a^3F_4 - w^3F_4$	1883.394...	1	53095.63	$a^5D_0 - z^3D_1$
1905.818...	2	52470.91	$a^5F_1 - x^5F_2$	1883.185...	2	53101.53	$a^1F_3 - v^3F_4$
1905.214...	1	52487.5	$c^3D_3 - t^3D_2$	1882.979...	4	53107.34	$a^5D_3 - y^5D_4$
1904.402...	4	$\begin{cases} 52509.92 \\ 52510.6c \end{cases}$	$a^5D_3 - z^3D_3$ / $c^3D_2 - t^3D_2$	1882.357...	5	53124.89	$b^3G_4 - w^3H_5$
1904.257...	2	52513.92	$b^1D_2 - w^1D_2?$	1882,047...	10	53133.64	$\begin{cases} a^5D_1 - y^5D_1 \\ a^5D_4 - y^5D_3 \end{cases}$
1903.983...	1	52521.47	$c^3D_1 - t^3D_2$	1881.578...	3	53146.87	$a^5F_1 - w^3D_2$
1903.706...	1	52529.12	$b^3G_4 - u^3F_3$	1881.178...	5	53158.18	$b^3G_3 - w^3H_4$
1903.257...	3	52541.51	$a^3P_1 - z^3S_1$	1880.704...	4	53171.58	$b^3D_3 - y^3G_4$
1903.18....	1	52543.6	$a^5F_4 - w^3D_3$	1880.620...	3	53173.95	$\begin{cases} a^5F_2 - w^3F_2 \\ a^5D_0 - y^5D_1 \end{cases}$
1902.902...	5	52551.31	$a^1F_3 - y^1F_3$	1878.550...	2	53232.55	$a^5P_3 - z^3P_2$
1902.402...	6	52565.13	$b^3D_2 - x^3D_3$	1877.989...	12	53248.45	$a^5D_4 - y^5D_4$
1902.076...	5	52574.13	$a^5F_4 - y^3G_5$	1873.534...	2	53375.07	$a^5F_3 - w^3F_4$
1901.540...	3	52588.95	$a^5F_1 - x^5F_1$	1872.515...	4	53404.11	$a^5G_{32} - z^5S_2$
1901.379...	5	52593.41	$\begin{cases} b_3D_1 - x^3P_0 \\ b_3D_3 - x^3D_3 \end{cases}$	1872.214...	6 $\uparrow$	$\begin{cases} 53411.2\ c \\ 53412.70 \end{cases}$	$b^3F_4 - v^3G_5$ / $b^3G_5 - w^3H_6$
1901.096...	9	52601.24	$a^5F_5 - y^5G_6$	1871.44....	0	53434.8	$a^5F_2 - w^3D_2$
1900.575...	1	52615.66	$b^3G_3 - u^3F_3$	1871.319...	2	53438.24	$a^5F_2 - w^3F_3$
1899.931...	5	52633.49	$c^3D_3 - s^3F_4$	1871.152...	9	53443.01	$a^5G_2 - z^5F_1$
1899.318...	5 b	52650.5	$\begin{cases} a^5F_2 - x^5F_3 \\ a^5D_4 - z^3D_3 \\ c^3G_3 - r^3F_2 \end{cases}$	1869.91....	4)	53478.5	$c^3F_2 - u^3G_3$
1898.870...	6	52662.89	$a^3P_2 - z^3S_1$	1869.828...	10)	53480.85	$a^5G_{32} - z^5F_2$
1897.379...	3	52704.28	$a^3I_5 - y^3H_5$	1866.900...	2	53564.73	$a^1F_3 - v^3D_3$
1897.028...	4	52714.03	$b^3D_3 - y^5G_3$	1866.554...	5	53574.66	$a^5G_3 - z^5F_3$
1896.803...	9)	52720.29	$a^3I_6 - y^3H_5$	1866.305...	9	53581.81	$a^5G_4 - z^5F_3$
1896.73....	4)	52722.3	$b^3D_1 - x^3D_1$	1865.606...	2	53601.88	$b^3F_3 - v^3G_4$
1896.333...	4 n blg	52733.3	$c^3G_3 - t^3G_3$	1865.445...	2	53606.51	$\begin{cases} a^1D_2 - y^1F_3 \\ b^3D_3 - x^5F_4 \end{cases}$
1895.912...	1	52745.06	$c^3G_4 - t^3G_3$	1865.202...	7	53613.50	$b^1F_3 - w^1F_3$
1895.63....	?)	52752.9	$a^5F_3 - x^5F_4$	1864.53....	1	53632.8	$b^3F_3 - v^3G_3$
1895.456...	20)	$\begin{cases} 52757.75 \\ 52759.1\ c \end{cases}$	$4s^7S_3 - 4p^7P_4$ / $a^5F_2 - x^5F_2$	1863.317...	4	53667.73	$a^5D_1 - y^5D_0$
1894.983...	4	52770.92	$a^5F_3 - x^5F_3$	1862.446...	2	53692.83	$b^3F_2 - v^3G_3$
1894.52....	3 blg	52783.8	$b^3D_1 - x^3D_2$	1861.665...	3	53715.36	$a^5D_2 - y^5P_1$
1894.252...	5	52791.29	$\begin{cases} a^5D_{32} - z^3D_2 \\ a^1F_3 - v^3F_3 \end{cases}$	1859.955...	3	53764.74	$a^5D_1 - y^5P_1$
1893.981...	11	52798.84	$a^3I_5 - y^3H_4$	1859.813...	5	53768.85	$c^3F_3 - u^3G_4$
1893.113...	3	52823.04	$c^3D_2 - t^3D_3$	1858.542...	5	53805.62	$a^5D_0 - y^5P_1$
1892.890...	5	52829.27	$a^5F_4 - x^5F_4$	1856.690...	7	$\begin{cases} 53859.29 \\ 53859.7\ c \end{cases}$	$a^5D_2 - y^5P_2$ / $b^3F_4 - t^3F_4$
1892.598...	1	52837.42	$b^3G_3 - u^3F_2$	1855.510...	3	53893.54	$a^1G_4 - u^3G_5$
1892.488...	1	52840.49	$a^5D_1 - z^3D_2$	1854.975...	5	53909.08	$a^5D_1 - y^5P_2$
1892.339...	1	52844.65	$a^3H_5 - y^1I_6$	1854.826...	9 b	$\begin{cases} 53913.4 \\ 53914.1\ c \end{cases}$	$a^5D_{32} - y^5P_3$ / $a^5F_1 - x^5D_1$
1892.247...	5	52847.22	$a^5F_4 - x^5F_3$	1854.384...	3	53926.26	$a^5F_1 - x^5D_0$
1892.140...	5	52850.21	$a^5G_5 - z^5F_5$	1852.812...	2	53972.02	$a^5F_3 - x^5D_4$
1892.073...	5	52852.08	$a^5F_4 - x^5F_4$	1852.677...	6	53975.95	$b^3G_5 - v^3G_5$
1891.909...	3	52856.66	$b^3D_3 - y^5G_4$	1852.366...	1	53985.0	$a^3H_6 - w^3H_5$
1891.516...	5 b	52867.6	$\begin{cases} c^3G_4 - t^3G_4 \\ b^3D_2 - x^3D_2 \end{cases}$	1851.261...	6	54017.23	$c^3F_4 - u^3G_5$
1891.339...	1	52872.59	$a^3F_3 - x^5D_2$	1850.650...	1	54035.1	$a^5G_4 - z^5D_4$
1891.186...	3	52876.87	$a^5F_2 - x^5F_1$	1850.200...	5	54048.21	$a^5F_4 - x^5D_4$
1891.070...	4	52880.12	$a^5F_3 - x^5F_2$	1849.960...	5	54055.22	$\begin{cases} a^5D_4 - y^5P_3 \\ a^5G_5 - z^5D_4 \end{cases}$
1890.893...	2	52885.07	$\begin{cases} a^5F_1 - w^3F_2 \\ a^5G_2 - z^5D_1 \end{cases}$	1849.648...	1	54064.34	$a^5F_2 - x^5D_3$
1890.669...	13	52891.33	$a^5G_6 - z^5F_5$	1849.407...	7	54071.39	$a^5F_5 - x^5D_4$
1889.735...	4	52917.47	$a^1D_2 - y^1D_2$	1849.172...	1	54078.26	$b^3F_2 - t_3F_2$
1889.451...	5	52925.43	$a^5D_{32} - z^5D_2$	1848.883...	1	54086.71	$b^3F_3 - t^3F_3$
1888.260...	2	52958.80	$c^3G_4 - t^3G_5$	1848.492...	1	54098.15	$b^3F_4 - t^3F_3$
1887.734...	4	52973.57	$c^3G_5 - t^3G_5$	1848.428...	0	54100.0	$b^3G_4 - v^3G_5$

