A NEW ATOMIC LINE CATALOGUE FOR PLANETARY NEBULAE

This is an updated in 1997 version of the *Atomic line catalogue* presented in Baltic Astronomy, **3**, p. 292-320 (1994)

T.Feklistova[1], A.F.Kholtygin[2]

[1] *Tartu Observatory, Töravere, EE2444, Estonia*

[2] *Astronomical Institute, St.Petersburg University, 198904, St.Petersburg, Petrodvoretz, Russia*

ABSTRACT. A list of the lines observed in the spectra of the gaseous nebulae in the wavelength range from 920Å to 610μm and corresponding transition probabilities have been compiled. The most probable identification for each line has been presented. The classification scheme for transition types is proposed. For the lines listed also their formation mechanism is given. First version of such catalogue was issued by Feklistova et al. (1994). Since the first edition of the catalogue numerous weak lines belonging to the heavy elements (Z>30) were identified in the spectra of NGC 7027 (Péquignot et al. 1994, Baluteau et al. 1995). Moreover many newly identified lines were found in the spectra of other planetary nebulae. These lines together with unidentified ones are compiled in the catalogue

KEYWORDS: planetary nebulae, HII regions: atomic data

1 Introduction

Over 1000 lines of atoms and ions belonging to more than 20 elements were observed in the spectral range $\lambda \geq 920$Å of the gaseous nebulae (Kaler, 1976; Aller and Czyzak, 1979, 1983; Aller and Keyes, 1987; Péquignot et al. 1994; Hyung et al. 1994; Baluteau et al. 1995; Aller and Hyung, 1995; Liu et al. 1995; Hyung and Aller, 1996). The lines of some molecules and radicals (CO, H_2O, H_2, OH etc.) and unidentified IR bands connected with polycyclical aromatic carbo-hydrate molecules also were detected (Kholtygin, 1990). Many of these lines are very weak, thus their identification in the spectra is a hard problem. To facilitate solution of this problem, we have compiled a list of the lines observed in the spectra of the objects quoted. Both well identified and badly or unidentified lines are given. Recently revealed lines of the heavy elements (Z>30) are added to the line list.

The classification scheme for the lines observed in the spectra of the gaseous nebulae is described in Section 2. The mechanisms of line formation in the spectra of the gaseous nebulae are discussed in Section 3. The list of lines is presented in Section 4.

2 The line classification

The lines observed in the spectra of gaseous nebulae can be divided into permitted, forbidden and intercombinational ones. Ions HI, HeI and HeII are presented only by the permitted lines. Most of the strong lines in the spectra of gaseous nebulae are forbidden or intercombinational ones belonging to ions of C, N and O and of the other heavy elements. In the UV spectral region the resonance lines of the ions C, N, O, Si, S, Ar and other elements are the strongest ones. In addition, a lot of weak permitted lines of C, N, O, Ne, Mg and other ions are observed in the spectra of the bright nebulae.

The classification scheme for atomic transitions used in astrophysics is given in Table 1. There we use the standard designations E1 and E2 for the electric dipole and quadrupole transitions and M1 for the magnetic dipole transitions. The selection rules for Ek transitions are: $\Delta L = 0, \pm 1, ... \pm$ k, $L + L^{'} \geq$ k; $\Delta S = 0$, $\Delta J = 0, \pm 1, ... \pm$ k, J + J$^{'} \geq$ k. Here k=1 for E1 transitions and k=2 for E2 transitions. For the magnetic dipole transitions M1 we have the next selection rules: $\Delta L = 0$, $\Delta S =$

0, $\Delta J = \pm 1$, $\Delta l = 0$. The magnetic dipole transitions take place only between levels belonging to the same term. In Table 1 only violations of these selection rules occurring for different types of the forbidden transitions are presented. The typical values of the transition probabilities for the transitions under consideration are given in column 3 of the table. In the first column there are presented also the transition type notations (p - permitted, f - forbidden, i - intercombination, 2e - dielectronic) used in the line catalogue.

Table 1

Classification of the transition types

Transition type	Selection rule violation	$A_{ki}(\mathrm{s}^{-1})$
E1, p	no	$10^7 - 10^9$
E1, i	$\Delta S \neq 0$	$10^2 - 10^4$
E1, 2e	quantum number change of two(three) electrons	$10^6 - 10^8$
E2, f	no	$1 - 10^2$
E2, f	$\Delta S \neq 0$	$10^{-4} - 1$
M1, f	no	$1 - 10$
M1, f	transition between levels of different terms	$10^{-4} - 1$

3 Line formation mechanisms

Main mechanisms of the line formation in the spectra of gaseous nebulae are the recombination one for the lines of HI, HeI and HeII and for weak permitted lines of C, N and O ions and the excitation by electron impacts for the forbidden, intercombinational and resonance lines (see, e.g., Aller, 1984; Nikitin et al., 1988).

For many recombinational lines the contributions by both the radiative and the dielectronic recombination are important (Nussbaumer & Storey 1983, 1984, 1986, 1987). The effective recombination coefficients for weak permitted lines of C, N and O ions are compiled in the paper by Pequignot et al. (1991) and Nikitin et al. (1993).

Many permitted lines of the C, N, O and some other ions have significant additional contribution to their intensities due to some selective excitation mechanisms. Classification of such selective mechanisms is considered in papers by Nikitin et al. (1988); Rudzikas et al. (1990). The most important selective excitation mechanisms in gaseous nebulae are the Bowen fluorescence excitation, photoionization followed by recombination and excitation connected with charge transfer reactions.

4 List of the lines

Lines detected in the spectra of gaseous nebulae are given in Table 2. As sources of data about the spectral lines we used the papers by Kaler (1976), Kholtygin (1990) and the papers cited on the introduction. In the first column of the Table 2 the laboratory wavelengths taken mainly (for permitted and intercombination lines) from tables by Striganov and Odintsova (1982) are presented. In the case

of absence of the desired values in those tables (mostly for forbidden lines) we either took laboratory wavelengths given in the papers used as sources of the lines or calculated them by usual way from the level energies (e.g., Moore 1949, 1970, 1971,1975 and references in the catalogue by Kholtygin et. al. 1996). The next two columns specify the ion type and the electron transition, respectively. Unidentified lines are marked with the capital letter X in the second column.

We use the standard term designations given by Moore (1949, 1970, 1971, 1975) and by Striganov and Odintsova (1982). The observational wavelengths given by various authors differ essentially and therefore we do not list them. If difference between the laboratory and the observational wavelengths exceeds 0.2Å we mark the values λ by colons. We consider the line identification to be uncertain if they are weak in the laboratory spectra and if the strongest line of the multiplet has not been identified in the nebular spectra. In this case we also mark the λ values by colons. The transition probabilities are presented in column 4 of the Table. We use notation $a + b$ for value $a \cdot 10^b$. The probable line formation mechanisms are presented in column 5. The references to the used sources of the transition probabilities are given in the last column.

To find the transition probabilities and wavelengths for the HI and HeII transitions with large n values we have used the standard formulas for nonrelativistic hydrogenic ions (see, e.g. Rudzikas et al., 1990) which were slightly corrected to fit with experimental wavelengths by Striganov and Odintsova (1982). The values calculated so are referred to as Kh93. Nussbaumer and Storey (1984) presented the total transition probabilities for multiplets of C, N and O ions. To calculate the values for component lines of multiplets we used the standard relations for LS-coupling scheme (see, e.g., Rudzikas et al., 1990).

We used the following abbreviations for the line generation mechanisms:

R - Radiative recombination,

D - Dielectronic recombination,

B - Bowen mechanism,

C - Collision excitation,

Ch- Charge transfer excitation,

Au- Auger excitation,

NF- Nonresonance fluorescence,

Ph- Photoionization mechanism.

Mostly cases only one line generation mechanism must be taken into account in the line intensity calculation. It is why, only the main mechanisms contributing to the line intensity is presented in the Table 2.

Table 2

The list of lines observed in the spectra of gaseous nebulae

λ, Å	Ion	Transition	A, s^{-1}	Ex.M.	Ref
919.78	ArII	$3p^5\,^2P_{3/2} - 3p^6\,^2S_{1/2}$	1.398+8	C	M91
932.05	ArII	$3p^5\,^2P_{1/2} - 3p^6\,^2S_{1/2}$	6.719+7	C	M91
933.38	SVI	$3s\ ^2S_{1/2} - 3p\ ^2P_{3/2}$	1.690+9	C	M91
972.11	HeII	2-8	3.550+6	R	R80
972.54	HI-L_γ	$1s\ ^2S_{1/2} - 4p\ ^2P_{3/2}$	6.818+7	R	M91
977.03	CIII	$2s^2\,^1S_0 - 2p\ ^1P_1$	1.775+9	C,Au	M
989.79	NIII	$2p\ ^2P_{1/2} - 2p^2\,^2D_{3/2}$	3.630+8	C	M91
991.51	NIII	$2p\ ^2P_{3/2} - 2p^2\,^2D_{5/2}$	4.332+8	C	M91
992.36	HeII	2-7	7.030+6	R	R80
998.43	ArVI	$3p\ ^2P_{1/2} - 3p^2\,^4P_{3/2}$		C	
1000.16	ArVI	$3p\ ^2P_{1/2} - 3p^2\,^4P_{1/2}$		C	
1012.67	ArVI	$3p\ ^2P_{3/2} - 3p^2\,^4P_{3/2}$		C	
1020	NeVI	$2p\ ^2P_{3/2} - 2p^2\,^4P_{1/2}$		C	
1022.6	ArVI	$3p\ ^2P_{3/2} - 3p^2\,^4P_{1/2}$		C	
1025.27	HeII	2-6	1.560+7	R	R80
1025.72	HI-L_β	$1s\ ^2S_{1/2} - 3p\ ^2P_{1/2}$	1.672+8	R	M91
1031.91	OVI	$2s\ ^2S_{1/2} - 2p\ ^2P_{3/2}$	4.163+8	C,Au	M91
1037.02	CII	$2p\ ^2P_{3/2} - 2p^2\,^2S_{1/2}$	1.526+9	C	M91
1037.61	OVI	$2s\ ^2S_{1/2} - 2p\ ^2P_{1/2}$	4.095+8	C,Au	M91
1072.99	SIV	$3p\ ^2P_{3/2} - 3p^2\,^2D_{5/2}$	1.377+8	C	M91
1084.58	NII	$2p^2\,^3P_1 - 2p^3\,^3D_2$	2.629+8	C	M91
1084.94	HeII	2-5	4.050+7	R	R80
1085.70	NII	$2p^2\,^3P_2 - 2p^3\,^3D_3$	3.494+8	C	M91

Table 2 (Continuation)

λ, Å	Ion	Transition	A, s^{-1}	Ex.M.	Ref
1175.71	CIII	$2p\ ^3P_2 - 2p^2\ ^3P_2$		C,D	
1176.37	CIII	$2p\ ^3P_2 - 2p^2\ ^3P_1$		C,D,Au	
1194.50	SiII	$3p\ ^2P_{3/2} - 3p^2\ ^2P_{3/2}$	2.914+9	C	M91
1198.6	SV	$3s^2\ ^1S_0 - 3p\ ^3P_1$	1.640+5	C	M91
1201.97	SIII	$3p^2\ ^3P_2 - 3p^3\ ^3D_3$	6.098+7	C	M91
1206.51	SiIII	$3s^2\ ^1S_0 - 3p\ ^1P_1$	2.550+9	C	M91
1215.09	HeII	2-4	1.350+8	R	R80
1215.17	HeII	2-4	1.350+8	R	R80
1215.67	HI-L$_\alpha$	$1s\ ^2S_{1/2} - 2p\ ^2P_{3/2}$	6.265+8	R	M91
1218.34	OV]	$2s^2\ ^1S_0 - 2p\ ^3P_1$	2.210+3	C,Au	M91
1238.82	NV	$2s\ ^2S_{1/2} - 2p\ ^2P_{3/2}$	3.411+8	C,Au	M91
1242.80	NV	$2s\ ^2S_{1/2} - 2p\ ^2P_{1/2}$	3.378+8	C,Au	M91
1247.38	CIII	$2p\ ^1P_1 - 2p^2\ ^1S_0$	1.860+9	C,D	R80
1256.52	CIII	$3s\ ^3S_1 - 4p\ ^3P_2$	1.040+8	C,D	NS84
1259.52	SII	$3p^3\ ^4S_{3/2} - 3p^4\ ^4P_{5/2}$	4.553+7	C	M91
1264.74	SiII	$3p\ ^2P_{3/2} - 3d\ ^2D_{5/2}$	2.512+9	C	M91
1302.17	OI	$2p^4\ ^3P_2 - 3s\ ^3S_1$	3.204+8	C	M91
1304.37	SiII	$3p\ ^2P_{1/2} - 3p^2\ ^2S_{1/2}$	5.776+8	C	M91
1304.86	OI	$2p^4\ ^3P_1 - 3s\ ^3S_1$	1.911+8	C	M91
1306.03	OI	$2p^4\ ^3P_0 - 3s\ ^3S_1$	6.352+7	C	M91
1309.28	SiII	$3p\ ^2P_{3/2} - 3p^2\ ^2S_{1/2}$	1.142+9	C	M91
1335.71	CII	$2p\ ^2P_{3/2} - 2p^2\ ^2D_{5/2}$	2.864+8	C,D	M91
1343.51	OIV	$2p^2\ ^2P_{3/2} - 2p^3\ ^2D_{5/2}$	2.640+8	C	R80
1371.29	OV	$2p\ ^1P_1 - 2p^2\ ^1D_2$	3.480+8	C,D	Kh81
1393.78	SiIV	$3s\ ^2S_{1/2} - 3p\ ^2P_{3/2}$	8.825+8	C	M91
1397.20	OIV]	$2p\ ^2P_{1/2} - 2p^2\ ^4P_{3/2}$	5.815+1	C	M91
1399.77	OIV]	$2p\ ^2P_{1/2} - 2p^2\ ^4P_{1/2}$	2.075+3	C	M91
1401.16	OIV]	$2p\ ^2P_{3/2} - 2p^2\ ^4P_{5/2}$	1.466+3	C	M91
1402.77	SiIV	$3s\ ^2S_{1/2} - 3p\ ^2P_{1/2}$	8.656+8	C	M91
1404.81	OIV]	$2p\ ^2P_{3/2} - 2p^2\ ^4P_{3/2}$	4.414+2	C	M91
1407.39	OIV]	$2p\ ^2P_{3/2} - 2p^2\ ^4P_{1/2}$	2.120+3	C	M91
1483.3	NIV]	$2s^2\ ^1S_0 - 2p\ ^3P_2$	1.150-2	C	M83
1486.50	NIV]	$2s^2\ ^1S_0 - 2p\ ^3P_1$	5.773+2	C	M91
1503.7	[NaIV]	$2p^4\ ^3P_2 - 2p^4\ ^1S_0$	1.050-2	C	M83
1529.1	[NaIV]	$2p^4\ ^3P_1 - 2p^4\ ^1S_0$	0.710+1	C	M83
1548.20	CIV	$2s\ ^2S_{1/2} - 2p\ ^2P_{3/2}$	2.654+8	C	M91
1550.77	CIV	$2s\ ^2S_{1/2} - 2p\ ^2P_{1/2}$	2.641+8	C	M91
1574.9	[NeV]	$2p^2\ ^3P_1 - 2p^2\ ^1S_0$	0.421+1	C	M83
1592.7	[NeV]	$2p^2\ ^3P_2 - 2p^2\ ^1S_0$	6.690-3	C	M83
1608.8	[NeIV]	$2p^3\ ^4S_{3/2} - 2p^3\ ^2P_{3/2}$	0.127+1	C	M83

Table 2 (Continuation)

λ, Å	Ion	Transition	A, s^{-1}	Ex.M.	Ref
1609.0	[NeIV]	$2p^3\,^4S_{3/2} - 2p^3\,^2P_{1/2}$	5.210-1	C	M83
1620.05	CIII	$3p\ ^3P_1 - 4d\ ^3D_2$	8.520+8	R,D	NS84
1640.33	HeII	2-3	7.060+8	R	R80
1640.47	HeII	2-3	7.060+8	R	R80
1640.49	HeII	2-3	7.060+8	R	R80
1641.3	OI]	$2p^4\,^1D_2 - 3s\ ^3S_1$		C	
1661.17	OIII]	$2p^2\,^3P_1 - 2p^3\,^5S_2$	2.369+2	C,Au	M91
1666.52	OIII]	$2p^2\,^3P_2 - 2p^3\,^5S_2$	5.845+2	C,Au	M91
1711.30	SiII	$3p^2\,^2D_{5/2} - 5f\ ^2F_{7/2}$		R	
1718.55	NIV	$2p\ ^1P_1 - 2p^2\,^1D_2$	2.540+8	C,D	Kh81
1746.82	NIII]	$2p\ ^2P_{1/2} - 2p^2\,^4P_{3/2}$	8.950+0	C	M91
1748.61	NIII]	$2p\ ^2P_{1/2} - 2p^2\,^4P_{1/2}$	3.390+2	C	M91
1749.67	NIII]	$2p\ ^2P_{3/2} - 2p^2\,^4P_{5/2}$	2.510+2	C	M91
1751.22	NIII]	$2p\ ^2P_{3/2} - 2p^2\,^4P_{3/2}$	5.900+1	C	M91
1753.99	NIII]	$2p\ ^2P_{3/2} - 2p^2\,^4P_{1/2}$	3.640+2	C	M91
1760.40	CII	$2p^2\,^2D_{5/2} - 3p\ ^2P_{3/2}$	3.500+7	R	B85
1793.8	[NeIII]	$2p^4\,^3P_2 - 2p^4\,^1S_0$	3.940-3	C	M83
1808.01	SiII	$3p\ ^2P_{1/2} - 3p^2\,^2D_{3/2}$	5.639+6	C	M91
1814.7	[NeIII]	$2p^4\,^3P_1 - 2p^4\,^1S_0$	2.000+0	C	M83
1816.93	SiII	$3p\ ^2P_{3/2} - 3p^2\,^2D_{5/2}$	6.668+6	C	M91
1817.45	SiII	$3p\ ^2P_{3/2} - 3p^2\,^2D_{3/2}$	1.110+6	C	M91
1854.72	AlIII	$3s\ ^2S_{1/2} - 3p\ ^2P_{3/2}$	5.432+8	C	M91
1862.79	AlIII	$3s\ ^2S_{1/2} - 3p\ ^2P_{1/2}$	5.361+8	C	M91
1867.4	[FIV]	$2p^2\,^3P_0 - 2p^2\,^1S_0$		C	
1875.5	[FIV]	$2p^2\,^3P_1 - 2p^2\,^1S_0$	1.100+0	C	G68
1883	SiIII]	$3s^2\,^1S_0 - 3p\ ^3P_2$	1.200-2	C	M83
1889.3	[FIV]	$2p^2\,^3P_2 - 2p^2\,^1S_0$	2.300-3	C	G68
1892.03	SiIII]	$3s^2\,^1S_0 - 3p\ ^3P_1$	1.670+4	C	M91
1906.68	CIII]	$2s^2\,^1S_0 - 2p\ ^3P_2$	5.190-3	C,Au,Ph	M83
1908.73	CIII]	$2s^2\,^1S_0 - 2p\ ^3P_1$	7.520+1	C,Au,Ph	M91
1922.93	CIII	$3p\ ^3D_3 - 4f\ ^3F_4$	7.720+8	R,D	NS84
1939.6	[FIII]	$2p^3\,^4S_{3/2} - 2p^3\,^4P_{3/2}$	0.260+0	C	G68
1939.6	[FIII]	$2p^3\,^4S_{3/2} - 2p^3\,^4P_{1/2}$	0.100+0	C	G68
2009.57	CIII	$3p\ ^3P_1 - 4s\ ^3S_1$	6.860+8	R	NS84
2010.09	CIII	$3p\ ^3P_2 - 4s\ ^3S_1$	6.860+8	R	NS84
2112.0	[CaVII]	$3p^2\,^3P_1 - 3p^2\,^1S_0$	3.400+1	C	G68
2139.01	NII]	$2p^2\,^3P_1 - 2p^3\,^5S_2$	5.700+1	C	M91
2225.61	[FII]	$2p^4\,^3P_2 - 2p^4\,^1S_0$	1.600-3	C	G68
2226.0	[CaVII]	$3p^2\,^3P_2 - 3p^2\,^1S_0$	0.250+0	C	G68
2242.61	[FII]	$2p^4\,^3P_1 - 2p^4\,^1S_0$	0.490+0	C	G68
2252.69	HeII-P$_\zeta$	3-10	8.250+5	R	R80

Table 2 (Continuation)

λ, Å	Ion	Transition	A, s^{-1}	Ex.M.	Ref
2280.0	[CaV]	$3p^4\,^3P_2 - 3p^4\,^1S_0$	0.145+0	C	M83
2296.87	CIII	$2p\,^1P_1 - 2p^2\,^1D_2$	1.490+8	C,D	Kh81
2306.19	HeII-P_ε	3-9	1.430+6	R	R80
2321.08	[OIII]	$2p^2\,^3P_1 - 2p^2\,^1S_0$	0.223+0	C	M83
2325.40	CII]	$2p\,^2P_{3/2} - 2p^2\,^4P_{5/2}$	4.320+1	C	M91
2328.12	CII]	$2p\,^2P_{3/2} - 2p^2\,^4P_{1/2}$	6.550+1	C	M91
2331.55	[OIII]	$2p^2\,^3P_2 - 2p^2\,^1S_0$	7.850-4	C	M83
2334.40	SiII]	$3p\,^2P_{1/2} - 3p^2\,^4P_{1/2}$	4.550+3	C	M91
2334.61	SiII]	$3p\,^2P_{3/2} - 3p^2\,^4P_{5/2}$	2.400+3	C	M91
2350.17	SiII]	$3p\,^2P_{3/2} - 3p^2\,^4P_{1/2}$	3.000+3	C	M91
2366.8	[KVI]	$3p^2\,^3P_1 - 3p^2\,^1S_0$	1.600+1	C	G68
2385.40	HeII-P_δ	3-8	2.640+6	R	R80
2399.2	FeII	$4s^6D_{5/2} - z^6F_{5/2}$	1.366+8	C	M91
2412.4	[CaV]	$3p^4\,^3P_1 - 3p^4\,^1S_0$	2.310+1	C	M83
2416.5	[MgV]	$2p^4\,^1D_2 - 2p^4\,^1S_0$	4.230+0	C	M83
2421.8	[NeIV]	$2p^3\,^4S_{3/2} - 2p^3\,^2D_{3/2}$	5.540-3	C,Au	M83
2436.2	FeII	$a^4G_{11/2} - y^4H_{11/2}$		C	
2438.6	[NeIV]	$2p^3\,^4S_{3/2} - 2p^3\,^2D_{5/2}$	4.840-4	C	M
2441.6	[MgVII]	$2p^2\,^1D_2 - 2p^2\,^3P_0$	1.600-4	C	KL80
2444.5	FeII	$b^4P_{5/2} - y^4D_{7/2}$		C	
2458.8	FeII	$a^4G_{9/2} - y^4H_{11/2}$		C	
2465.2	FeII	$b^4P_{1/2} - y^4D_{3/2}$		C	
2470.32	[OII]	$2p^3\,^4S_{3/2} - 2p^3\,^2P_{1/2}$	0.232-1	C	M83
2470.41	[OII]	$2p^3\,^4S_{3/2} - 2p^3\,^2P_{3/2}$	0.564-1	C	M83
2471.7	[KVI]	$3p^2\,^3P_2 - 3p^2\,^1S_0$	0.140+0	C	G68
2479.2	FeII	$c^2D_{5/2} - w^2D_{3/2}$		C	
2481.0	FeII	$b^2H_{11/2} - y^4H_{11/2}$		C	
2482.3	FeII	$c^2D_{3/2} - w^2D_{3/2}$		C	
2484.2	FeII	$b^2H_{11/2} - y^4H_{13/2}$		C	
2492.3	FeII	$b^2H_{9/2} - y^4H_{11/2}$		C	
2494.5	[KV]	$3p^3\,^4S_{3/2} - 3p^3\,^2P_{3/2}$	5.190+0	C	M83
2506.4	FeII	$c^4F_{9/2} - z^4G_{9/2}$		C	
2506.8	FeII	$c^4F_{7/2} - y^6F_{9/2}$		C	
2508.3	FeII	$c^4F_{7/2} - w^4G_{9/2}$		C	
2511.20	HeII-P_γ	3-7	5.370+6	R	R80
2512.0	[MgVII]	$2p^2\,^3P_1 - 2p^2\,^1D_2$	1.050+0	C	KL80
2514.5	[KV]	$3p^3\,^4S_{3/2} - 3p^3\,^2P_{1/2}$	2.140+0	C	M83
2519.4	FeII	$b^2P_{1/2} - x^4P_{3/2}$		C	
2548.2	FeII	$b^4F_{5/2} - y^6P_{7/2}$		C	

Table 2 (Continuation)