TABLE 1—*Continued*

λ_{vac} A	Int.	ν_{vac} m⁻¹	Combination	λ_{vac} A	Int.	ν_{vac} m⁻¹	Combination
1848.130...	2	54108.74	$c^3D_3-v^3P_2$	1628.304...	3	61413.59	$a^1I_6-x^1H_5$
1847.637...	2	54123.19	$a^1G_4-u^3D_3$	1624.206...	2	61568.54	$a^3G_5-y^3H_6$
1847.348...	1	54131.65	$c^3D_2-v^3P_2$	1617.171...	1	61836.4	$a^3G_4-y^3H_5$
1846.943...	3	54143.52	$c^3F_2-u^3D_1$	1614.611...	1	61934.4	$a^3G_3-y^3H_4$
1845.749...	1 b	54178.5	$\{b^3G_5-v^3G_4$ / $a^3G_3-y^3D_2$	1611.763...	7 n } unr.	62043.9	$4p^5P_1-4d^5D_2$
				1611.723...	7 n }	62045.4	$4p^5P_1-4d^5D_{10}$
1845.521...	7	54185.24	$\{a^5F_3-x^5D_3$ / $a^5F_2-x^5D_2$	1607.723...	9 n	62199.8	$4p^5P_2-4d^5D_{32}$
1845.304...	5	54191.61	$a^3H_4-w^3H_4$	1606.014...	3 n	62266.0	$4p^5P_1-5s^5S_2$
1844.942...	3	54202.25	$\{c^3F_2-u^3D_2$ / $a^5F_2-x^5D_1$	1602.000...	5 n	62422.0	$4p^5P_2-5s^5S_2$
				1601.289...	6 n	62449.7	$4p^5P_3-4d^5D_{32}$
1844.547...	6	54213.85	$a^3H_5-w^3H_5$	1601.211...	10 n	62452.8	$4p^5P_3-4d^5D_4$
1844.263...	5	54222.20	$c^3F_3-u^3D_2$				
1843.999...	3	54229.96	$b^3D_3-w^3F_4$	1595.597...	6 n	62672.5	$4p^5P_3-5s^5S_2$
1843.502...	2	54244.58	$a^3H_4-w^3H_5$	1551.377...	4 n	64458.9	$4p^7P_4-4d^7D_3$
1843.409...	4	54247.32	$c^3F_4-u^3D_3$	1550.862...	8 n	64480.3	$4p^7P_4-4d^7D_4$
1842.927...	5	54261.51	$a^5F_4-x^5D_3$	1550.196...	12 n	64508.0	$4p^7P_4-4d^7D_5$
1841.536...	5	54302.50	$b^3G_4-v^3G_4$	1539.480...	5 n	64957.0	$4p^7P_3-4d^7D_2$
1841.387...	3	54306.89	$a^5F_3-x^5D_2$	1539.128...	8 n	64971.9	$4p^7P_3-4d^7D_3$
1838.698...	1	54386.3	$b^3D_2-w^3F_3$	1538.632...	10 n	64992.8	$4p^7P_3-4d^7D_4$
1838.621...	1	54388.6	$b^3G_3-v^3G_4$	1531.864...	7 n	65279.9	$4p^7P_2-4d^7D_1$
1838.309...	7	54397.82	$a^3H_6-w^3H_6$	1531.644...	8 n	65289.3	$4p^7P_2-4d^7D_2$
1837.588...	4	54419.16	$b^3G_3-v^3G_3$	1531.293...	6 n	65304.3	$4p^7P_2-4d^7D_3$
1837.422...	1	54424.1	$b^3G_5-t^3F_4$	1505.166...	10 n	66437.9	$4p^7P_4-5s^7S_3$
1834.096...	1	54522.77	$a^3P_1-y^3P_0$	1504.002...	2	66489.3	$a^5D_4-x^5F_5$
1830.623...	3	54626.21	$a^3H_5-w^3H_6$	1493.640...	9 n	66950.5	$4p^7P_3-5s^7S_3$
1829.172...	2	54669.54	$\{a^5G_3-z^3F_2$ / $a^3P_0-y^3P_1$	1486.265...	7 n	67282.8	$4p^7P_2-5s^7S_3$
1828.857...	1 bl II	54679.0	$b^3G_5-y^1H_5$	1484.546...	1	67360.7	$a^3G_5-x^3G_5$
1826.267...	0	54756.5	$a^3P_1-y^3P_1$	1484.241...	0	67374.5	$a^3G_4-x^3G_4$
1826.156...	1	54759.83	$a^5G_4-z^3F_3$	1481.169...	2	67514.2	$a^5D_4-x^5D_4$
1824.659...	1	54804.76	$(b^3G_3-t^3F_2)$	1471.638...	1	67951.5	$3d'\,^3F_3-z^3F_3$
1822.183...	1	54879.23	....	1471.051...	0	67978.6	$3d'\,^3F_2-z^3F_2$
1821.865...	0	54888.8	$a^5G_5-z^3H_6$	1468.986...	2	68074.2	$3d'\,^3F_4-z^3F_4$
1820.496...	1	54930.08	$a^5G_6-z^3H_6$	1395.750...	2	71646.1	$3d'\,^3F_3-z^3G_4$
1819.718...	1	54953.56	$\{a^3F_3-w^3G_4$ / $a^1F_3-w^3H_4$	1395.382...	0	71665.0	$3d'\,^3F_4-z^3G_4$
1819.480...	2	54960.76	$a^3H_6-v^3G_5$	1395.213...	3	71673.6	$3d'\,^3F_3-z^3G_5$
1812.974...	2	55157.99	$a^5D_4-y^3D_3$	1394.024...	1	71734.8	$3d'\,^3F_2-z^3G_3$
1811.924...	3	55189.95	$a^3P_2-y^3P_2$	1382.857...	1	72314.1	$a^5G_6-y^5G_6$

From here to λ 1017 intensities in parentheses refer to M.I.T. plates

λ_{vac} A	Int.	ν_{vac} m⁻¹	Combination
1808.203...	0	55303.5	$a^3F_4-w^3G_5$
1805.337...	2	55391.32	$a^3H_5-v^3G_4$
1803.330...	1	55452.97	$a^3H_4-v^3G_3$
1801.766...	3	55501.10	$a^1G_4-w^1G_4$
1797.769...	0	55624.5	$c^3F_4-w^1G_4$
1793.785...	1	55748.04	$a^5D_4-y^3F_4$
1791.345...	0	55823.98	$a^5P_2-z^3D_3$
1777.737...	1	56251.29	$a^5P_1-z^3D_1$
1775.983...	6	56306.85	$\{a^5P_2-y^5D_3$ / $a^5P_1-y^5D_2$
1775.590...	0	56319.3	$a^5P_2-z^3D_1$
1775.267...	1	56329.55	$a^5P_1-y^5D_1$
1773.098...	1	56398.46	$a^5P_2-y^5D_1$
1771.975...	2	56434.20	$a^5P_3-y^5D_2$
1770.554...	6	56479.50	$a^5P_3-y^5D_4$
1770.247...	3	56489.29	$a^1H_5-w^1G_4$
1753.455...	0	57030.26	$a^5P_2-y^5P_1$
1749.052...	1	57173.83	$a^5P_2-y^5P_2$
1748.177...	2	57202.45	$a^5G_2-y^5F_1$
1747.260...	1	57232.47	$a^5P_3-y^5P_2$
1745.638...	4	57285.65	$a^5P_3-y^5P_3$
1744.233...	3	57331.79	$a^5G_{32}-y^5F_2$
1739.201...	0	57497.7	$b^3G_5-u^3G_5$
1738.468...	3	57521.91	$a^5G_4-y^5F_3$
1730.842...	4	57775.35	$a^5G_5-y^5F_4$
1722.837...	4	58043.80	$a^5G_6-y^5F_5$
1717.414...	2	58227.08	$a^3H_4-u^3G_3$
1710.374...	3	58466.74	$a^3H_5-u^3G_4$
1709.892...	4	58483.23	$a^3H_6-u^3G_5$
1695.036...	2	58995.79	$4s^7S_3-4p^5P_3$
1656.831...	2	60356.2	$a^3I_7-y^3I_7$

λ_{vac} A	Int.	ν_{vac} m⁻¹	Combination
1143.67....	3 (3 bl)	87437.8	$3d^3D_1-z^8F_2$
1143.54....	1 (2 bl)	87447.7	$3d^3D_2-z^8F_2$
1142.955...	5 (5)	87492.5	$3d^3D_3-z^8F_4$
1142.464...	4 (4)	87530.1	$3d^3D_2-z^8F_3$
1141.272...	3 (3)	87621.5	$3d'\,^1G_4-x^1H_5$
1131.914...	3 (3)	88345.9	$3d^5D_2-4p^5P_3$
1131.194...	7 (5)	88402.2	$3d^5D_1-4p^5P_2$
1130.404...	5 (3)	88463.9	$3d^5D_0-4p^5P_1$
1129.19....	7	88559.1	$3d^5D_1-4p^5P_1$
1128.72....	7	88595.9	$3d^5D_2-4p^5P_2$
1128.02....	8	88650.9	$3d^5D_3-4p^5P_3$
1126.72....	6 (0)	88753.2	$3d^5D_2-4p^5P_1$
1124.883...	9 (5)	88898.1	$3d^5D_3-4p^5P_2$
1122.526...	9 (2)	89084.8	$3d^5D_4-4p^5P_3$
1099.05....	2	90987.7	$3d'\,^3P_2-v^3D_2$
1098.24....	5 (0)	91054.8	$3d'\,^3P_2-v^3D_3$
1097.65....	m (1)	91103.7	$3d'\,^3F_3-v^3D_2$
1096.61....	bl (3)	91190.1	$3d'\,^3F_4-v^3D_3$
1095.47....	5 (1)	91285.0	$3d'\,^3F_2-v^3D_1$
1093.32....	2	91464.5	$3d^1F_3-z^1G_4$
1089.671...	4	91770.8	$3d'\,^3F_4-u^3F_4$
1089.416...	4	91792.3	$3d'\,^1G_4-w^1G_4$
1089.061...	3	91822.2	$3d'\,^3P_1-v^3D_2$
1088.224...	1	91892.8	$3d'\,^3P_1-v^3D_1$
1086.748...	5 (3)	92017.6	$3d'\,^3F_3-u^3F_3$
1083.176...	2	92321.1	$3d'\,^3P_0-v^3D_1$
1082.838...	4 (1)	92349.9	$3d'\,^3F_2-u^3F_2$
1075.024...	4	93021.2	$3d^3G_3-z^3F_2$