λ, Å	Ion	Transition	A, s^{-1}	Ex.M.	Ref
2562.5	FeII	$a^4D_{7/2} - x^4P_{5/2}$		C	
2582.6	FeII	$a^4D_{3/2} - x^4P_{3/2}$		C	
2585.9	FeII	$a^6D_{9/2} - x^6D_{7/2}$	8.046+7	C	M91
2591.5	FeII	$a^4D_{5/2} - x^4P_{5/2}$		C	
2593.5	[KIV]	$3p^4\,^3P_2 - 3p^4\,^1S_0$	0.817-1	C	M83
2593.60	NeIII	$3s\ ^5S_2 - 3p\ ^5P_2$		R	
2595.68	NeIII	$3s\ ^5S_2 - 3p\ ^5P_1$		R	
2598.4	FeII	$a^6D_{7/2} - z^6D_{5/2}$	1.307+8	C	M91
2599.4	FeII	$a^6D_{9/2} - a^6D_{7/2}$		C	
2604.0	FeII	$c^2F_{7/2} - v^2G_{7/2}$		C	
2605.0	FeII	$c^2F_{5/2} - v^2G_{7/2}$		C	
2606.5	FeII	$b^2D_{5/2} - x^2D_{5/2}$		C	
2607.1	FeII	$a^6D_{5/2} - z^6D_{3/2}$	1.658+8	C	M91
2611.9	FeII	$a^6D_{7/2} - z^6D_{7/2}$	1.089+8	C	M91
2613.8	FeII	$a^6D_{3/2} - z^6D_{1/2}$	1.988+8	C	M91
2617.6	FeII	$a^6D_{5/2} - z^6D_{5/2}$	4.364+7	C	M91
2620.4	FeII	$a^6D_{3/2} - z^6D_{3/2}$	3.590+6	C	M91
2625.6	FeII	$a^6D_{7/2} - z^6D_{9/2}$	3.353+7	C	M91
2628.3	FeII	$a^6D_{1/2} - z^6D_{3/2}$	8.560+7	C	M91
2631.0	FeII	$a^6D_{3/2} - z^6D_{5/2}$	7.682+7	C	M91
2631.3	FeII	$a^6D_{5/2} - z^6D_{7/2}$	6.032+7	C	M91
2663.27	HeI	$2s\ ^3S_1 - 11p\ ^3P_{0-2}$	3.190+5	R	T87
2669.16	AlII	$3s^2\,^1S_0 - 3p\ ^3P_1$	3.330+3	C	M91
2690.82	[ArV]	$3p^2\,^3P_1 - 3p^2\,^1S_0$	6.550+0	C	KL80
2696.12	HeI	$2s\ ^3S_1 - 9p\ ^3P_{0-2}$	5.790+5	R	T87
2709.4	FeII	$a^4D_{5/2} - z^4F_{3/2}$		C	
2711.2	[KIV]	$3p^4\,^3P_1 - 3p^4\,^1S_0$	1.000+1	C	M83
2711.8	FeII	$a^4G_{11/2} - z^2I_{13/2}$		C	
2712.4	FeII	$a^4G_{9/2} - z^2I_{11/2}$		C	
2714.4	FeII	$a^4D_{7/2} - z^4D_{5/2}$		C	
2716.7	FeII	$a^4D_{7/2} - z^4F_{7/2}$		C	
2723.19	HeI	$2s\ ^3S_1 - 8p\ ^3P_{0-2}$	8.170+5	R	T87
2724.9	FeII	$a^4D_{5/2} - z^4F_{5/2}$		C	
2727.5	FeII	$a^4D_{5/2} - z^4D_{3/2}$		C	
2730.7	FeII	$a^4D_{3/2} - z^4F_{3/2}$		C	
2732.4	FeII	$a^4F_{9/2} - z^6D_{9/2}$		C	
2733.30	HeII-P$_\beta$	3-6	1.250+7	R	R80
2739.5	FeII	$a^4D_{7/2} - z^4D_{7/2}$		C	

Table 2 (Continuation)

λ, Å	Ion	Transition	A, s^{-1}	Ex.M.	Ref
2741.7	FeII	$z^2F_{5/2} - e^2F_{5/2}$		C	
2743.2	FeII	$a^4D_{1/2} - z^4F_{3/2}$		C	
2746.5	FeII	$a^4D_{3/2} - z^4F_{5/2}$		C	
2747.0	FeII	$a^4D_{5/2} - z^4D_{5/2}$		C	
2749.2	FeII	$a^4D_{3/2} - z^4D_{3/2}$		C	
2749.3	FeII	$a^4D_{5/2} - z^4F_{7/2}$		C	
2749.5	FeII	$a^4D_{1/2} - z^4D_{1/2}$		C	
2754.9	FeII	$z^6F_{7/2} - e^6D_{5/2}$		C	
2755.1	FeII	$z^6F_{7/2} - e^6D_{3/2}$		C	
2755.7	FeII	$a^4D_{7/2} - z^4F_{9/2}$		C	
2763.80	HeI	$2s\ ^3S_1 - 7p\ ^3P_{0-2}$	1.200+6	R	T87
2767.5	FeII	$b^2H_{11/2} - z^2I_{13/2}$		C	
2767.5	FeII	$z^6F_{9/2} - e^6D_{7/2}$		C	
2768.9	FeII	$a^4D_{3/2} - z^4D_{5/2}$		C	
2771.2	FeII	$b^2G_{9/2} - y^4H_{11/2}$		C	
2776.9	FeII	$z^6F_{7/2} - e^6D_{7/2}$		C	
2783.2	[MgV]	$2p^4\ ^3P_2 - 2p^4\ ^1D_2$	1.850+0	C	M83
2785.2	FeII	$z^6F_{11/2} - e^6D_{9/2}$		C	
2785.76	[ArV]	$3p^2\ ^3P_2 - 3p^2\ ^1S_0$	0.569-1	C	KL80
2790.6	FeII	$b^2G_{7/2} - y^4H_{9/2}$		C	
2790.78	MgII	$3p\ ^2P_{1/2} - 3d\ ^2D_{3/2}$		C,R	
2795.53	MgII	$3s\ ^2S_{1/2} - 3p\ ^2P_{3/2}$	2.612+8	C	M91
2797.99	MgII	$3p\ ^2P_{3/2} - 3d\ ^2D_{5/2}$		C,R	
2802.70	MgII	$3s\ ^2S_{1/2} - 3p\ ^2P_{1/2}$	2.592+8	C	M91
2803.3	[NaIV]	$2p^4\ ^1D_2 - 2p^4\ ^1S_0$	3.460+0	C	M83
2818.68	OIII	$3p\ ^3D_2 - 3d\ ^3P_2$	6.980+5	B,R	E84
2829.08	HeI	$2s\ ^3S_1 - 6p\ ^3P_{0-2}$	1.860+6	R	T87
2836.34	OIII	$3p\ ^3D_3 - 3d\ ^3P_2$	8.710+6	B,R	E84
2839.5	FeII	$z^4F_{9/2} - e^4D_{7/2}$		C	
2845.5	FeII	$z^4D_{3/2} - e^4D_{3/2}$		C	
2848.1	FeII	$z^4D_{5/2} - e^4D_{5/2}$		C	
2848.3	FeII	$z^4F_{5/2} - e^4D_{3/2}$		C	
2851.7	FeII	$z^4F_{3/2} - e^4D_{1/2}$		C	
2853.68	[ArIV]	$3p^3\ ^4S_{3/2} - 3p^3\ ^2P_{3/2}$	2.110+0	C	M83
2856.4	FeII	$z^6P_{5/2} - e^6D_{7/2}$		C	
2856.9	FeII	$z^4D_{7/2} - e^4D_{7/2}$		C	
2865.5	FeII	$z^4F_{3/2} - e^4D_{3/2}$		C	

Table 2 (Continuation)

λ, Å	Ion	Transition	A, s^{-1}	Ex.M.	Ref
2868.18	[ArIV]	$3p^3\,^4S_{3/2} - 3p^3\,^2P_{1/2}$	0.862+0	C	M83
2886.2	FeII	$b^2H_{11/2} - z^4G_{9/2}$		C	
2888.1	FeII	$b^2P_{3/2} - y^4P_{5/2}$		C	
2916.2	FeII	$a^4D_{7/2} - z^6F_{7/2}$		C	
2922.0	FeII	$b^4D_{7/2} - x^4G_{9/2}$		C	
2926.6	FeII	$a^4D_{7/2} - z^6F_{9/2}$		C	
2928.7	[MgV]	$2p^4\,^3P_1 - 2p^4\,^1D_2$	0.541+0	C	M83
2930.0	[FIII]	$2p^3\,^4S_{3/2} - 2p^3\,^2D_{3/2}$	1.300-3	C	G68
2933.1	[FIII]	$2p^3\,^4S_{3/2} - 2p^3\,^2D_{5/2}$	1.300-4	C	G68
2944.1	FeII	$a^4P_{3/2} - z^4P_{1/2}$		C	
2945.11	HeI	$2s\ ^3S_1 - 5p\ ^3P_{0-2}$	3.080+6	R	T87
2945.3	FeII	$a^4D_{5/2} - z^6F_{5/2}$		C	
2953.8	FeII	$a^4D_{5/2} - z^6F_{7/2}$		C	
2958.36	[OI]	$2p^4\,^3P_2 - 2p^4\,^1S_0$	2.880-4	C	M83
2964.6	FeII	$a^4P_{1/2} - z^4P_{1/2}$		C	
2965.0	FeII	$a^4P_{3/2} - z^4P_{3/2}$		C	
2970.5	FeII	$a^4D_{3/2} - z^6F_{5/2}$		C	
2972.29	[OI]	$2p^4\,^3P_1 - 2p^4\,^1S_0$	0.732-1	C	M83
2972.56	NIII	$3p'\,^2P_{1/2} - 3d'\,^2P_{1/2}$	6.310+7	R,D	NS84
2973.4	[NeV]	$2p^2\,^1D_2 - 2p^2\,^1S_0$	2.850+0	C	M83
2978.83	NIII	$3p'\,^2P_{1/2} - 3d'\,^2P_{3/2}$	3.600+7	R,D	NS84
2979.1	FeII	$b^2F_{7/2} - z^2H_{9/2}$		C	
2979.3	FeII	$a^4D_{1/2} - z^6F_{3/2}$		C	
2984.8	FeII	$a^4P_{5/2} - z^4P_{5/2}$		C	
3002.7	FeII	$a^4P_{3/2} - z^4P_{5/2}$		C	
3005.22	[ArIII]	$3p^4\,^3P_2 - 3p^4\,^1S_0$	0.417-1	C	M83
3023.45	OIII	$3s\ ^3P_1 - 3p\ ^3P_2$	5.100+7	B,R	E84
3024.57	OIII	$3s\ ^3P_0 - 3p\ ^3P_1$	6.560+7	B,R	E84
3047.13	OIII	$3s\ ^3P_2 - 3p\ ^3P_2$	1.610+8	B,R	E84
3059.30	OIII	$3s\ ^3P_2 - 3p\ ^3P_1$	9.650+7	B,R	E84
3062.83	[NII]	$2p^2\,^3P_1 - 2p^2\,^1S_0$	0.338-1	C	M83
3070.55	[NII]	$2p^2\,^3P_2 - 2p^2\,^1S_0$	1.510-4	C	M83
3109.16	[ArIII]	$3p^4\,^3P_1 - 3p^4\,^1S_0$	3.910+0	C	M83
3118.61	[ClIV]	$3p^2\,^3P_1 - 3p^2\,^1S_0$	2.470+0	C	KL80
3121.71	OIII	$3p\ ^3S_1 - 3d\ ^3P_1$	1.240+8	B,R	E84
3132.86	OIII	$3p\ ^3S_1 - 3d\ ^3P_2$	1.360+8	B,R	E84
3183.1	FeII	$a^4P_{3/2} - z^4P_{5/2}$		C	
3187.74	HeI	$2s\ ^3S_1 - 4p\ ^3P_{0-2}$	5.420+6	R	T87
3196.1	FeII	$a^4P_{5/2} - z^4F_{7/2}$		C	

Table 2 (Continuation)