TABLE 1—*Continued*

λ_{vac}A	Int.	ν_{vac}cm^{-1}	Combination	λ_{vac}A	Int.	ν_{vac}cm^{-1}	Combination
1072.061...	1	93104.6	$3d^3G_3-z^3F_3$	986.514...	4	101367.0	$3d^3F_4-y^5D_3$
1072.217...	4 (1)	93264.7	....	985.824...	8	101438.0	$3d^3H_4-z^3G_3$
1071.746...	5 (4)	{93303.2 c / 93305.7}	$3d^1F_3-z^1F_3$ / $3d^3G_4-z^3F_3$	983.877...	10 b	101638.7	$\{3d^1I_6-z^1K_7$ / $3d^3H_5-z^3G_4\}$
1070.556...	3 (0)	93409.4	$3d^3G_4-z^3F_4$	983.510...	2	101676.6	$\{3d^1F_3-t^3F_3$ / $3d^1G_4-y^3H_5\}$
1070.284...	4 (1)	93433.1	$3d'^1G_4-w^1F_3$	981.373...	10	101898.1	$3d^3H_6-z^2G_5$
1069.019...	5 (3)	93543.7	$3d^3G_3-z^3H_4$	981.084...	1	101928.1	$3d^3D_3-x^3F_4$
1068.299...	3 (1)	93606.8	$3d'^3F_4-v^3G_5$	980.416...	1	101997.5	$3d^3F_3-y^5P_2$
1068.190...	5 (4)	93616.3	$3d^3G_4-z^3H_5$	979.704...	2	102071.6	$3d^1F_3-z^1G_4$
1066.181...	10 b {(3)	{93790.8 c / 93792.7}	$3d'^3F_3-v^3G_4$ / $3d^3G_5-z^3F_4$	979.032...	5	102141.7	$3d^1F_3-x^1F_3$
1066.143...	(4)}	93796.0	$3d^3G_5-z^3H_6$	977.790...	2	102271.4	$3d'^1G_4-v^1F_3$
1064.611...	1	93931.0	$3d'^3F_2-v^3G_3$	973.505...	4	102721.6	$3d^1F_3-x^1D_2$
1063.872...	8 (5)	93996.3	$3d^3D_3-y^3D_3$	971.929...	3	102888.2	$3d^1D_2-z^1P_1$
1063.309...	3 (1)	94046.0	$3d^3D_3-y^3D_2$	970.435...	2}	103046.6	$3d^3F_2-y^3D_2$
1063.188...	4	94056.7	$3d'^3F_4-t^3F_4$	970.381...	2}	103052.3	....
1062.272...	3	94137.8	$3d^3D_2-y^3D_3$	969.954...	3	103097.7	$3d^3F_2-y^3D_1$
1061.827...	4	94177.3	$3d^3D_1-y^3D_2$	969.423...	2	103154.1	$3d^3F_3-y^3D_3$
1061.708...	6 (3)	94187.9	$3d^3D_2-y^3D_2$	968.955...	4	103204.0	$3d^3F_3-y^3D_2$
1061.245...	5 (2)	94228.9	$3d^3D_1-y^3D_1$	967.197...	6	103391.6	$3d^3F_4-y^3D_3$
1061.127...	4 (0)	94239.4	$3d^3D_2-y^3D_1$	965.717...	1	103550.0	$3d^3D_2-x^3P_2$
1060.723...	4 (0)	94275.3	$3d'^3F_3-t^3F_3$	963.880...	3 bl	103747.4	$3d^3P_0-y^3D_1$
1060.258...	4 (0)	94316.7	$3d'^3F_2-t^3F_2$	963.197...	2 b	103820.9	$\{3d^3F_2-y^3F_2$ / $3d^3D_1-x^3P_1\}$
1038.355...	6 (2)	96306.2	$3d^3F_2-z^3F_2$	962.655...	5	103879.4	$3d^1S_0-z^1P_1$
1037.462...	1	96389.1	$3d^3F_2-z^3F_3$	962.108...	1	103938.0	$3d^3F_3-y^3F_3$
1036.659...	2	96463.7	$3d^3F_3-z^3F_2$	961.901...	7	103960.8	$3d^1D_2-y^1D_2$
1035.768...	6 (5)	96546.7	$3d^3F_3-z^3F_3$	961.709...	2	103981.6	$3d^3F_4-y^3F_4$
1034.654...	2	96650.7	$3d^3F_3-z^3F_4$	960.454...	1	104117.4	$3d^3D_3-x^3D_3$
1034.054...	2	96706.7	$3d'^3F_2-u^3G_3$	959.552...	4	104215.3	$3d^3P_1-y^3D_2$
1033.298...	5 {(4)	96777.5	$3d^3G_3-z^3G_3$	959.329...	1	104239.5	$3d^3D_3-y^5G_3$
1033.24....	2}	96782.9	$3d^3F_4-z^3F_3$	959.070...	1 ↑	104267.7	$3d^3P_1-y^3D_1$
1033.079...	1	96798.0	$3d^3G_3-z^3G_4$	956.355...	1	104563.7	$3d^3D_2-x^3D_2$
1032.342...	4 (1)	96867.1	$\{3d'^3F_3-u^3G_4$ / $3d^1F_3-y^1D_2\}$	955.572...	5	104649.4	$3d^1D_2-y^1F_3$
1032.123...	8 (5)	96887.7	$3~^{12}F_4-z^2F_4$	955.141...	2	104696.6	$3d^3D_3-y^3G_4$
1030.924...	6 (3)	97000.4	$3d^3G_4-z^3G_4$	953.383...	3	104889.6	$3d^1D_2-v^3F_3$
1030.844...	2	97007.9	$3d^3G_4-z^3G_5$	950.722...	3}	105183.2	$3d^3P_0-z^3S_1$
1029.551...	2	97129.7	$3d'^3F_4-u^3G_5$	950.663...	4}	105189.7	....
1026.790...	6	97390.9	$3d^3G_5-z^3G_5$	950.334...	10	105226.2	$3d^1I_6-z^1I_6$
1024.108...	3	97646.0	$3d^3D_1-y^3P_0$	948.918...	4	105383.2	$3d^1I_6-y^5G_6$
1021.561...	4	97889.4	$3d^3D_2-y^3P_1$	948.322...	5	105449.4	$3d^3P_2-y^3D_3$
1020.022...	2	98037.1	$3d^{2'}P_1-u^3D_2$	946.056...	6	105702.0	$3d^3P_1-z^3S_1$
1019.789...	6 (1)	98059.5	$3d^3D_3-y^3P_2$	942.363...	2	106116.2	$3d^1F_3-w^1G_4$
1018.286...	8 (1)	{98201.3 c / 98204.2}	$3d^3D_2-y^3P_2$ / $3d^3H_4-z^3H_4$	934.703...	7	106985.9	$3d^3P_2-z^3S_1$
1017.745...	8 (2)	98256.4	$3d^3H_5-z^3H_5$	931.124...	1	107397.1	$3d^3P_0-y^3P_1$
1017.254...	9 (1)	98303.9	$3d^3H_6-z^3H_6$	930.086...	4	107516.9	$3d^3G_3-y^3H_4$
1012.411...	3	98774.1	$3d^3P_0-z^3P_1$	929.163...	5	107623.7	$3d^3G_4-y^3H_5$
1010.005...	4	99009.4	$3d^3P_1-z^3P_2$	928.474...	5	107703.6	$3d^3G_5-y^3H_6$
1007.113...	3	99293.7	$3d^3P_1-z^3P_1$	928.004...	4	107758.2	$3d^1F_3-w^1F_3$
1006.341...	2	99369.9	$3d^1G_4-z^3I_5$	923.215...	1	108317.1	$3d'^3P_2-t^3D_3$
1005.106...	2	99492.0	$3d^3P_1-z^3P_0$	918.800...	1	108838	$3d'^3P_1-t^3D_2$
999.376...	5	100062.4	$3d^3F_2-z^3G_3$	917.932...	4	108940.5	$3d^1G_4-y^1G_4$
997.794...	1	100221.1	$3d^3F_3-z^3G_3$	917.684...	2	108970.0	$3d^3D_3-y^1G_4$
997.599...	6 bl	100240.7	$3d^3F_3-z^3G_4$	915.455...	3	109235.3	$3d^1D_2-x^1F_3$
997.081...	7	100292.8	$3d^3P_2-y^3P_2$	913.919...	2	109418.9	$3d^3G_4-z^1G_4$
995.223...	2	100480.0	$3d^3F_4-z^3G_4$	913.324...	1	109490.2	$3d^1I_6-y^3I_6$
995.150...	6	100487.4	$3d^3F_4-z^3G_5$	913.132...	1	109513.2	$3d^3P_2-y^3P_2$
994.724...	6	100530.4	$3d^3G_3-y^3F_2$	912.794...	3	109553.7	$3d^3H_5-z^3I_6$
994.257...	3	100577.6	$3d^3P_2-z^3P_1$	912.683...	5	109567.1	$3d^1G_4-y^1F_3$
993.080...	7	100696.8	$3d^1G_4-y^3F_3$	912.197...	2	109625.4	$3d'^3P_2-v^3P_2$
992.337...	2 bl	100772.2	$3d^3F_2-z^3D_2$	911.265...	2	109737.6	$3d^3D_2-y^1F_3$
991.829...	6	100823.8	$3d^1G_4-z^1H_5$	911.205...	1	109744.8	$3d^3F_3-z^1D_2$
991.232...	9	100884.6	$\{3d^3F_4-z^3D_3$ / $3d^3G_5-y^3F_4\}$	910.961...	6	109774.2	$3d^3H_4-z^3I_5$
990.800...	6	100928.5	$3d^3F_3-z^3D_2$	910.693...	4}	109806.5	$\{3d^3H_6-z^3I_6$ / $3d^1G_4-v^3F_3\}$
990.235...	4	100986.1	$3d^3F_2-z^3D_1$	910.639...	3}	109813.0	$3d^1D_2-x^1D_2$
989.467...	4	101064.5	$3d^3F_2-y^5D_1$	909.279...	2	109977.2	$3d^3D_2-v^3F_3$
988.148...	2	101199.4	$3d^3F_3-y^5D_2$	909.178...	4	109989.5	$3d^3H_6-z^1I_7$
986.637...	5	101354.4	$3d^1I_6-z^1H_5$	908.885...	2	110024.9	$3d^3D_1-v^3F_2$

TABLE 1—*Continued*

λ_{vac}A	Int.	ν_{vac}cm^{-1}	Combination	λ_{vac}A	Int.	ν_{vac}cm^{-1}	Combination
908.800...	1	110035.2	$3d^3D_2-v^3F_2$	868.450...	4 b	115147.7	$\begin{cases}3d^3P_2-x^3P_1\\3d^3F_4-w^3F_4\end{cases}$
908.131...	5	110116.3	$3d^1G_4-v^3F_4$	867.639...	5	115255.3	$\begin{cases}3d^3H_5-y^3G_4\\3d^3P_0-w^3D_1\end{cases}$
907.891...	4	110145.4	$3d^3D_3-v^3F_4$	866.905...	1	115352.9	$3d^5D_0-z^5D_1$
907.041...	1	110248.6	$3d^3F_2-x^3F_2$	865.896...	4	115487.3	$3d^5D_1-z^5D_2$
905.964...	1	110379.7	$3d^3F_3-x^3F_3$	865.267...	1	115571.3	$3d^3P_2-x^3D_3$
905.338...	7	110456.0	$3d^3H_5-z^3K_6$	864.425...	4 }unr.	115683.8	$\begin{cases}3d^5D_2-z^5D_2\\3d^3H_6-y^3G_5\end{cases}$
904.320...	3	110580.3	$3d^1G_4-v^3D_3$	864.375...	2	115690.5	$\begin{cases}3d^3H_6-y^5G_6\\3d^3P_2-y^5G_3\end{cases}$
902.869...	3	110758.0	$3d^3G_5-y^5G_5$	864.034...	6	115736.2	$3d^5D_2-z^5D_3$
901.034...	5	110983.6	$3d^3H_6-z^3K_7$	863.730...	1	115776.9	$3d^3P_1-w^3D_1$
900.940...	3	110995.2	$3d^3G_5-y^3G_4$	863.302...	4	115834.3	$3d^1D_2-y^1P_1?$
900.432...	2	111057.8	$3d^3G_3-z^1F_3$	863.232...	4	115843.7	$3d^3P_1-w^3F_2$
		$\Big(111176.5$ c	$3d^3G_5-y^3G_5$	863.004...	1	115874.3	$3d^3P_2-x^3D_2$
899.417...	8	111180.7 c	$3d^3G_5-y^5G_6$	862.735...	5	115910.4	$3d^5D_0-z^5F_1$
		111183.1	$3d^1I_6-y^1I_6$	862.468...	3	115946.3	$3d'^3F_4-r^3F_4$
		$\Big(111189.2$ c	$3d^3D_3-u^3F_4$	862.326...	2	115965.4	$3d^5D_1-z^5S_2$
899.052...	1	111228.3	$3d^3H_4-z^1H_5$	862.191...	2	115983.6	$3d^5D_3-z^5D_2$
898.805...	1	111258.8	$3d^3G_4-z^1F_3$	862.028...	5	116005.5	$3d^5D_1-z^5F_1$
897.747...	2	111390.0	$3d^3G_3-w^3F_2$	861.832...	10 }unr.	116031.8	$3d^5D_3-z^5F_4$
897.580...	1	111410.7	$3d^3H_5-z^1H_5$	861.761...	8	116041.5	$\begin{cases}3d^5D_3-z^5D_3\\3d^5D_1-z^5F_2\end{cases}$
896.380...	1	111559.8	$3d'^1G_4-w^1H_5$	861.284...	4	116105.7	$3d^3P_1-w^3D_2$
896.072...	1	111598.2	$3d^3D_2-u^3F_3$	861.087...	2	116132.3	$\begin{cases}3d^3H_4-w^3F_4\\3d^3H_6-x^5F_5\end{cases}$
894.008...	4	111855.8	$3d^3G_4-w^3F_3$	860.889...	2	116159.0	$3d^5D_2-z^5S_2$
892.417...	6	112055.2	$\begin{cases}3d^3G_5-w^3F_4\\3d'^1G_4-v^1G_4\end{cases}$	860.565...	2 bl	116202.7	$3d'^3F_3-s^3F_3$
891.442...	8	112177.8	$3d^3H_4-y^3H_4$	860.315...	5	116236.5	$3d^5D_2-z^5F_2$
891.172...	10	112211.8	$3d^3H_6-y^3H_6$	859.838...	6	116301.0	$3d^3P_2-w^3D_3$
890.755...	9	112264.3	$3d^3H_5-y^3H_5$	859.721...	8	116316.8	$3d^5D_4-z^5F_5$
890.008...	2	112358.5	$3d^3H_5-y^3H_4$	859.626...	6	116329.7	$\begin{cases}3d^5D_2-z^5F_3\\3d^3F_2-x^3G_3\end{cases}$
888.777...	2	112514.2	$3d^3H_6-y^3H_5$	859.086...	3	116402.8	$3d^3F_3-x^3G_4$
887.372...	3	112692.3	$3d^3F_2-y^3G_3$	858.602...	6 }unr.	116468.4	$3d^5D_4-z^5F_4$
886.138...	1	112849.2	$3d^3F_3-y^3G_3$	858.565...	4	116473.4	$3d^5D_4-z^5D_3$
884.600...	5	113045.4	$3d^3G_3-x^3G_3$	857.690...	5	116592.2	$3d^3F_4-x^3G_5$
884.263...	4	113088.5	$3d'^1G_4-u^1F_3$	857.392...	5	116632.8	$3d^5D_3-z^5F_3$
883.688...	6	113162.1	$3d^3G_4-x^3G_4$	856.480...	1	116757.0	$3d^3D_3-u^3D_2$
883.090...	3	113238.7	$\begin{cases}3d^3F_3-y^5G_2\\3d^3F_2-y^5G_3\end{cases}$	856.325...	5	116778.1	$3d^3D_3-u^3D_3$
882.295...	1	113340.8	$3d^3P_0-x^3P_1$	856.244...	1	116789.1	$3d'^3F_3-t^3G_3$
882.147...	4	113359.8	$3d^3F_2-x^3D_1$	856.039...	2	116817.1	$3d'^3F_3-r^3F_2$
881.477...	3	113446.0	$3d^1G_4-t^3F_4$	855.935...	2	116831.3	$3d^3D_1-u^3D_1$
881.088...	7	113496.0	$3d^3G_5-x^3G_5$	855.879...	2	116838.'	$3d^3D_2-u^3D_1$
880.949...	6	113513.9	$3d^3F_4-x^3D_3$	855.441...	3	116898.8	$3d^3D_2-u^3D_2$
880.447...	6	113578.7	$3d^3F_3-x^3D_2$	855.336...	1	116913.1	$3d'^3F_3-t^3G_4$
880.008...	5	113635.3	$3d^3F_4-y^5G_3$	854.532...	2	117023.1	$3d'^3F_4-t^3G_5$
879.505...	4	113700.3	$3d^1G_4-y^1H_5$	854.367...	6 bl	117045.7	$3d^3H_4-\lambda^3H_4$
878.287...	4 b	113858.0	$\begin{cases}3d^3F_4-y^5G_5\\3d^3F_3-y^3G_4\\3d^3P_1-x^3P_1\end{cases}$	854.205...	1	117067.9	$3d^5D_4-z^5F_3$
				854.073...	5	117086.0	$3d^5D_3-z^5D_4$
876.679...	3	114066.8	$3d^3H_4-y^3G_3$	853.456...	1	117170.7	$3d^3G_3-u^3F_3$
876.564...	3	114081.8	$3d^1G_4-x^1G_4$	853.045...	1	117227.1	$3d^3H_5-x^3H_4$
876.483...	3	114092.3	$3d^3F_4-y^3G_4$	852.644...	2	117282.2	$3d^3H_4-x^3H_5$
876.021...	5	114152.5	$3d^1G_4-x^1F_3$	851.992...	6	117372.0	$3d^3G_4-u^3F_3$
875.423...	5	114230.5	$3d^1I_6-y^1H_5$	851.842...	6	117392.7	$3d^3G_3-u^3F_2$
875.090...	2	114274.0	$3d^3F_4-y^3G_5$	851.332...	7	117463.0	$3d^3H_5-x^3H_5$
874.560...	1	114343.2	$3d^3F_2-z^1F_3$	851.150...	7	117488.1	$3d^3G_5-u^3F_4$
874.129...	2	114399.6	$3d^3P_1-x^3P_0$	849.569...	4 }unr.	117706.7	$3d^5D_2-z^5F_3$
873.988...	1	114418.0	$3d^3F_3-x^5F_2$	849.524...	5	117713.0	$3d^3G_3-w^3H_4$
873.462...	8	114486.9	$3d^1I_6-x^1H_5$	848.977...	3	117788.8	$3d^5D_1-z^5P_2$
873.130...	2	114530.5	$\begin{cases}3d^3F_4-x^5F_4\\3d^3P_1-x^3D_1\end{cases}$	848.729...	4	117823.2	$3d^3F_2-w^3G_3$
873.080...	3	114537.0	$3d^3G_3-w^3G_3$	848.601...	4	117841.0	$3d^5D_0-z^5P_1$
872.027...	4	114675.3	$3d^3F_2-w^3F_2$	848.07....	1	117915	$3d^3G_4-w^3H_4$
871.968...	4	114683.1	$3d^3G_4-w^3G_4$	847.984...	5	117926.8	$3d^3F_3-w^3G_4$
871.552...	2	114737.8	$3d^3F_4-z^1F_3$	847.924...	6	117935.1	$3d^5D_1-z^5P_1$
870.621...	5	114860.5	$3d^3P_2-x^3P_2$	847.700...	6	$\begin{cases}117963.7 \text{ c}\\117966.3\end{cases}$	$\begin{cases}3d^3H_5-x^3H_6\\3d^3G_4-w^3H_5\end{cases}$
870.274...	2 }unr.	114906.3	$3d^3G_5-w^3G_5$				
870.235...	2	114911.5	$3d^3F_3-w^3F_4$				
870.041...	3	114937.1	$\begin{cases}3d^3F_2-w^3D_2\\3d^3H_5-y^5G_4\end{cases}$				
868.836...	5	115096.5	$\begin{cases}3d^3F_3-w^3D_2\\3d^3F_3-w^3F_3\end{cases}$				