λ, Å	Ion	Transition	A, s^{-1}	Ex.M.	Ref
3203.10	HeII-P_α	3-5	3.520+7	R	R80
3203.60	[ClIV]	$3p^2\,^3P_2 - 3p^2\,^1S_0$	0.262-1	C	KL80
3241.67	[NaIV]	$2p^4\,^3P_2 - 2p^4\,^1D_2$	0.610+0	C	M83
3260.98	OIII	$3p\,^3D_2 - 3d\,^3F_3$	2.040+8	R,D	E84
3265.43	OIII	$3p\,^3D_3 - 3d\,^3F_4$	2.240+8	R,D	E84
3299.36	OIII	$3s\,^3P_0 - 3p\,^3S_1$	2.090+7	B,R	E84
3300.0	[NeV]	$2p^2\,^3P_0 - 2p^2\,^1D_2$	2.370-5	C	M83
3306.63	NIII	$4p\,^2P_{3/2} - 5d\,^2D_{5/2}$	7.980+7	R	NS84
3312.30	OIII	$3s\,^3P_1 - 3p\,^3S_1$	5.780+7	B,R,D,Ch	E84
3319.00	[FeIII]	$a\,^5D_2 - a\,^3D_3$		C	
3334.84	[FeIII]	$a\,^5D_2 - a\,^3D_2$		C	
3334.84	NeII	$3s\,^4P_{5/2} - 3p\,^4D_{7/2}$		R	
3340.74	OIII	$3s\,^3P_2 - 3p\,^3S_1$	7.970+7	B,R,D,Ch	E84
3340.81	[FeIII]	$a\,^5D_1 - a\,^3D_3$		C	
3342.55	[NeIII]	$2p^4\,^1D_2 - 2p^4\,^1S_0$	2.710+0	C	M83
3342.85	[ClIII]	$3p^3\,^4S_{3/2} - 3p^3\,^2P_{3/2}$	0.754+0	C	M83
3345.86	[NeV]	$2p^2\,^3P_1 - 2p^2\,^1D_2$	0.131+0	C	M83
3349.12	OIV	$3s\,^2P_{3/2} - 3p\,^2D_{5/2}$	1.330+8	R	NS84
3350.68	OIII	$3s'\,^5P_2 - 3p'\,^5P_1$		R,D	
3350.99	OIII	$3s'\,^5P_3 - 3p'\,^5P_3$		R,D	
3353.21	[ClIII]	$3p^3\,^4S_{3/2} - 3p^3\,^2P_{1/2}$	0.305+0	C	M83
3355.05	NeII	$3s\,^4P_{3/2} - 3p\,^4D_{5/2}$	1.300+8	R	R80
3355.05	[FeIII]	$a\,^5D_1 - a\,^3D_1$		C	
3362.20	[NaIV]	$2p^4\,^3P_1 - 2p^4\,^1D_2$	0.186+0	C	M83
3381.24	OIV	$3s\,^4P_{3/2} - 3p\,^4P_{5/2}$		R	
3382.69:	OIII	$3p'\,^5P_2 - 3d'\,^5D_3$		R,D	
3385.50	OIV	$3s\,^4P_{5/2} - 3p\,^4D_{7/2}$		R	
3396.67	OIV	$3s\,^4P_{3/2} - 3p\,^4D_{3/2}$		R	
3403.54	OIV	$3p\,^2P_{1/2} - 3d\,^2D_{3/2}$	8.060+7	R	NS84
3404.82	NeII	$3p\,^2D_{3/2} - 3d\,^2D_{5/2}$	1.900+8	R	R80
3405.74	OIII	$3p\,^3P_0 - 3d\,^3P_1$	2.070+7	B,R	E84
3407.38	OII	$3p\,^2D_{5/2} - 4s\,^2D_{5/2}$	4.080+7	R	NS84
3407.38	OII	$3p\,^2D_{5/2} - 4s\,^2D_{3/2}$	4.080+7	R	NS84
3407.96	OIII	$3p\,^3P_1 - 3d\,^3P_0$	8.200+7	R	E84
3409.60	OIV	$3s\,^4P_{5/2} - 3p\,^4D_{5/2}$		R	
3411.69	OIV	$3p\,^2P_{3/2} - 3d\,^2D_{5/2}$	1.030+8	R	NS84
3415.18	OIII	$3p\,^3P_1 - 3d\,^3P_1$	2.560+7	B,R	E84
3416.2	[NaIV]	$2p^4\,^3P_0 - 2p^4\,^1D_2$	2.240-5	C	M83
3425.97	[NeV]	$2p^2\,^3P_2 - 2p^2\,^1D_2$	0.365+0	C	M83
3428.67	OIII	$3p\,^3P_1 - 3d\,^3P_2$	9.840+6	B,R	E84

Table 2 (Continuation)

λ, Å	Ion	Transition	A, s^{-1}	Ex.M.	Ref
3430.60	OIII	$3p\ ^3P_2 - 3d\ ^3P_1$	3.120+7	B,R	E84
3433.9	OVI	$6fgFG - 7ghGH$	5.910+8	R	Kh93
3444.10	OIII	$3p\ ^3P_2 - 3d\ ^3P_2$	5.820+7	B,R	E84
3447.59	HeI	$2s\ ^1S_0 - 6p\ ^1P_1$	2.230+6	R	T87
3450.40	OIII	$3p'\ ^5D_1 - 3d'\ ^5F_1$		R,D	
3455.20	OIII	$3p'\ ^5D_2 - 3d'\ ^5F_2$		R,D	
3466.50	[NI]	$2p^3\ ^4S_{3/2} - 2p^3\ ^2P_{3/2}$	6.580-3	C	M83
3466.54	[NI]	$2p^3\ ^4S_{3/2} - 2p^3\ ^2P_{1/2}$	2.710-3	C	M83
3471.81	HeI	$2p\ ^3P - 16d\ ^3D$	3.140+5	R	T87
3478.71	NIV	$3s\ ^3S_1 - 3p\ ^3P_2$	1.100+8	R,D	R80
3478.96	HeI	$2p\ ^3P - 15d\ ^3D$	3.820+5	R	T87
3485.5	[MgVI]	$2p^3\ ^2D_{5/2} - 2p^3\ ^2P_{3/2}$	2.400+0	C	G68
3487.72	HeI	$2p\ ^3P - 14d\ ^3D$	4.710+5	R	T87
3488.1	[MgVI]	$2p^3\ ^2D_{3/2} - 2p^3\ ^2P_{3/2}$	3.800+0	C	G
3498.64	HeI	$2p\ ^3P - 13d\ ^3D$	5.900+5	R	T87
3500.4	[MgVI]	$2p^3\ ^2D_{5/2} - 2p^3\ ^2P_{1/2}$	0.150+0	C	G
3503.0	[MgVI]	$2p^3\ ^2D_{3/2} - 2p^3\ ^2P_{1/2}$	2.500+0	C	G68
3512.51	HeI	$2p\ ^3P - 12d\ ^3D$	7.520+5	R	T87
3530.49	HeI	$2p\ ^3P - 11d\ ^3D$	9.810+5	R	T87
3532.2	[FIV]	$2p^2\ ^1D_2 - 2p^2\ ^1S_0$	2.100+0	C	G68
3554.34	NeII	$3p\ ^2D_{5/2} - 3d\ ^4D_{7/2}$		R	
3554.41	HeI	$2p\ ^3P - 10d\ ^3D$	1.310+6	R	T87
3568.53	NeII	$3s\ ^2D_{5/2} - 3p\ ^2F_{7/2}$	1.400+8	R	R80
3583.0	[CIII]	$3p^4\ ^3P_2 - 3p^4\ ^1S_0$	0.197-1	C	M83
3586.0	[FeVII]	$3d^2(a^3F_3 - a^1G_4)$		C	
3587.27	HeI	$2p\ ^3P - 9d\ ^3D$	1.810+6	R	T87
3609.62	CIII	$4p\ ^3P_2 - 5d\ ^3D_3$	9.090+7	R	NS84
3613.64	HeI	$2s\ ^1S_0 - 5p\ ^1P_1$	3.740+6	R	T87
3634.23	HeI	$2p\ ^3P_{1,2} - 8d\ ^3D_{1-3}$	2.320+6	R	T87
3634.37	HeI	$2p\ ^3P_0 - 8d\ ^3D_1$	1.450+8	R	T87
3657.27	H_{36}	2-36		R	
3657.93	H_{35}	2-35	1.320+2	R	Kh93
3658.64	H_{34}	2-34	1.520+2	R	Kh93
3659.42	H_{33}	2-33	1.770+2	R	Kh93
3660.28	H_{32}	2-32	2.060+2	R	Kh93
3661.22	H_{31}	2-31	2.420+2	R	Kh93
3662.26	H_{30}	2-30	2.850+2	R	Kh93
3662.50	[FeVI]	$3d^3(a^4F_{7/2} - a^2D_{5/2})$		C	
3663.41	H_{29}	2-29	3.380+2	R	Kh93
3664.68	H_{28}	2-28	4.020+2	R	Kh93
3666.10	H_{27}	2-27	4.830+2	R	Kh93
3667.88	H_{26}	2-26	5.830+2	R	Kh93
3669.47	H_{25}	2-25	7.100+2	R	Kh93
3671.48	H_{24}	2-24	8.710+2	R	Kh93
3673.76	H_{23}	2-23	1.080+3	R	Kh93

Table 2 (Continuation)

λ, Å	Ion	Transition	A, s^{-1}	Ex.M.	Ref
3675.0	[CIII]	$3p^4\,^3P_1 - 3p^4\,^1S_0$	1.310+0	C	M83
3676.36	H_{22}	2-22	1.350+3	R	Kh93
3679.35	H_{21}	2-21	1.700+3	R	Kh93
3682.81	H_{20}	2-20	2.170+3	R	Kh93
3686.83	H_{19}	2-19	2.810+3	R	Kh93
3688.0:	[CaVII]	$3p^2\,^1D_2 - 3p^2\,^1S_0$	4.300+0	C	G68
3690.07	HeII	4-36	9.660+2	R	Kh93
3691.56	H_{18}	2-18	3.690+3	R	Kh93
3694.21	NeII	$3s\ ^4P_{5/2} - 3p\ ^4P_{5/2}$	1.000+8	R	R80
3697.15	H_{17}	2-17	4.910+3	R	Kh93
3698.07	NeII	$3d\ ^4P_{3/2} - 5p\ ^4D_{1/2}$		R	
3698.72	HeII	4-33	1.500+3	R	Kh93
3701.77	NeII	$3p\ ^2P_{3/2} - 3d\ ^4P_{5/2}$	2.700+7	R	R80
3702.75	OIII	$3p\,^3P_0 - 3d\,^3D_1$			
3703.86	H_{16}	2-16	6.660+3	R	Kh93
3705.00	HeI	$2p\ ^3P_{1,2} - 7d\ ^3D_{1-3}$	3.520+6	R	T87
3705.15	HeI	$2p\,^3P_0 - 7d\,^3D_1$	2.200+6	R	T87
3707.24	OIII	$3p\,^3P_1 - 3d\,^3D_2$	7.740+7	R	E84
3709.52	OIII	$3s`\,^5P_1 - 3p`\,^5D_0$		R,D	
3709.62	NeII	$3s\,^4P_{3/2} - 3p\,^4P_{1/2}$	1.100+8	R	R80
3711.97	H_{15}	2-15	9.210+3	R	Kh93
3712.75	OII	$3s\,^4P_{1/2} - 3p\,^4S_{3/2}$			
3715.08	OIII	$3p\ ^3P_2 - 3d\ ^3D_3$	9.810+7	B,R	E84
3715.15	HeII	4-29	2.870+3	R	R80
3715.46	NeII	$4p\ ^2D_{5/2} - 7s\ ^2P_{3/2}$		R	
3717.90	X				
3720.72	NeII	$3d\ ^2F_{5/2} - 5p\ ^2D_{5/2}$		R	
3721.88	[SIII]	$3p^2\,^3P_1 - 3p^2\,^1S_0$	0.796+0	C	KL80
3721.94	H_{14}	2-14	1.300+4	R	Gr90
3726.19	[OII]	$2p^3\,^4S_{3/2} - 2p^3\,^2D_{3/2}$	1.650-4	C,Ph	M83
3727.33	OII	$3s\,^4P_{3/2} - 3p\,^4S_{3/2}$			
3729.11	[OII]	$2p^3\,^4S_{3/2} - 2p^3\,^2D_{5/2}$	3.820-5	C,Ph	M83
3731.60	OIII	$3p\,^3P_2 - 3d\,^3D_1$	2.150+6	B,R	E84
3732.34	NeII	$3p\ ^2P_{3/2} - 3d\ ^4F_{3/2}$		R	
3732.82	HeII	4-26	4.980+3	R	R80
3732.86	HeI	$2p\ ^3P_{1,2} - 7s\ ^3S_1$	1.290+6	R	T87
3733.01	HeI	$2p\,^3P_0 - 7s\,^3S_1$	1.610+5	R	T87
3734.37	H_{13}	$2p\ ^2P - 13d\ ^2D$	1.880+4	R	Gr90
3735.94:	OII	$3p'\,^2P_{3/2} - 4s'\,^2D_{5/2}$			
3736.85	OIV	$3p'\,^4D_{7/2} - 3d'\,^4F_{9/2}$		R,D	
3739.92	OII	$3p\,^4S_{3/2} - 4s\,^4P_{5/2}$		R,D	
3740.22	HeII	4-25	6.060+3	R	R80
3740.30	[FeVI]	$3d\,^4F_{9/2} - 3d\,^2H_{9/2}$		C	
3745.92	NIII	$3s`\,^4P_{1/2} - 3p`\,^4S_{3/2}$		R,D	
3747.86	NeII	$3d\ ^2P_{1/2} - 5p\ ^2S_{1/2}$		R	

Table 2 (Continuation)