TABLE 1—*Continued*

λvacA	Int.	ν_{vac} cm^{-1}	Combination
847.578...	7	117983.2	$3d^5D_2-z^5P_2$
847.425...	8 b	118004.5	$3d^3FI_4-w^3G_5$ $3d^5D_3-z^5P_3$
846.534...	6	118127.0 c 118128.7	$3d^1G_4-w^1G_4$ $3d^5D_2-z^5P_1$
846.089...	2	118190.9	$3d^3D_1-w^3P_1$
846.035...	3	118198.4	$3d^3D_2-w^3P_1$
845.925...	7	118213.8	$3d^3H_6-x^3H_6$
845.686...	1	118247.2	$3d^5D_4-z^3F_3$
845.408...	9	118286.1	$3d^5D_3-z^5P_2$
844.954...	2	118349.6	$3d^3G_5-w^3H_5$ $3d^5D_4-z^3F_4$
844.838...	4	118365.9	$3d^3F_4-y^1G_4$
844.284...	10	118443.6	$3d^5D_4-z^5P_3$
842.686...	5	118668.2	$3d^3D_3-w^3P_3$
842.09....	5 bl	118752	$3d^3F_3-y^1F_3$
842.020...	6	118762.0	$3d^3G_5-w^3H_6$
841.688...	2	118808.9	$3d^3D_2-w^3P_2$
841.088...	5	118893.6	$3d^3F_2-v^3F_2$
840.741...	2	118942.7	$3d^3G_4-v^3G_5$ $3d^3G_3-v^3G_4$
840.629...	3	118958.5	$3d^5D_2-z^3P_2$
840.518...	4	118974.3	$3d^3G_3-v^3G_3$
840.381...	5	118993.6	$3d^3F_3-v^3F_3$
840.141...	4	119027.6	$3d^3H_4-y^3I_5$
839.981...	3	119050.3	$3d^5D_1-z^3P_1$
839.319...	5	119144.2	$3d^3H_4-w^3G_4$ $3d^3G_4-v^3G_4$
839.195...	2	119161.8	$3d^3H_5-w^3G_5$
839.092...	2	119176.4	$3d^3G_4-v^3G_3$
838.997...	4	119189.9	$3d^1F_3-w^1D_2$?
838.936...	5	119198.6	$3d^3H_4-w^3G_3$
838.869...	2	119208.1	$3d^3H_5-y^3I_5$
838.498...	2	119260.9	$3d^5D_3-z^2P_2$
838.048...	8	119324.9	$3d^3H_5-w^3G_4$ $3d^3G_5-v^3G_5$
837.803...	3	119359.8	$3d^3G_3-t^3F_2$
837.439...	7	119411.7	$3d^3H_6-w^3G_5$
836.628...	3	119527.4	$3d^3G_5-v^3G_4$
836.521...	7	119542.7	$3d^3F_4-v^3F_4$ $3d^3H_5-y^3I_6$
835.917...	2	119629.1	$3d^3G_4-t^3F_3$
835.627...	2	119670.6	$3d^5D_0-y^5F_1$
834.944...	6	119764.7 c 119768.5 119773.4 c	$3d^5D_1-y^5F_1$ $3d^1G_4-w^1F_3$ $3d^5G_5-t^3F_4$
....	m	119795.1 c	$3d^3H_6-y^3I_6$
834.067...	4	119894.4	$3d^5D_1-y^5F_2$
833.532...	2	119971.4	$3d^3H_4-y^1F_3$
....	m 0 II	120087.3 c	$3d^5D_2-y^5F_2$
832.328...	5	120144.9	$3d^3H_6-y^3I_7$
831.464...	5	120269.8	$3d^5D_2-y^5F_3$
830.500...	1	120409.4	$3d^3G_5-x^1G_4$
829.375...	4	120572.7	$3d^5D_3-y^5F_3$
827.777...	6	120805.5	$3d^5D_3-y^5F_4$
824.800...	3	121241.5	$3d^5D_4-y^5F_4$
823.257...	6	121468.8	$3d^5D_4-y^5F_5$
822.314...	3	121608.0	$3d^5D_2-z^3D_3$
821.723...	3	121695.5	$3d^5D_1-z^3D_2$
820.915...	3	121815.3	$3d^5D_0-z^3D_1$
820.409...	3 bl	121890.4	$3d^5D_2-z^3D_2$ $3d^5D_0-y^5D_1$
820.271...	3	121910.9	$3d^5D_3-z^3D_3$ $3d^5D_1-z^3D_1$
819.898...	3	121966.4	$3d^5D_1-y^5D_2$
819.742...	1	121989.6	$3d^5D_1-y^5D_1$
819.066...	4	122090.3	$3d^5D_2-y^5D_3$
818.981...	1	122103.0	$3d^5D_2-z^3D_1$
818.598...	4	122160.1	$3d^5D_2-y^5D_2$
818.383...	3	122192.2	$3d^5D_3-z^3D_2$
817.348...	3	122346.9	$3d^5D_4-z^3D_3$
817.166...	3	122374.2	$3d^3H_4-w^3H_4$
817.038...	7	122393.3	$3d^5D_3-y^5D_3$
816.273...	6	122508.0	$3d^5D_3-y^5D_4$
816.163...	6	122524.5	$3d^5D_1-y^5D_0$ $3d^5D_0-y^5P_1$
815.612...	3	122607.3	$3d^3H_5-w^3H_5$

λvacA	Int.	ν_{vac} cm^{-1}	Combination
815.52....	1 bl	122621	$3d^5D_1-y^5P_1$
815.363...	3	122644.8	$3d^3F_2-t^3F_2$
814.565...	5	122764.9	$3d^5D_1-y^5P_2$
814.242...	6	122813.6	$3d^5D-y^5P_1$
814.148...	1	122827.8	$3d^5D_4-y^5D_3$
813.862...	5	122871.0	$3d^3F_4-t^3F_4$ $3d^3F_3-t^3F_3$
813.382...	10	122943.4	$3d^5D_4-y^5D_4$
813.288...	4	122957.7	$3d^5D_2-y^5P_2$
812.931...	5	123011.7	$3d^5D_2-y^5P_3$
811.284...	8 }unr.	123261.4	$3d^5D_3-y^5P_2$
811.246...	4 }unr.	123267.2	$3d^3H_6-w^3H_6$
810.940...	7	123313.7	$3d^5D_3-y^5P_3$
809.675...	3	123506.3	$3d^3F_4-x^1G_4$
808.840...	8	123633.8	$3d^3H_4-v^3G_3$
808.079...	5	123750.3	$3d^5D_2-y^5P_3$
807.855...	8	123784.6	$3d^3H_5-v^3G_4$
807.547...	9	123831.8	$3d^3H_6-v^3G_5$
801.32....	1	124794	$3d^3H_6-x^1H_5$
797.16....	2	125445	$3d^5D_4-y^3F_4$
797.055...	2	125461.9	$3d^3F_3-u^3G_4$
795.550...	2	125699.2	$3d^3F_2-u^3D_1$
794.19....	2	125914	$3d^3F_3-u^3D_2$
794.01....	1	125943	$3d^3F_4-u^3G_5$
792.559...	3	126173.5	$3d^3F_4-u^3D_3$
788.469...	2	126828.1	....
788.082...	4	126890.3	....
785.76....	1	127265	$3d^3D_2-s^3F_3$
783.069...	3	127702.6	$3d^3D_2-t^3D_2$ $3d^3D_3-s^3F_4$
782.035...	3	127871.5	$3d^3D_3-t^3D_3$
776.097...	2	128849.9	....
757.279...	2	132051.7	....
757.167...	2	132071.3	....
754.478...	2	132542.0	$3d^3G_4-s^3F_2$
751.648...	2	133041.0	$3d^3G_4-s^3F_3$
751.427...	2	133080.1	....
746.247...	3	134003.9	$3d^3G_5-s^3F_4$
739.724...	4	135185.6	$3d^5D_1-x^5F_2$
739.594...	2	135209.3	$3d^5D_0-x^5F_1$
739.264...	5	135269.7	$3d^5D-x^5F_3$
738.742...	1	135365.3	$3d^3D_3-r^3F_4$
737.708...	5	135555.0	$3d^5D_3-x^5F_4$
736.47....	0	135783	$3d^3D_2-r^3F_3$
735.338...	1	135991.9	$3d^5D_4-x^5F_4$
734.296...	4	136184.9	$3d^5D_4-x^5F_5$
733.13....	1	136401	$3d^3F_2-t^3D_1$
732.425...	2	136532.8	$3d^5D_0-x^5D_1$
732.004...	3	136611.3	$3d^5D_1-x^5D_2$
731.90....	1	136631	$3d^5D_1-x^5D_1$
731.846...	1	136640.8	$3d^5D_1-x^5D_0$
731.612...	2	136684.5	$3d^5D_2-x^5D_3$
731.443...	1	136716.1	$3d^3F_3-t^3D_2$
731.130...	1	136774.6	$3d^5D_3-x^5D_4$
730.96....	2	136806	$3d^5D_2-x^5D_2$
....	m	136822.2 c	$3d^5D_2-x^5D_1$
729.996...	5	136987.1	$3d^5D_3-x^5D_3$
729.349...	3	137108.6	$3d^5D_3-x^5D_2$
728.810...	6	137210.0	$3d^5D_4-x^5D_4$
728.52....	1	137265	$3d^3F_4-t^3D_3$
727.681...	3	137422.9	$3d^5D_4-x^5D_3$
722.419...	4	138423.8	$3d^1I_6-w^1H_5$
707.444...	1	141353.9	$3d^3G_3-r^3F_3$
705.892...	2 bl	141664.7	$3d^3G_5-r^3F_4$
704.923...	1	141859.5	$3d^3G_3-r^3F_2$
703.506...	1	142145.2	$3d^3G_4-t^3G_3$
700.575...	1	142739.9	$3d^3G_5-t^3G_5$
688.53....	0	145237	$3d^3H_4-v^3H_4$
686.63....	1	145639	$3d^3H_5-v^3H_5$
684.858...	1	146015.7	$3d^3H_4-r^3F_3$
684.28....	1	146139	$3d^3H_6-v^3H_6$
682.10....	2 bl	146606	$3d^3H_4-t^3G_3$
680.700...	2	146907.6	$3d^3H_5-t^3G_4$
679.129...	3	147247.4	$3d^3H_6-t^3G_5$

TABLE 2

EVEN TERMS OF THE *Fe* III SPECTRUM

Configuration	Symbol	Level Value	Separation	Configuration	Symbol	Level Value	Separation
$3d^6$........	$3d^5 D_4$	$-\ 0.8$		$3d^6$........	$^3P_1$	49576.1	
			$-\ 436.2$				$+\ 429$
	$^5D_3$	$+435.4$			$^3P_0$	49147	
			$-\ 302.7$	$3d^6$........	$3d'^1 G_4$	57220.9	
	$^5D_2$	738.1		$3d^5(^4G)4s$....	$a^5 G_6$	63424.37	
			$-\ 193.5$				$-\ 41.22$
	$^5D_1$	931.6			$^5G_5$	63465.59	
			$-\ 94.9$				$-\ 20.39$
	$^5D_0$	1026.5			$^5G_4$	63485.98	
							$-\ 7.22$
$3d^6$........	$3d^3 P_2$	19404.0			$^5G_3$	63493.20	
			-1283.6				$-\ 0.56$
	$^3P_1$	20687.6			$^5G_2$	63493.76	
			$-\ 520.1$				
	$^3P_0$	21207.7		$3d^5(^4P)4s$....	$a^5 P_3$	66463.84	
							$-\ 58.31$
$3d^6$........	$3d^3 H_6$	20050.3			$^5P_2$	66522.15	
			$-\ 249.7$				$-\ 68.73$
	$^3H_5$	20300.0			$^5P_1$	66590.88	
			$-\ 181.1$				
	$^3H_4$	20481.1		$3d^5(^4D)4s$....	$a^5 D_4$	69694.93	
							$-\ 141.10$
$3d^6$........	$3d^3 F_4$	21461.4			$^5D_3$	69836.03	
			$-\ 237.7$				$-\ 0.93$
	$^3F_3$	21699.1			$^5D_2$	69836.96	
			$-\ 157.3$				$+\ 49.57$
	$^3F_2$	21856.4			$^5D_1$	69787.39	
							$+\ 40.79$
$3d^6$........	$3d^3 G_5$	24558.0			$^5D_0$	69746.60	
			$-\ 382.1$	$3d^5(^4G)4s$....	$a^3 G_5$	70693.23	
	$^3G_4$	24940.1					$-\ 34.72$
			$-\ 201.5$		$^3G_4$	70727.95	
	$^3G_3$	25141.6					$+\ 3.74$
$3d^5(^6S)4s$....	$4s^7 S_3$	30088.04			$^3G_3$	70724.21	
$3d^6$........	$3d^1 I_6$	30355.4		$3d^5(^4P)4s$....	$a^3 P_2$	73726.84	
$3d^6$........	$3d^3 D_3$	30857.0					$-\ 121.46$
			$+\ 141.6$		$^3P_1$	73848.30	
	$^3D_2$	30715.4					$-\ 86.86$
			$-\ 9.6$		$^3P_0$	73935.16	
	$^3D_1$	30725.0		$3d^5(^4D)4s$....	$a^3 D_3$	76955.99	
							$-\ 145.64$
$3d^6$........	$3d^1 G_4$	30885.6			$^3D_2$	77101.63	
							$+\ 27.13$
$3d^6$........	$3d^1 S_0$	34811.6			$^3D_1$	77074.50	
$3d^6$........	$3d^1 D_2$	35802.9		$3d^5(^2I)4s$....	$a^3 I_7$	79839.32	
$3d^5(^6S)4s$....	$4s^5 S_2$	40999.07					$-\ 4.62$
$3d^6$........	$3d^1 F_3$	42896.1			$^3I_6$	79843.94	
							$-\ 15.68$
$3d^6$........	$3d'^3 F_4$	50275.3			$^3I_5$	79859.62	
			$-\ 19.1$	$3d^5(^2D)4s$....	$b^3 D_3$	82382.07	
	$^3F_3$	50294.4					$-\ 28.07$
			$+\ 110.3$		$^3D_2$	82410.14	
	$^3F_2$	50184.1					$-\ 83.94$
					$^3D_1$	82494.08	
$3d^6$........	$3d'^3 P_2$	50411.5					
			$+\ 835.4$				