λ, Å	Ion	Transition	A, s^{-1}	Ex.M.	Ref
3748.60	HeII	4-24	7.450+3	R	R80
3750.15	H_{12}	$2p\ ^2P - 12d\ ^2D$	2.820+4	R	Gr90
3754.67	OIII	$3s\ ^3P_1 - 3p\ ^3D_2$	8.270+7	B,R,Ch	E84
3756.11	HeI	$2p\ ^1P_1 - 14d\ ^1D_2$		R	
3757.21	OIII	$3s\ ^3P_0 - 3p\ ^3D_1$	6.120+7	B,R,Ch	E84
3757.47	NIII	$3p'\ ^4D_{1/2} - 3d'\ ^4P_{3/2}$		R,D	
3757.65	NIII	$3p'\ ^4D_{3/2} - 3d'\ ^4P_{1/2}$		R,D	
3758.14	HeII	4-23	9.240+3	R	R80
3759.0	[FeVII]	$3d^2(a^3F_4 - a^1G_4)$		C	
3759.87	OIII	$3s\ ^3P_2 - 3p\ ^3D_3$	1.080+8	B,R,Ch	E84
3762.63	OII	$3p\ ^4S_{3/2} - 4s\ ^4P_{3/2}$		R,D	
3768.07	HeII	4-22	1.160+4	R	R80
3768.78	HeI	$2p\ ^1P_1 - 13d\ ^1D_2$	4.320+5	R	T87
3770.63	H_{11}	$2p\ ^2P - 11d\ ^2D$	4.370+4	R	Gr90
3773.98	[FeVI]	$3d\ ^4F_{3/2} - 3d\ ^2P_{1/2}$		C	
3774.00	OIII	$3s\ ^3P_1 - 3p\ ^3D_1$	4.290+7	B,R,Ch	E84
3777.07	[FeV]	$3d\ ^5D_0 - 3d\ ^3P_2$		C	
3777.07	NeII	$3s\ ^4P_{1/2} - 3p\ ^4P_{3/2}$		R	
3781.62	FII	$3s'\ ^3D_2 - 3p'\ ^1F_3$		R,D	
3781.68	HeII	4-21	1.460+4	R	R80
3783.47	[FeV]	$3d\ ^5D_2 - 3d\ ^3F_3$		C	
3784.86	HeI	$2d\ ^1P_1 - 12d\ ^1D_2$	5.550+5	R	T87
3785.01	OII	$4p\ ^2P_{3/2} - 4d'\ ^2D_{5/2}$		R,D	
3791.26	OIII	$3s\ ^3P_2 - 3p\ ^3D_2$	2.490+7	B,R,Ch	E84
3795.23	[FeV]	$3d\ ^5D_2 - 3d\ ^3F_2$		C	
3796.3	SiIII	$4p\ ^3P_1 - 4d\ ^3D_2$		R	
3796.33	HeII	4-20	1.880+4	R	R80
3796.7	[SIII]	$3p^2\ ^3P_2 - 3p^2\ ^1S_0$	0.105-1	C	KL80
3797.90	H_{10}	$2p\ ^2P - 10d\ ^2D$	7.080+4	R	Gr90
3805.74	HeI	$2p\ ^1P_1 - 11d\ ^1D_2$	7.240+5	R	T87
3810.96	OIII	$3s\ ^3P_2 - 3p\ ^3D_1$		B,R,Ch	
3813.49	HeII	4-19	2.440+4	R	R80
3814.56	FII	$3p'\ ^3P_1 - 3d'\ ^3S_1$		R,D	
3819.61	HeI	$2p\ ^3P_{1,2} - 6d\ ^3D_{1-3}$	5.720+6	R	T87
3819.76	HeI	$2p\ ^3P_0 - 6d\ ^3D_1$	3.580+6	R	T87
3829.75	NeII	$3p\ ^2P_{3/2} - 3d\ ^2D_{5/2}$	8.400+7	R	R80
3829.79	NII	$3p\ ^3P_1 - 4s\ ^3P_2$	1.500+7	R	R80
3833.55	HeI	$2p\ ^1P_1 - 10d\ ^1D_2$	9.720+5	R	T87
3833.78	HeII	2-10	2.850+5	R	Kh93
3833.80	HeII	4-18	3.210+4	R	R80
3835.38	H_9	$2p\ ^2P - 9d\ ^2D$	1.210+5	R	Gr90
3838.09	HeI	$2p\ ^1P_1 - 10s\ ^1S_0$	3.667+5	R	T87
3839.27	[FeV]	$3d^4(a^5D_3 - a^3F_3)$		C	
3842.82:	OII	$3p\ ^4D_{1/2} - 3d\ ^4D_{3/2}$	1.460+7	R	NS84

Table 2 (Continuation)

λ, Å	Ion	Transition	A, s^{-1}	Ex.M.	Ref
3851.20	[FeV]	$3d\,^5D_3 - 3d\,^3F_2$		C	
3853.66	SiII	$3p^2\,^2D_{3/2} - 4p\,^2P_{3/2}$		R	
3856.16	OII	$3p\,^4D_{3/2} - 3d\,^4D_{1/2}$			
3856.02	SiII	$3p^2\,^2D_{5/2} - 4p\,^2P_{3/2}$		R	
3856.16	OII	$3p\,^4D_{3/2} - 3d\,^4D_{1/2}$			
3857.81	NeII	$3p'\,^2P_{1/2} - 4d\,^2D_{3/2}$		R,D	
3858.07	HeII	4-17	4.300+4	R	R80
3859.19	X				
3862.59	SiII	$3p^2\,^2D_{3/2} - 4p\,^2P_{1/2}$		R	
3867.48	HeI	$2p\,^3P_{2,1} - 6s\,^3S_1$	2.120+6	R	T87
3867.63	HeI	$2p\,^3P_0 - 6s\,^3S_1$	2.640+5	R	T87
3868.71	[NeIII]	$2p^4\,^3P_2 - 2p^4\,^1D_2$	0.171+0	C	M83
3871.79	HeI	$2p\,^1P_1 - 9d\,^1D_2$	1.350+6	R	T87
3875.50	OII]	$3p\,^4D_{7/2} - 3d\,^2F_{5/2}$		R	
3878.10	X				
3882.20	OII	$3p\,^4D_{7/2} - 3d\,^4D_{7/2}$		R	
3883.82	CIII	$4d\,^3D_1 - 5f\,^3F_2$	9.030+7	R,D	NS84
3885.94	CIII	$4d\,^3D_2 - 5f\,^3F_3$	9.560+7	R	NS84
3887.44	HeII	4-16	5.860+4	R	R80
3887.57:	NI	$3s\,^2P_{1/2} - 5p\,^2D_{3/2}$	6.410+6	R	NS84
3888.65	HeI	$2s\,^3S_1 - 3p\,^3P_{0-2}$	9.120+6	R	T87
3889.05	H_8	2-8	2.210+5	R	S77
3891.28	[FeV]	$^5D_4 -^3 F_4$		C	
3891.80	X				
3895.22	[FeV]	$^5D_3 -^3 P_2$		C	
3918.98	CII	$3p\,^2P_{1/2} - 4s\,^2S_{1/2}$	1.810+8	R,NF	B85
3919.29	OII	$3s'\,^2D_{3/2} - 3p'\,^2P_{1/2}$		R	
3920.69	CII	$3p\,^2P_{3/2} - 4s\,^2S_{1/2}$	1.810+8	R,NF	B85
3923.48	HeII	4-15	8.160+4	R	R80
3924.47	SiIII	$4f\,^1F_3 - 5g\,^1G_4$		R	
3926.53	HeI	$2p\,^1P_1 - 8d\,^1D_2$	1.950+6	R	T87
3934.47	X				
3935.91	HeI	$2p\,^1P_1 - 8s\,^1S_0$		R	
3945.05	OII	$3s\,^2P_{1/2} - 3p\,^2P_{3/2}$		R	
3954.37:	OII	$3s\,^2P_{1/2} - 3p\,^2P_{1/2}$	4.320+7	R	NS84
3956.74:	OIV	$3s'\,^4P_{3/2} - 3d'\,^4P_{3/2}$		R,D	
3960.7	[FIV]	$2p^2\,^3P_0 - 2p^2\,^1D_2$	6.400-6	C	G68
3961.59	OIII	$3p\,^1D_2 - 3d\,^1F_3$	1.500+8	R	E84
3964.73	HeI	$2s\,^1S_0 - 4p\,^1P_1$	6.830+6	R	T87
3967.41	[NeIII]	$2p^4\,^3P_1 - 2p^4\,^1D_2$	0.542-1	C	M83
3968.43	HeII	4-14	1.160+5	R	R80
3970.07	H_7	$2p\,^2P - 7d\,^2D$	4.390+5	R	S77
3973.26	OII	$3s\,^2P_{3/2} - 3p\,^2P_{3/2}$		R	

Table 2 (Continuation)

λ, Å	Ion	Transition	A, s^{-1}	Ex.M.	Ref
3973.76:	CII				
3982.72	OII	$3s\,^2P_{3/2} - 3p\,^2P_{1/2}$		R	
3995.00	NII	$3s\,^1P_1 - 3p\,^1D_2$		R	
3995.08	OIV	$3p'\,^4P_{5/2} - 3d'\,^4P_{5/2}$		R	
3996.3	[CaV]	$3p^4\,^1D_2 - 3p^4\,^1S_0$	3.730+0	C	M83
3997.4	[FIV]	$2p^2\,^3P_1 - 2p^2\,^1D_2$	0.340-1	C	G68
4003.58	NIII	$4d\,^2D_{5/2} - 5f\,^2F_{7/2}$	1.820+8	R,D	NS84
4007.91	[FeIII]	$a^5D_4 - a^3G_4$		C	
4009.27	HeI	$2p\,^1P_1 - 7d\,^1D_2$	2.980+6	R	T87
4011.60	[NaV]	$2p^3\,^2D_{5/2} - 2p^3\,^2P_{3/2}$		C	
4012.7	[NeIII]	$2p^4\,^3P_0 - 2p^4\,^1D_2$	8.510-6	C	M83
4025.60	HeII	4-13	1.710+5	R	R80
4026.13	HeI	$2p\,^3P_{1,2} - 5d\,^3D_{1-3}$	1.030+7	R	T87
4026.36	HeI	$2p\,^3P_0 - 5d\,^3D_1$	6.440+6	R	T87
4033.18:	OII	$3d\,^4F_{3/2} - 4f\,^4F_{3/2}$	2.300+7	R	NS84
4035.09	OII	$3d\,^4F_{5/2} - 4f\,^2F_{5/2}$		R	
4046.5	[FeIII]	$3d^6(a^5D_3 - a^3G_3)$		C	
4047.80	OII	$3d\,^4F_{7/2} - 4f\,^4F_{7/2}$	2.200+7	R	NS84
4056.06	CIII	$4d\,^1D_2 - 5f\,^1F_3$	2.520+8	R,D	Kh81
4057.76	NIV	$3p\,^1P_1 - 3d\,^1D_2$	7.080+7	R	Kh81
4060.2	[FIV]	$2p^2\,^3P_2 - 2p^2\,^1D_2$	0.098+0	C	G68
4068.60	[SII]	$3p^3\,^4S_{3/2} - 3p^3\,^2P_{3/2}$	0.225+0	C	M83
4068.91	CIII	$4f\,^3F_3 - 5g\,^3G_4$	3.070+8	R,D	NS84
4069.64	OII	$3p\,^4D_{1/2} - 3d\,^4F_{3/2}$	1.420+8	R	NS84
4069.90	OII	$3p\,^4D_{3/2} - 3d\,^4F_{3/2}$	1.520+8	R	NS84
4070.26	CIII	$4f\,^3F_4 - 5g\,^3G_5$	3.270+8	R	NS84
4071.3	[FeV]	$^5D_2 - ^3P_1$		C	
4072.16	OII	$3p\,^4D_{5/2} - 3d\,^4F_{7/2}$	1.740+8	R	NS84
4073.90	OIII	$3s'\,^3P_1 - 3p'\,^3D_2$	3.110+7	R,D	NS84
4076.35	[SII]	$3p^3\,^4S_{3/2} - 3p^3\,^2P_{1/2}$	0.906-1	C	M83
4077.78	CII	$3d'\,^4D_{7/2} - 4f'\,^2F_{7/2}$		R	
4078.86	OII	$3p\,^4D_{3/2} - 3d\,^4F_{3/2}$	5.680+7	R	NS84
4081.10	OIII	$3s'\,^3P_2 - 3p'\,^3D_3$	4.140+7	R	NS84
4085.12	OII	$3p\,^4D_{5/2} - 3d\,^4F_{5/2}$	4.950+7	R	NS84
4087.16	OII	$3d\,^4F_{3/2} - 4f\,^4G_{5/2}$	2.240+8	R	R80
4089.29	OII	$3d\,^4F_{9/2} - 4f\,^4G_{11/2}$	2.620+8	R	R80
4091.32	X				
4092.80	OII	$3p\,^4D_{7/2} - 3d\,^4F_{7/2}$	2.900+7	R	NS84
4097.0:	[KVI]	$3p^2\,^1D_2 - 3p^2\,^1S_0$	4.100+0	C	G68
4097.33	NIII	$3s\,^2S_{1/2} - 3p\,^2P_{3/2}$	1.190+8	R	B85
4100.04	HeII	4-12	2.590+5	R	R80

Table 2 (Continuation)

λ, Å	Ion	Transition	A, s^{-1}	Ex.M.	Ref
4101.74	H_δ	$2p\ ^2P - 6d\ ^2D$	9.730+5	R	S77
4102.94	SiI]	$3p^2\ ^1S_0 - 4s\ ^3P_1$		C	
4103.43	NIII	$3s\ ^2S_{1/2} - 3p\ ^2P_{1/2}$	1.190+8	R	B85
4104.74	OII	$3p\ ^4P_{3/2} - 3d\ ^4D_{5/2}$			
4107.07:	OII	$3d\ ^4F_{5/2} - 4f\ ^4D_{7/2}$	3.790+3	R	NS8
4115.83	SiIV	$4s\ ^2S_{1/2} - 4p\ ^2P_{1/2}$		R	
4119.22	OII	$3p\ ^4P_{5/2} - 3d\ ^4D_{7/2}$	1.480+8	R	R80
4120.82	HeI	$2p\ ^3P_{1,2} - 5s\ ^3S_1$	3.860+6	R	T87
4120.55:	OII	$3p\ ^4P_{5/2} - 3d\ ^4D_{3/2}$	7.600+6	R	NS84
4120.99	HeI	$2p\ ^3P_{2-0} - 5s\ ^3S_1$	4.820+5	R	T87
4121.84	CIII	$4p\ ^1P_1 - 5d\ ^1D_2$	1.090+8	R	NS84
4122.46	[KV]	$3p^3\ ^4S_{3/2} - 3p^3\ ^2D_{5/2}$	4.590-3	C	M83
4128.75	[FeII]	$3d^6(a^5D_1 - a^3G_3)$		C	
4141.8	[BaV]				
4143.76	HeI	$2p\ ^1P_1 - 6d\ ^1D_2$	4.910+6	R	T87
4143.77	OII	$3p'''\ ^6P_{5/2} - 3d'''\ ^6D_{7/2}$			
4146.06:	OII	$3p\ ^6P_{7/2} - 3d\ ^6D_{7/2}$		R	
4152.51	CIII	$3p`\ ^3D_1 - 5f\ ^3F_2$	1.090+8	R,D	Kh81
4156.45	OII	$3p\ ^4P_{5/2} - 3d\ ^4P_{3/2}$	4.350+7	R	NS84
4156.49	CIII	$3p'\ ^3D_2 - 5f\ ^3F_3$	1.150+8	R,D	Kh81
4157.5	[FII]	$2p^4\ ^1D_2 - 2p^4\ ^1S_0$	2.100+0	C	G68
4162.86	CIII	$3p'\ ^3D_3 - 5f\ ^3F_4$	1.300+8	R,D	Kh81
4163.05	[KV]	$3p^3\ ^4S_{3/2} - 3p^3\ ^2D_{3/2}$		C	
4163.30	[KV]	$3p^3\ ^4S_{3/2} - 3p^3\ ^2D_{3/2}$	0.884-1	C	M83
4168.97	HeI	$2p\ ^1P_1 - 6s\ ^1S_0$	1.100+6	R	T87
4180.59	[FeV]	$^5D_1 - ^3P_0$		C	
4185.46	OII	$3p`\ ^2F_{5/2} - 3d`\ ^2G_{7/2}$		R	
4186.90	CIII	$4f\ ^1F_3 - 5g\ ^1G_4$	4.310+8	R,D	Kh81
4189.79	OII	$3p'\ ^2F_{7/2} - 3d'\ ^2G_{9/2}$	1.980+8	R,D	NS84
4195.76	NIII	$3s'\ ^2P_{1/2} - 3p'\ ^2D_{3/2}$		R,D	
4199.83	HeII	4-11	4.090+5	R	R80
4227.19	[FeV]	$a^5D_4 - a^3H_4$		C	
4229.27	[FeV]	$a^5D_2 - a^3P_0$		C	
4240.0	[YVI]				
4244.0	[FeII]	$a^4F_{9/2} - a^4G_{11/2}$		C	
4247.31	CIII	$3p'\ ^1P_1 - 5p\ ^1P_1$	1.060+7	R	NS84
4250.0	[SrVI]				
4253.74	OII	$3d`\ ^2G_{9/2} - 4f`\ ^2H_{9,11/2}$		R,D	
4253.98	OII	$3d`\ ^2G_{7/2} - 4f`\ ^2H_{9/2}$		R,D	
4265.34	X				
4267.00	CII	$3d\ ^2D_{3/2} - 4f\ ^2F_{5/2}$	2.220+8	R	B85

Table 2 (Continuation)

λ, Å	Ion	Transition	A, s^{-1}	Ex.M.	Ref
4267.26	CII	$3d\,^2D_{5/2} - 4f\,^2F_{7/2}$	2.380+8	R	B85
4275.52	OII	$3d\,^4D_{7/2} - 4f\,^4F_{9/2}$		R	
4276.71	OII	$3d\,^4P_{3/2} - 4f\,^4D_{1/2}$		R	
4276.71	OII	$3d\,^4D_{5/2} - 4f\,^4F_{7/2}$	1.820+8	R	R80
4276.71	OII]	$3d\,^4D_{5/2} - 4f\,^2F_{5/2}$		R	
4287.40	[FeII]	$a^6D_{9/2} - a^6S_{5/2}$		C	
4295.24	OII	$3d\,^4P_{3/2} - 4f\,^4D_{5/2}$		R	
4303.83	OII	$3d\,^4P_{5/2} - 4f\,^4D_{7/2}$		R	
4317.14	OII	$3s\,^4P_{1/2} - 3p\,^4P_{3/2}$			
4319.68	OII	$3s\,^4P_{3/2} - 3p\,^4P_{5/2}$			
4325.56	CIII	$3s'\,^1P_1 - 3p'\,^1D_2$	8.070+7	R,D	NS84
4325.69	OII	$3s\,^4P_{1/2} - 3p\,^4P_{1/2}$			
4332.76	OII	$3d\,^4D_{7/2} - 4f\,^4G_{9/2}$			
4336.86	OII	$3s\,^4P_{3/2} - 3p\,^4P_{3/2}$			
4338.67	HeII	4-10	6.760+5	R	R80
4340.47	H_γ	$2p\,^2P - 5d\,^2D$	2.530+6	R	S77
4349.43	OII	$3s\,^4P_{5/2} - 3p\,^4P_{5/2}$	7.400+7	R	R80
4359.0	[FeII]	$a^6D_{7/2} - a^6S_{5/2}$		C	
4363.21	[OIII]	$2p^2\,^1D_2 - 2p^2\,^1S_0$	1.780+0	C	M83
4366.90	OII	$3s\,^4P_{5/2} - 3p\,^4P_{3/2}$		R	
4368.14	CII	$3d\,^4P_{5/2} - 4f\,^4D_{3/2}$			
4368.25	OI	$3s\,^3S_1 - 4p\,^3P_{2-0}$		R	
4379.11	NIII	$4f\,^2F - 5g\,^2G$	3.560+8	R	NS84
4387.93	HeI	$2p\,^1P_1 - 5d\,^1D_2$	9.100+6	R	T87
4414.78	[FeII]				
4414.91	OII	$3s\,^2P_{3/2} - 3p\,^2D_{5/2}$	1.150+8	R	R80
4416.98	OII	$3s\,^2P_{1/2} - 3p\,^2D_{3/2}$	9.500+7	R	R80
4437.55	HeI	$2p\,^1P_1 - 5s\,^1S_0$	3.210+6	R	T87
4447.99	OII	$3p\,^2F_{7/2} - 3d\,^2F_{7/2}$		R	
4452.10	[FeII]				
4452.38	OII	$3s\,^2P_{3/2} - 3p\,^2D_{3/2}$		R	
4465.40	OII	$3s\,^6S_{5/2} - 3p\,^6P_{7/2}$			
4465.5	[XeIV]				
4471.48	HeI	$2p\,^3P_{1,2} - 4d\,^3D_{1-3}$	2.190+7	R	T87
4471.68	HeI	$2p\,^3P_0 - 4d\,^3D_1$	1.370+7	R	T87
4474.91	[FeIII]				
4481.13	MgII	$3d\,^2D_{5/2} - 4f\,^2F_{7/2}$		R	
4491.25	OII	$3d\,^2P_{3/2} - 4f\,^2D_{5/2}$	1.100+8	R	NS84
4506.9	[SI]	$3p^4\,^3P_2 - 3p^4\,^1S_0$	8.230-3	C	M83
4510.94	[KIV]	$3p^4\,^1D_2 - 3p^4\,^1S_0$	3.180+0	C	M83

Table 2 (Continuation)

λ, Å	Ion	Transition	A, s^{-1}	Ex.M.	Ref
4514.86	NIII	$3s'\,^4P_{5/2} - 3p'\,^4D_{7/2}$		R,D	
4516.77	CIII	$4p\,^3P_2 - 5s\,^3S_1$	1.660+8	R	NS84
4518.15	NIII	$3s'\,^4P_{1/2} - 3p'\,^4D_{1/2}$		R,D	
4523.58	NIII	$3s'\,^4P_{3/2} - 3p'\,^4D_{3/2}$		R,D	
4529.93	X				
4534.58	NIII	$3s'\,^4P_{5/2} - 3p'\,^4D_{5/2}$		R,D	
4541.59	HeII	4-9	1.210+6	R	R80
4544.85	NIII	$4p\,^2P_{3/2} - 5s\,^2S_{1/2}$	8.290+7	R	NS84
4552.00	SiIII	$4s\,^3S_1 - 4p\,^3P_2$		R	
4558.29	X				
4562.60	MgI]	$3s^2\,^1S_0 - 3p\,^3P_2$	4.130-4	C	M83
4568.50	OIV	$5f\,^2F - 6d\,^2D$		R	
4571.0:	[CaVII]	$3p^2\,^3P_0 - 3p^2\,^1D_2$	2.100-4	C	G68
4571.10	MgI]	$3s^2\,^1S_0 - 3p\,^3P_1$	1.800+2	C	M83
4581.12	X				
4589.0	[SI]	$3p^4\,^3P_1 - 3p^4\,^1S_0$	0.350+0	C	M83
4590.97	OII	$3s'\,^2D_{5/2} - 3p'\,^2F_{7/2}$	8.510+7	R	NS84
4596.17	OII	$3s'\,^2D_{3/2} - 3p'\,^2F_{5/2}$	7.940+7	R	NS84
4602.11	OII	$3d\,^2D_{3/2} - 4f\,^2F_{5/2}$			
4603.73	NV	$3s\,^2S_{1/2} - 3p\,^2P_{3/2}$	4.120+7	R	R80
4605.00	X				
4606.6	[FeIII]	$a^5D_4 - a^3F_3$		C	
4607.16	NII	$3s\,^3P_0 - 3p\,^3P_1$			
4613.67	OII	$3d\,^2D_{5/2} - 4f\,^4F_{7/2}$			
4613.87	NII	$3s\,^3P_1 - 3p\,^3P_1$			
4616.01	X				
4618.40	CII	$3d'\,^2F_{5/2} - 4f'\,^2G_{7/2}$	2.550+8	R	NS84
4619.98	NV	$3s\,^2S_{1/2} - 3p\,^2P_{1/2}$	4.080+7	R	R80
4620.10	CII	$3d`\,^2F - 4f`\,^2G$		R	
4621.28	OII	$3d\,^2D_{5/2} - 4f\,^4F_{5/2}$			
4621.39:	NII	$3s\,^3P_1 - 3p\,^3P_0$	9.000+7	R	R80
4621.57	[CI]	$2p^2\,^3P_1 - 2p^2\,^1S_0$	2.710-3	C	M83
4624.93	[ArV]	$3p^2\,^1D_2 - 3p^2\,^1S_0$	3.290+0	C	KL80
4627.35	[CI]	$2p^2\,^3P_2 - 2p^2\,^1S_0$	2.000-5	C	M83
4630.54	NII	$3s\,^3P_2 - 3p\,^3P_2$			
4631.89	OIV	$5g\,^2G - 6h\,^2H$		R	
4634.14	NIII	$3p\,^2P_{1/2} - 3d\,^2D_{3/2}$	5.660+7	R,D	B85
4638.85	OII	$3s\,^4P_{1/2} - 3p\,^4D_{3/2}$			
4640.64	NIII	$3p\,^2P_{3/2} - 3d\,^2D_{5/2}$	6.790+7	R,D	B85
4641.81	OII	$3s\,^4P_{3/2} - 3p\,^4D_{5/2}$			
4641.85	NIII	$3p\,^2P_{3/2} - 3d\,^2D_{3/2}$	1.130+7	R,D	B85
4643.09	NII	$3s\,^3P_2 - 3p\,^3P_1$			

Table 2 (Continuation)