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TABLE 2—*Continued*

Configuration	Symbol	Level Value	Separation	Configuration	Symbol	Level Value	Separation
$3d^5(^4F)4s....$	a^5F_5	83137.43		$3d^5(^2D')4s...$	b^1D_2	109570.04	
	$^5F_4$	83160.68	− 23.25	$3d^5(^2G')4s...$	c^3G_5	114324.55	
	$^5F_3$	83237.06	− 76.38		$^3G_4$	114339.15	− 14.60
	$^5F_2$	83358.08	− 121.02		$^3G_3$	114351.12	− 11.97
	$^5F_1$	83646.18	− 288.10	$3d^5(^2G')4s...$	b^1G_4	117949.52	
$3d^5(^2I)4s....$	a^1I_6	83428.81		$3d^5(^6S)4d....$	$4d^7D_5$	147353.9	
$3d^5(^2F)4s....$	a^3F_4	84158.75			$^7D_4$	147326.0	+ 27.9
	$^3F_3$	84671.07	− 512.32		$^7D_3$	147305.0	+ 21.0
	$^3F_2$	84369.12	+ 301.95		$^7D_2$	147290.2	+ 14.8
$3d^5(^2D)4s....$	a^1D_2	86846.31			$^7D_1$	147281.0	+ 9.2
$3d^5(^2F)4s....$	a^1F_3	87901.07		$3d^5(^6S)5s....$	$5s^7S_3$	149283.6	
$3d^5(^2H)4s....$	a^3H_6	88922.27		$3d^5(^6S)4d....$	$4d^5D_4$	151536.9	
	$^3H_5$	88693.87	+ 228.40		$^5D_3$	151533.3	+ 3.6
	$^3H_4$	88663.07	+ 30.80		$^5D_2$	151533.8	− 0.5
$3d^5(^2G)4s....$	b^3G_5	89907.05			$^5D_1$	151536.1	− 2.3
	$^3G_4$	89782.79	+ 124.26		$^5D_0$	....	
	$^3G_3$	89696.72	+ 86.07	$3d^5(^6S)5s....$	$5s^5S_2$	151755.9	
$3d^5(^4F)4s....$	b^3F_4	90471.73		$3d^5(^6S)5d....$	$5d^7D_5$	190424.9	
	$^3F_3$	90483.14	− 11.41		$^7D_4$	190412.7	+ 12.2
	$^3F_2$	90422.88	+ 60.26		$^7D_3$	190404.0	+ 8.7
$3d^5(^2H)4s....$	a^1H_5	92523.11			$^7D_2$	190397.2	+ 6.8
$3d^5(^2F')4s...$	c^3F_4	93387.95			$^7D_1$	190391.7	+ 5.5
	$^3F_3$	93391.65	− 3.70	$3d^5(^6S)6s....$	$6s^7S_3$	190916.9	
	$^3F_2$	93412.13	− 20.48	$3d^5(^6S)5d....$	$5d^5D_4$	193610.0	
$3d^5(^2G)4s....$	a^1G_4	93511.84			$^5D_3$	193609.5	+ 0.5
$3d^5(^2F')4s...$	b^1F_3	97040.58			$^5D_2$	193605.3	+ 4.2
$3d^5(^2S)4s....$	a^3S_1	....			$^5D_1$	193599.0	+ 6.3
	a^1S_0	....			$^5D_0$	193594.5	+ 4.5
$3d^5(^2D')4s...$	c^3D_3	105928.36		$3d^5(^6S)5g....$	$\{5g^7G$	207640	
	$^3D_2$	105905.43	+ 22.93		$\{5g^5G$	207642±	
	$^3D_1$	105894.55	+ 10.88				

TABLE 3

ODD TERMS OF THE *Fe* III SPECTRUM

Configuration	Symbol	Level Value	Separation	Configuration	Symbol	Level Value	Separation
$3d^5(^6S)4p$....	$4p^7P_4$	82845.79		$3d^5(^4G)4p$...	z^3H_6	118354.21	
			$+\ 512.67$				$-\ 202.24$
	$^7P_3$	82333.12			z^3H_5	118556.45	
			$+\ 332.19$				$-\ 129.00$
	$^7P_2$	82000.93			z^3H_4	118685.45	
$3d^5(^6S)4p$....	$4p^5P_3$	89083.99		$3d^5(^4P)4p$....	z^5P_3	118442.12	
			$-\ 249.80$				$-\ 278.68$
	$^5P_2$	89333.79			$^5P_2$	118720.80	
			$-\ 156.85$				$-\ 146.27$
	$^5P_1$	89490.64			$^5P_1$	118867.07	
$3d^5(^4G)4p$...	z^5G_6	113738.82		$3d^5(^4P)4p$....	z^3P_2	119696.84	
			$+\ 62.61$				$-\ 284.62$
	$^5G_5$	113676.21			$^3P_1$	119981.46	
			$+\ 41.67$				$-\ 197.69$
	$^5G_4$	113634.54			$^3P_0$	120179.15	
			$+\ 29.97$	$3d^5(^4D)4p$...	y^5F_5	121468.02	
	$^5G_3$	113604.57					$+\ 227.15$
			$+\ 21.17$		$^5F_4$	121240.87	
	$^5G_2$	113583.40					$+\ 232.89$
$3d^5(^4G)4p$...	z^5H_7	115641.43			$^5F_3$	121007.98	
			$+\ 167.98$				$+\ 182.61$
	$^5H_6$	115473.45			$^5F_2$	120825.37	
			$+\ 184.34$				$+\ 129.07$
	$^5H_5$	115289.11			$^5F_1$	120696.30	
			$+\ 178.99$	$3d^5(^4G)4p$...	z^3G_5	121948.82	
	$^5H_4$	115110.12					$+\ 8.33$
			$+\ 162,37$		$^3G_4$	121940.49	
	$^5H_3$	114947.75					$+\ 21.55$
$3d^5(^4G)4p$...	z^5F_5	116315.83			$^3G_3$	121918.94	
			$-\ 150.78$	$3d^5(^4P)4p$....	z^3D_3	122345.81	
	$^5F_4$	116466.61					$-\ 281.73$
			$-\ 601.15$		$^3D_2$	122627.54	
	$^5F_3$	117067.76					$-\ 214.69$
			$+\ 93.51$		$^3D_1$	122842.23	
	$^5F_2$	116974.25		$3d^5(^4D)4p$...	y^5D_4	122943.35	
			$+\ 37.48$				$+\ 114.60$
	$^5F_1$	116936.77			$^5D_3$	122828.75	
$3d^5(^4P)4p$....	z^5S_2	116897.42					$-\ 69.29$
$3d^5(^4P)4p$....	z^5D_4	117521.11			$^5D_2$	122898.04	
			$+1046.47$				$-\ 22.53$
	$^5D_3$	116474.64			$^5D_1$	122920.57	
			$+\ 56.05$				$-\ 534.55$
	$^5D_2$	116418.59			$^5D_0$	123455.12	
			$+\ 39.32$	$3d^5(^4D)4p$...	y^5P_3	123749.59	
	$^5D_1$	116379.27					$+\ 53.21$
			$+\ 15.31$		$^5P_2$	123696.38	
	$^5D_0$	116363.96					$+\ 144.23$
$3d^5(^4G)4p$...	z^3F_4	118349.44			$^5P_1$	123552.15	
			$+\ 103.72$	$3d^5(^4D)4p$...	y^3D_3	124853.24	
	$^3F_3$	118245.72					$-\ 49.88$
			$+\ 82.96$		$^3D_2$	124903.12	
	$^3F_2$	118162.76					$-\ 50.96$

TABLE 3—*Continued*

Configuration	Symbol	Level Value	Separation	Configuration	Symbol	Level Value	Separation
3d⁵(⁴D)4p...	$^3D_1$	124954.08		3d⁵(²D)4p...	x^3D_3	134975.42	
3d⁵(⁴D)4p...	y^3F_4	125442.78			$^3D_2$	135278.2	− 302.8
	$^3F_3$	125637.18	− 194.40		$^3D_1$	135216.3	+ 61.9
	$^3F_2$	125672.03	− 34.85	3d⁵(²I)4p....	z^1I_6	135581.28	
3d⁵(⁴P)4p....	z^3S_1	126389.77		3d⁵(²F)4p....	w^3D_3	135704.9	
3d⁵(⁴D)4p...	y^3P_2	128916.71			$^3D_2$	136793.0	−1088.1
	$^3P_1$	128604.85	+ 311.86		$^3D_1$	136464.1	+ 328.9
	$^3P_0$	128370.73	+ 234.12	3d⁵(²F)4p...	y^3G_5	135734.51	
3d⁵(²I)4p....	z^3I_7	130039.76			$^3G_4$	135553.61	+ 180.9
	$^3I_6$	129854.00	+ 185.76		$^3G_3$	134548.20	+1005.41
	$^3I_5$	130255.47	− 401.47	3d⁵(⁴F)4p....	y^5G_6	135738.67	
3d⁵(²I)4p....	z^3K_8	130851.45			$^5G_5$	135315.62	+ 423.05
	$^3K_7$	131034.27	− 182.82		$^5G_4$	135238.94	+ 76.68
	$^3K_6$	130756.04	+ 278.23		$^5G_3$	135096.04	+ 142.90
3d⁵(²D)4p...	z^1D_2	131444.23			$^5G_2$	134937.04	+ 159.00
3d⁵(²I)4p....	z^1H_5	131709.99		3d⁵(⁴F)4p....	x^5F_5	136184.37	
3d⁵(²I)4p....	z^1K_7	131990.78			$^5F_4$	135989.82	+ 194.55
3d⁵(²I)4p....	y^3H_6	132261.86			$^5F_3$	136007.94	− 18.12
	$^3H_5$	132563.91	− 302.05		$^5F_2$	136117.14	− 109.20
	$^3H_4$	132658.37	− 94.46		$^5F_1$	136235.04	− 117.90
3d⁵(²D)4p...	x^3F_4	132784.56		3d⁵(²D)4p...	z^1F_3	136199.33	
	$^3F_3$	132079.11	+ 705.45	3d⁵(²F)4p....	w^3F_4	136611.98	
	$^3F_2$	132104.14	− 25.03		$^3F_3$	136796.25	− 184.27
3d⁵(²D)4p...	x^3P_2	134264.62			$^3F_2$	136531.65	+ 264.6
	$^3P_1$	134548.6	− 284.0	3d⁵(⁴F)4p....	x^5D_4	137208.93	
	$^3P_0$	135087.3	− 538.7		$^5D_3$	137422.20	− 213.27
3d⁵(²F)4p....	z^1G_4	134359.60			$^5D_2$	137543.80	− 121.60
					$^5D_1$	137560.3	− 16.5
							− 12.1