λ, Å	Ion	Transition	A, s^{-1}	Ex.M.	Ref
4647.42	CIII	$3s\ ^3S_1 - 3p\ ^3P_2$	7.180+7	R,D	NS84
4649.14	OII	$3s\ ^4P_{5/2} - 3p\ ^4D_{7/2}$	8.570+7	R	NS84
4650.25	CIII	$3s\ ^3S_1 - 3p\ ^3P_1$	7.180+7	R,D	NS84
4650.84	OII	$3s\ ^4P_{1/2} - 3p\ ^4D_{1/2}$			
4651.47	CIII	$3s\ ^3S_1 - 3p\ ^3P_0$	7.180+7	R,D	NS84
4654.40	[SrVII]				
4658.0	[FeIII]	$a^5D - a^3F$		C	
4658.30	CIV	$5g\ ^2G - 6h\ ^2H$		R	
4661.63	OII	$3s\ ^4P_{3/2} - 3p\ ^4D_{3/2}$	5.200+7	R	R80
4663.64	CIII	$3s'\ ^3P_1 - 3p'\ ^3P_0$		R,D	
4665.61	CIV	$5f\ ^2F - 6d\ ^2D$		R	
4665.86	CIII	$3s'\ ^3P_2 - 3p'\ ^3P_2$		R,D	
4669.20	[PII]	$3p^2\ ^3P_1 - 3p^2\ ^1S_0$		C	
4673.75	OII	$3s\ ^4P_{3/2} - 3p\ ^4D_{1/2}$		R	
4676.23	OII	$3s\ ^4P_{5/2} - 3p\ ^4D_{5/2}$		R	
4678.14	NII	$3d\ ^1P_1 - 4f\ ^1D_2$		R	
4680.32	X				
4685.71	HeII	3-4	1.430+8	R	R80
4699.21	OII	$3p\ ^2D_{3/2} - 3d\ ^2F_{5/2}$			
4699.21	OII	$3p'\ ^2D_{5/2} - 3d'\ ^2F_{7/2}$			
4701.62	[FeIII]	$a^5D_3 - a^3F_3$		C	
4711.15	[ArIV]	$3p^3\ ^4S_{3/2} - 3p^3\ ^2D_{5/2}$	1.770-3	C	M83
4713.14	HeI	$2p\ ^3P_{1,2} - 4s\ ^3S_1$	8.270+6	R	T87
4713.38	HeI	$2p\ ^3P_0 - 4s\ ^3S_1$	1.030+6	R	T87
4714.3	[NeIV]	$2p^3\ ^2D_{5/2} - 2p^3\ ^2P_{3/2}$	0.400+0	C,Au	M83
4715.7	[NeIV]	$2p^3\ ^2D_{5/2} - 2p^3\ ^2P_{1/2}$	0.115+0	C,Au	M83
4724.3	[NeIV]	$2p^3\ ^2D_{3/2} - 2p^3\ ^2P_{3/2}$	0.437+0	C,Au	M83
4725.7	[NeIV]	$2p^3\ ^2D_{3/2} - 2p^3\ ^2P_{1/2}$	0.393+0	C,Au	M83
4733.93	[FeIII]	$a^5D_2 - a^3F_2$		C	
4736.6	[PII]	$3p^2\ ^3P_2 - 3p^2\ ^1S_0$		C	
4740.18	[ArIV]	$3p^3\ ^4S_{3/2} - 3p^3\ ^2D_{3/2}$	0.223-1	C	M83
4754.90	[FeIII]	$^5D_3 -^3 F_4$		C	
4756.56	[BaVII]				
4769.60	[FeIII]				
4789.45	[FII]	$2p^4\ ^3P_2 - 2p^4\ ^1D_2$	0.038+0	C	G68
4803.29	NII	$3p\ ^3D_3 - 3d\ ^3D_3$			
4814.55	[FeII]				
4839.96	X				
4844.92	OII	$3p\ ^4S_{3/2} - 3d\ ^2F_{5/2}$			
4851.5	[FeV]				
4859.32	HeII	4-8	2.280+6	R	R80
4861.29	H_β	$2p\ ^2P - 4d\ ^2D$	8.420+6	R	S77

Table 2 (Continuation)

λ, Å	Ion	Transition	A, s^{-1}	Ex.M.	Ref
4868.99	[FII]	$2p^4\,^3P_1 - 2p^4\,^1D_2$	0.012+0	C	G68
4881.11	[FeIII]				
4893.42	[FeVII]	$^3F_2 -^3 P_1$		C	
4895.00	NII	$2p^3\,^1D_2 - 3p\,^1P_1$			
4904.56	[FII]	$2p^4\,^3P_0 - 2p^4\,^1D_2$	4.100-6	C	G68
4904.80	NIII	$4d\,^2D_{5/2} - 5p\,^2P_{3/2}$		R	
4906.60	OII	$3p\,^4S_{3/2} - 3d\,^4P_{3/2}$		R	
4921.93	HeI	$2p\,^1P_1 - 4d\,^1D_2$	1.990+7	R	T87
4930.27	OV	$6h\,^{3,1}H - 7i\,^{3,1}I$		R	
4931.78	[OIII]	$2p^2\,^3P_0 - 2p^2\,^1D_2$	2.740-6	C	M83
4938.6	[CaVII]	$3p^2\,^3P_1 - 3p^2\,^1D_2$	1.200+0	C	G68
4944.6	[FeVII]	$^3F_3 -^3 P_2$		C	
4948.56	X				
4958.90	[FeIII]				
4959.52	[OIII]	$2p^2\,^3P_1 - 2p^2\,^1D_2$	6.740-3	C,Au	M83
4969.36	X				
4971.60	X				
4972.47	[FeVI]	$^4F_{5/2} -^2 G_{7/2}$		C	
4987.30	[FeIII]				
4988.8	[FeVII]	$a^3F_2 - a^3P_0$		C	
4994.42	X				
4996.36	X				
5007.57	[OIII]	$2p^2\,^3P_2 - 2p^2\,^1D_2$	0.196-1	C,Au	M83
5011.30	[FeIII]				
5015.67	HeI	$2s\,^1S_0 - 3p\,^1P_1$	1.310+7	R	T87
5017.48	X				
5032.07	CII	$2p^3\,^2P_{3/2} - 3p'\,^2D_{5/2}$		R,D	
5032.40	[FeIV]				
5035.74	X				
5041.0	[FeIV]	$3d^5\,^4G - 3d^5\,^4F$		C	
5041.03	SiII	$4p\,^2P_{1/2} - 4d\,^2D_{3/2}$	9.800+7	R	R80
5047.74	HeI	$2p\,^1P_1 - 4s\,^1S_0$	6.670+6	R	T87
5055.98	SiII	$4p\,^2P_{3/2} - 4d\,^2D_{5/2}$	1.200+8	R	R80
5056.02	SiII	$4p\,^2P_{3/2} - 4d\,^2D_{3/2}$			
5114.07	OV	$3s\,^1S_0 - 3p\,^1P_1$	1.700+7	R	R80
5121.82	CII	$4p\,^2P_{3/2} - 3p'\,^2P_{3/2}$			
5131.41	X				
5145.75	[FeVI]	$^4F_{7/2} -^2 G_{7/2}$		C	
5151.0	[FeIII]	$a^5D_4 - a^3P_2$		C	
5158.81	[FeII]				
5158.9	[FeVII]	$^3F_3 -^3 P_1$		C	
5176.04	[FeVI]	$^4F_{9/2} -^2 G_{9/2}$		C	
5191.80	[ArIII]	$3p^4\,^1D_2 - 3p^4\,^1S_0$	2.590+0	C	M83
5197.90	[NI]	$2p^3\,^4S_{3/2} - 2p^3\,^2D_{3/2}$	2.020-5	C	M83
5200.26	[NI]	$2p^3\,^4S_{3/2} - 2p^3\,^2D_{5/2}$	7.270-6	C	M83
5261.61	[FeII]				
5269.2	[KVI]	$3p^2\,^3P_0 - 3p^2\,^1D_2$	1.100-4	C	G68
5270.3	[FeIII]	$a^5D_3 - a^3P_2$		C	

Table 2 (Continuation)

λ, Å	Ion	Transition	A, s^{-1}	Ex.M.	Ref
5273.38	[FeII]				
5275.08	OI	$3p\,^3P_2 - 7d\,^3D_{3,2,1}$			
5277.8	[FeVII]	$^3F_4 - ^3P_2$		C	
5299.00	OI	$3p\,^3P_2 - 8s\,^3S_1$			
5309.2	[CaV]	$3p^4\,^3D_2 - 3p^4\,^1D_2$	1.900+0	C	M83
5323.3	[ClIV]	$3p^2\,^1D_2 - 3p^2\,^1S_0$	2.800+0	C	KL80
5334.00	[FeII]				
5335.18	[FeVI]	$^4F_{3/2} - ^4P_{1/2}$		C	
5342.56	X				
5345.9	[KrIV]				
5364.26	[RbV]				
5381.20	[RbVI]				
5411.52	HeII	4-7	4.860+6	R	R80
5424.22	[FeVI]	$^4F_{5/2} - ^4P_{3/2}$		C	
5426.64	[FeVI]	$^4F_{7/2} - ^4P_{5/2}$		C	
5434.7	[SrVI]				
5484.84	[FeVI]	$^4F_{5/2} - ^4P_{1/2}$		C	
5495.66	X				
5512.71	OI	$3p\,^3P_2 - 6d\,^3D_{3,2,1}$			
5517.72	[ClIII]	$3p^3\,^4S_{3/2} - 3p^3\,^2D_{5/2}$	7.040-4	C	M83
5537.89	[ClIII]	$3p^3\,^4S_{3/2} - 3p^3\,^2D_{3/2}$	4.830-3	C	M83
5551.84	X				
5554.94	OI	$3p\,^3P_1 - 7s\,^3S_1$			
5577.34	[OI]	$2p^4\,^1D_2 - 2p^4\,^1S_0$	1.220+0	C	M83
5592.37	OIII	$3s\,^1P_1 - 3p\,^1P_1$	4.120+7	C,Ch	E84
5603.2	[KVI]	$3p^2\,^3P_1 - 3p^2\,^1D_2$	0.530+0	C	G68
5614.7	[CaVII]	$3p^2\,^3P_2 - 3p^2\,^1D_2$	2.500+0	C	G68
5631.07	[FeVI]	$^4F_{7/2} - ^4P_{3/2}$		C	
5666.63	NII	$3s\,^3P_1 - 3p\,^3D_2$	4.230+7	R	R80
5676.02	NII	$3s\,^3P_0 - 3p\,^3D_1$			
5676.95	[FeVI]	$^4F_{9/2} - ^4P_{5/2}$		C	
5679.56	NII	$3s\,^3P_2 - 3p\,^3D_3$	5.600+7	R	R80
5695.26	X				
5695.92	CIII	$3p\,^1P_1 - 3d\,^1D_2$	4.980+7	R	Kh81
5696.4	[FeI]	$4s^2\,^5D_4 - 4s\,^5P_3$		C	
5709.2	[XeIV]				
5710.76	NII	$3s\,^3P_2 - 3p\,^3D_2$			
5721.1	[FeVII]	$^3F_2 - ^1D_2$		C	
5721.2	[FIII]	$2p^3\,^2D_{5/2} - 2p^3\,^2P_{1/2}$	0.088+0	C	G
5733.0	[FIII]	$2p^3\,^2D_{3/2} - 2p^3\,^2P_{1/2}$	0.160+0	C	G68
5733.0	[FIII]	$2p^3\,^2D_{3/2} - 2p^3\,^2P_{3/2}$	0.114+0	C	G68
5739.76	SiIII	$4s\,^1S_0 - 4p\,^1P_1$			
5754.59	[NII]	$2p^2\,^1D_2 - 2p^2\,^1S_0$	1.120+0	C	M83
5758.7	[RbIV]				
5776.4	[MnVI]	$3d^2\,^3F_3 - 3d^2\,^3P_1$		C	

Table 2 (Continuation)

λ, Å	Ion	Transition	A, s^{-1}	Ex.M.	Ref
5784.94	HeII	5-40	4.630+2	R	R80
5789.72	HeII	5-39	5.260+2	R	R80
5794.88	HeII	5-38	6.000+2	R	R80
5800.48	HeII	5-37	6.860+2	R	R80
5801.33	CIV	$3s\,^2S_{1/2} - 3p\,^2P_{3/2}$	3.190+7	NF,R,Ch	R80
5806.56	HeII	5-36	7.870+2	R	R80
5811.98	CIV	$3s\,^2S_{1/2} - 3p\,^2P_{1/2}$	3.160+7	NF,R,Ch	R80
5813.19	HeII	5-35	9.080+2	R	R80
5820.43	HeII	5-34	1.050+3	R	R80
5828.36	HeII	5-33	1.220+3	R	R80
5837.06	HeII	5-32	1.430+3	R	R80
5846.6	[XeIII]				
5846.65	HeII	5-31	1.670+3	R	R80
5857.26	HeII	5-30	1.980+3	R	R80
5860.94	X				
5863.0	[MnV]	$3d^3\,^4F_{7/2} - 3d^3\,^2G_{7/2}$		C	
5867.60	[KrIV]				
5867.82	SiII	$4s\,^4P_{5/2} - 4p\,^4P_{5/2}$		R	
5869.02	HeII	5-29	2.350+3	R	R80
5875.62	HeI	$2p\,^3P_{1,2} - 3d\,^3D_{1-3}$	6.280+7	R	T87
5875.97	HeI	$2p\,^3P_0 - 3d\,^3D_1$	3.930+7	R	T87
5882.12	HeII	5-28	2.800+3	R	R80
5886.34	X				
5889.77	CII	$3d\,^2D_{5/2} - 4p\,^2P_{3/2}$		R	
5891.0	[MnV]	$3d^3\,^4F_{9/2} - 3d^3\,^2G_{9/2}$		C	
5894.0	[MnVI]	$3d^2\,^3F - 3d^2\,^3P$		C	
5896.78	HeII	5-27	3.370+3	R	R80
5913.24	HeII	5-26	4.080+3	R	R80
5920.2	[BaV]				
5931.79	NII	$3p\,^3P_1 - 3d\,^3D_2$			
5931.83	HeII	5-25	4.980+3	R	R80
5936.88	X				
5941.67	NII	$3p\,^3P_2 - 3d\,^3D_3$			
5952.93	HeII	5-24	6.130+3	R	R80
5957.61	SiII	$4p\,^2P_{1/2} - 5s\,^2S_{1/2}$			
5958.58	OI	$3p\,^3P_0 - 5d\,^3D_1$			
5958.58	OI	$3p\,^3P_2 - 5d\,^3D_{3,2.1}$			
5977.02	HeII	5-23	7.610+3	R	R80
5978.97	SiII	$4p\,^2P_{3/2} - 5s\,^2S_{1/2}$			
6004.72	HeII	5-22	9.550+3	R	R80
6036.78	HeII	5-21	1.210+4	R	R80
6045.85	X				
6046.40	OI	$3p\,^3P_2 - 6s\,^3S_1$			
6074.19	HeII	5-20	1.550+4	R	R80
6086.9	[CaV]	$3p^4\,^3P_1 - 3p^4\,^1D_2$	0.426+0	C	M83
6086.9	[FeVII]	$^3F_3 -^1 D_2$		C	
6101.8	[KIV]	$3p^4\,^3P_2 - 3p^4\,^1D_2$	0.814+0	C	M83
6103.72	X				
6108.4	[KrIV]				
6118.26	HeII	5-19	2.020+4	R	R80
6130.56	[BrIII]				