TABLE 3—*Continued*

Configuration	Symbol	Level Value	Separation	Configuration	Symbol	Level Value	Separation
$3d^5(^4F)4p\ldots$	$^5D_0$	137572.4		$3d^5(^2G)4p\ldots$	v^3G_5	143882.94	
$3d^5(^2H)4p\ldots$	x^3G_5	138053.79			$^3G_4$	144085.17	− 202.23
	$^3G_4$	138102.32	− 48.53		$^3G_3$	144115.84	− 30.67
	$^3G_3$	138187.13	− 84.81	$3d^5(^2F')4p\ldots$	t^3F_4	144331.41	
$3d^5(^2G)4p\ldots$	x^3H_6	138263.67			$^3F_3$	144569.73	− 238.32
	$^3H_5$	137762.90	+ 500.77		$^3F_2$	144500.94	+ 68.79
	$^3H_4$	137527.12	+ 235.78	$3d^5(^2G)4p\ldots$	y^1H_5	144586.03	
$3d^5(^2D)4p\ldots$	z^1P_1	138691.01		$3d^5(^2H)4p\ldots$	x^1H_5	144842.44	
$3d^5(^4F)4p\ldots$	w^3G_5	139462.56		$3d^5(^2H)4p\ldots$	x^1G_4	144967.70	
	$^3G_4$	139624.37	− 161.81	$3d^5(^2G)4p\ldots$	x^1F_3	145037.81	
	$^3G_3$	139679.67	− 55.30	$3d^5(^2F')4p\ldots$	x^1D_2	145617.59	
$3d^5(^2F)4p\ldots$	y^1D_2	139763.68		$3d^5(^2F')4p\ldots$	u^3G_5	147405.34	
$3d^5(^2G)4p\ldots$	y^1G_4	139826.37			$^3G_4$	147160.56	+ 244.78
$3d^5(^2H)4p\ldots$	y^3I_7	140195.53			$^3G_3$	146890.2	+ 270.4
	$^3I_6$	139845.38	+ 350.15	$3d^5(^2F')4p\ldots$	u^3D_3	147635.15	
	$^3I_5$	139508.64	+ 336.74		$^3D_2$	147613.85	+ 21.30
$3d^5(^2F)4p\ldots$	y^1F_3	140452.30			$^3D_1$	147555.65	+ 58.20
$3d^5(^2G)4p\ldots$	v^3F_4	141002.19		$3d^5(^2F')4p\ldots$	w^1G_4	149012.56	
	$^3F_3$	140692.56	+ 309.63	$3d^5(^2S)4p\ldots$	w^3P_2	149524.83	
	$^3F_2$	140750.18	− 57.62		$^3P_1$	148914.5	+ 610.3
$3d^5(^4F)4p\ldots$	v^3D_3	141465.73			$^3P_0$	148654	+ 260.5
	$^3D_2$	141398.24	+ 67.49	$3d^5(^2F')4p\ldots$	w^1F_3	150654.1	
	$^3D_1$	141468.65	− 70.41	$3d^5(^2S)4p\ldots$	y^1P_1	151636.5 ?	
$3d^5(^2H)4p\ldots$	y^1I_6	141538.75		$3d^5(^2D')4p\ldots$	s^3F_4	158561.9	
$3d^5(^4F)4p\ldots$	u^3F_4	142046.2			$^3F_3$	157981.2	+ 580.7
	$^3F_3$	142312.10	− 265.9		$^3F_2$	157683.5	+ 297.7
	$^3F_2$	142534.27	− 222.17	$3d^5(^2D')4p\ldots$	t^3D_3	158728.5	
$3d^5(^2H)4p\ldots$	w^3H_6	143320.05			$^3D_2$	158416.0	+ 312.5
	$^3H_5$	142907.68	+ 412.37		$^3D_1$	158256.5	+ 159.5
	$^3H_4$	142854.79	+ 52.89	$3d^5(^2D')4p\ldots$	v^1F_3	159492.2	

TABLE 3—*Continued*

Configuration	Symbol	Level Value	Separation	Configuration	Symbol	Level Value	Separation
$3d^5(^2D')4p\ldots$	v^3P_2	160037.1			$^3G_3$	167084.2	
	$^3P_1$	....		$3d^5(^6S)5p\ldots$	$5p^5P_3$	168328.7	$-\ 91.2$
	$^3P_0$	....			$^5P_2$	168419.9	$-\ 56.9$
$3d^5(^2D')4p\ldots$	w^1D_2	162084.0 ?			$^5P_1$	168476.8	
$3d^5(^2G')4p\ldots$	v^3H_6	166186 ?	$+\ 247$	$3d^5(^2G')4p\ldots$	w^1H_5	168779.3	
	$^3H_5$	165938.8	$+\ 220.5$	$3d^5(^2G')4p\ldots$	v^1G_4	169276.8 ?	
	$^3H_4$	165718.3		$3d^5(^2G')4p\ldots$	u^1F_3	170309.8 ?	
$3d^5(^2G')4p\ldots$	r^3F_4	166221.4	$-\ 276$	$3d^5(^6S)4f\ldots$	$4f^7F_6$	184446.9	$+\ 30.8$
	$^3F_3$	166497	$-\ 504$		$^7F_5$	184416.1	$+\ 42.2$
	$^3F_2$	167001			$^7F_4$	184373.9	$+\ 58.1$
$3d^5(^6S)5p\ldots$	$5p^7P_4$	166420.8	$+\ 168.3$		$^7F_3$	184315.8	$+\ 69.3$
	$^7P_3$	166252.5	$+\ 108.3$		$^7F_2$	184246.5	
	$^7P_2$	166144.2			$^7F_1$	....	
$3d^5(^2G')4p\ldots$	t^3G_5	167298.1	$+\ 91.6$		$^7F_0$	....	
	$^3G_4$	167206.5	$+\ 122.3$	$3d^5(^6S)4f\ldots$	$4f^5F_{5-1}$	184780$\pm$	

TABLE 4

[*Fe* III] LINES IN STELLAR OR NEBULAR SPECTRA

	TRANSITION	λ PREDICTED	RY SCUTI*		RY SCUTI†		MWC 349‡		MWC 17§		R AQR§		ORION NEB.‖	
			λObs	Int.	λObs	Int.	λObs	Int.	λObs	Int.	λObs	Int.	λObs	Int.
$^5D-^3F\ldots$	4–4	4658.05	58.1	4	58.2	5	58.	1	57.36	2	58.	2	58.3	1.5
	4–3	4607.03	....	....	06.4	0	....	....	....	....	....	....	07.2	0.5
	3–4	4754.69	55.0	1	56.3	1	....	....	55.4	1	55.	0	54.1	0.9
	3–3	4701.54	01.5	2	01.5	3	01.	0	01.8	1–2	02.	1	01.9	0.8
	3–2	4667.01	....	....	70.	0	....	....	....	....	....	....	63.9	0.6
	2–3	4769.43	70.	1	69.3	1	....	....	69.0	0	....	....	67.8	0.8
	2–2	4733.91	33.6	1+	33.8	1	....	....	32.1	1 bl	....	....	37.3	0.8
	1–2	4777.69	....	....	77.6	0	....	....	....	....	....	....	77.	0.7?
$^5D-^3P\ldots$	3–2	5270.41	....	....	70.2	5	70.	3	70.3	2	....	....	71.4	1.0 bl
	2–1	5011.26	....	....	10.5	1	10.	2	10.1	1	....	....	....	bl
	1–1	5060.35	....	....	58.	0	....	....	....	....	....	....	56.9	0.8 bl

* Merrill, *Ap. J.*, **67**, 179, 1928.
† Swings and Struve, *Ap. J.*, **91**, 581, 1940.
‡ Merrill, Humason, and Burwell, *Ap. J.*, **76**, 156, 1932 (star MW 203); Swings and Struve, *Ap. J.*, **95**, 159, 1942.
§ Swings and Struve, *Ap. J.*, **93**, 349, 1941.
‖ Wyse, *Ap. J.*, **95**, 356, 1942.