Table 2 (Continuation)

λ, Å	Ion	Transition	A, s^{-1}	Ex.M.	Ref
6133.42	[ArV]	$3p^2\,^3P_0 - 3p^2\,^1D_2$	3.500-5	C	KL80
6151.29	X				
6152.9	[ClII]	$3p^4\,^1D_2 - 3p^4\,^1S_0$	2.060+0	C	M83
6166.2	[MnV]	$3d^3\,^4F_{7/2} - 3d^3\,^4P_{5/2}$		C	
6170.69	HeII	5-18	2.670+4	R	R80
6218.6	[MnV]	$3d^3\,^4F_{5/2} - 3d^3\,^4P_{3/2}$		C	
6221.0	[MnV]	$3d^3\,^4F_{5/2} - 3d^3\,^4P_{1/2}$		C	
6223.0:	[KV]	$3p^3\,^2D_{3/2} - 3p^3\,^2P_{3/2}$	1.860+0	C	M83
6228.4	[KVI]	$3p^2\,^3P_2 - 3p^2\,^1D_2$	1.100+0	C	G68
6233.82	HeII	5-17	3.590+4	R	R80
6256.56	[KrV]				
6300.30	[OI]	$2p^4\,^3P_2 - 2p^4\,^1D_2$	6.340-3	C	M83
6310.85	HeII	5-16	4.920+4	R	R80
6312.10	[SIII]	$3p^2\,^1D_2 - 3p^2\,^1S_0$	2.220+0	C,Ch	KL80
6317.0:	[KV]	$3p^3\,^2D_{5/2} - 3p^3\,^2P_{3/2}$	1.210+0	C	M83
6333.10	[SrVII]				
6347.10	SiII	$4s\ ^2S_{1/2} - 4p\ ^2P_{3/2}$	7.000+7	R,D	R80
6349.0:	[KV]	$3p^3\,^2D_{3/2} - 3p^3\,^2P_{1/2}$	1.250+0	C	M83
6363.77	[OI]	$2p^4\,^3P_1 - 2p^4\,^1D_2$	2.110-3	C	M83
6371.36	SiII	$4s\ ^2S_{1/2} - 4p\ ^2P_{1/2}$	6.900+7	R,D	R80
6391.74	[OI]	$2p^4\,^3P_0 - 2p^4\,^1D_2$	7.230-7	C	M83
6393.62	[MnV]	$3d^3\,^4F_{9/2} - 3d^3\,^4P_{5/2}$		C	
6406.38	HeII	5-15	6.880+4	R	R80
6428.2	[CaV]	$3p^4\,^3P_0 - 3p^4\,^1D_2$	8.420-5	C	M83
6434.72	[ArV]	$3p^2\,^3P_1 - 3p^2\,^1D_2$	0.204+0	C	KL80
6447.0:	[KV]	$3p^3\,^2D_{5/2} - 3p^3\,^2P_{1/2}$	0.141+0	C	M83
6461.95	X				
6482.07	X				
6518.3	[MnVI]	$3d^2\,^3F - 3d^2\,^1D$		C	
6527.10	HeII	5-14	9.880+4	R	R80
6527.23	[NII]	$2p^2\,^3P_0 - 2p^2\,^1D_2$	5.350-7	C	M83
6544.61	X				
6548.05	[NII]	$2p^2\,^3P_1 - 2p^2\,^1D_2$	1.010-3	C	M83
6560.10	HeII	4-6	1.230+7	R	R80
6562.85	H_α	$2p\ ^2P - 3d\ ^2D$	4.410+7	R	S77
6578.00	CII	$3s\,^2S_{1/2} - 3p\,^2P_{3/2}$			
6581.09	X				
6582.80	CII	$3s\,^2S_{1/2} - 3p\,^2P_{1/2}$			
6583.45	[NII]	$2p^2\,^3P_2 - 2p^2\,^1D_2$	2.990-3	C	M83
6598.76	[FeVII]	$3d^2(^3F_4 - ^1D_2)$		C	
6601.30	OV	$3p'\,^3D_3 - 3d'\,^3F_3$			
6610.60	X				
6617.50	X				
6627.40	OII	$3d\,^2P_{3/2} - 4p\,^2P_{3/2}$			
6630.60	[CsV]				
6639.22	X				
6641.10	OII	$3s\,^2P_{1/2} - 3p\,^2S_{1/2}$			

Table 2 (Continuation)

λ, Å	Ion	Transition	A, s^{-1}	Ex.M.	Ref
6655.10	X				
6666.70	OII	$3d\,^2P_{3/2} - 4p\,^2P_{1/2}$			
6666.80	[NiII]				
6668.50	X				
6672.00	X				
6676.02	X				
6678.15	HeI	$2p\,^1P_1 - 3d\,^1D_2$	6.370+7	R	T87
6683.20	HeII	5-13	1.460+5	R	R80
6708.70	[I III]				
6709.10	[MnII]				
6709.70	[CrV]				
6716.47	[SII]	$3p^3\,^4S_{3/2} - 3p^3\,^2D_{5/2}$	2.600-4	C	M83
6721.40	OII	$3s\,^2P_{3/2} - 3p\,^2S_{1/2}$			
6727.40	CIII	$3s'\,^3P_0 - 3p'\,^3D_1$			
6730.85	[SII]	$3p^3\,^4S_{3/2} - 3p^3\,^2D_{3/2}$	8.820-4	C	M83
6731.00	CIII	$3s'\,^3P_1 - 3p'\,^3D_2$			
6733.58	CII	$3p\,^4D_{3/2} - 3d\,^4D_{1/2}$			
6733.58	NI	$3p\,^4P_{1/2} - 4d\,^4P_{1/2}$			
6734.00	[CrIV]				
6734.40	[FeIV]	$^4G - ^2\,I$			
6738.40	[SrII]				
6739.80	[FeIV]	$^4G - ^2\,I$			
6742.20	CIII	$3s'\,^3P_1 - 3p'\,^3D_1$			
6744.10	HeI	$3\,^1S - 21\,^3P$			
6744.40	CIII	$3s'\,^3P_2 - 3p'\,^3D_3$			
6746.90	CIV				
6747.00	NV				
6747.60	[CrIV]				
6755.80	HeI	$3\,^1S - 20\,^3P$			
6756.00	[FeIV]	$^4P - ^2\,D$			
6761.40	[FeIV]	$^4P - ^2\,D$			
6762.20	CIII	$3s'\,^3P_2 - 3p'\,^3D_2$			
6763.50	[MnII]				
6768.90	[XeIV]				
6769.50	HeI	$3\,^1S - 19\,^3P$			
6778.70	CIV				
6779.90	CII	$3s'\,^4P_{3/2} - 3p'\,^4D_{5/2}$			
6780.60	CII	$3s'\,^4P_{1/2} - 3p'\,^4D_{3/2}$			
6783.90	CII	$3s'\,^4P_{5/2} - 3p'\,^4D_{7/2}$			
6785.70	HeI	$3\,^1S - 18\,^3P$			
6787.20	CII	$3s'\,^4P_{1/2} - 3p'\,^4D_{1/2}$			
6791.50	CII	$3s'\,^4P_{3/2} - 3p'\,^4D_{3/2}$			
6792.50	[FeIV]	$^4P - ^2\,D$			
6795.8	[KIV]	$3p^4\,^3P_1 - 3p^4\,^1D_2$	0.198+0	C	M83
6798.00	CII	$3s'\,^4P_{3/2} - 3p'\,^4D_{1/2}$			
6798.50	[KrIV]				

Table 2 (Continuation)

λ, Å	Ion	Transition	A, s^{-1}	Ex.M.	Ref
6800.70	CII	$3s'\,^4P_{5/2} - 3p'\,^4D_{5/2}$			
6804.80	HeI	$3\,^1S - 17\,^3P$			
6812.30	CII	$3s'\,^4P_{5/2} - 3p'\,^4D_{3/2}$			
6818.50	SiII	$5p\,^2P_{1/2} - 6d\,^2D_{3/2}$			
6819.20	[FeV]	$^3P - ^1S$			
6820.60	X				
6826.90	[KrIII]				
6827.90	HeI	$3\,^1S - 16\,^3P$			
6828.10	CI	$3p\,^1P_1 - 4d\,^1D_2$			
6829.80	SiII	$5p\,^2P_{3/2} - 6d\,^2D_{5/2}$			
6832.60	X				
6846.80	OII	$3d\,^4F_{7/2} - 4p\,^4D_{7/2}$			
6850.40	[MnII]				
6852.10	[MnVI]				
6855.90	HeI	$3\,^1S - 15\,^3P$			
6857.30	CIII	$3p'\,^3D_1 - 3d'\,^3D_1$			
6868.20	[SrII]				
6869.40	X				
6871.70	CIII	$3p'\,^3D_3 - 3d'\,^3D_3$			
6873.80	[FeII]				
6874.60	CIV	$7p\,^2P_{1/2} - 9d\,^2D_{3/2}$			
6875.80	CIV	$7p\,^2P_{3/2} - 9d\,^2D_{5/2}$			
6880.90	X				
6890.50	HeI	$3\,^1S - 14\,^3P$			
6890.90	HeII	$5g\,^2G - 12h\,^2H$	2.240+5	R	R80
6895.10	OII	$3d\,^4F_{9/2} - 4p\,^4D_{7/2}$			
6896.20	[FeII]				
6896.50	[CrIV]				
6901.10	X				
6906.40	OII	$3d\,^4F_{7/2} - 4p\,^4D_{5/2}$			
6907.90	OII	$3d\,^4F_{3/2} - 4p\,^4D_{1/2}$			
6910.60	OII	$3d\,^4F_{5/2} - 4p\,^4D_{3/2}$			
6914.80	[CrIV]				
6915.48	X				
6933.90	HeI	$3\,^1S - 13\,^3P$			
6949.00	[CuIV]	$^3F - ^1D$			
6957.30	NIII	$3p''\,^2D - 4d'\,^2F$			
6958.70	X				
6961.40	[CoIII]	$^4F - ^4P$			
6976.00	X				
6978.50	[MnII]				
6982.40	X				
6989.40	HeI	$3\,^1S - 12\,^3P$			
6989.40	X				
6997.10	[FeIV]	$^4P - ^2D$			
6998.50	[XeV]				
7002.10	OI	$3p\,^3P_1 - 4d\,^3D_{2,1}$			

Table 2 (Continuation)

λ, Å	Ion	Transition	A, s^{-1}	Ex.M.	Ref
7005.58	[ArV]	$3p^2\,^3P_2 - 3p^2\,^1D_2$	0.476+0	C	KL80
7011.00	X				
7021.40	CIV				
7029.00	X				
7032.30	OIV	$4s\,^2S_{1/2} - 4p\,^2P_{3/2}$			
7036.30	[FeIV]	$^4P - ^2D$			
7037.20	CIII	$3s'\,^1P_1 - 4d\,^1D_2$			
7037.80	NV				
7047.00	X				
7051.70	[CrIV]				
7053.60	OIV	$4s\,^2S_{1/2} - 4p\,^2P_{1/2}$			
7062.20	HeI	$3\,^1S - 11\,^3P$			
7062.40	CIV				
7065.19	HeI	$2p\,^3P_{1,2} - 3s\,^3S_1$	2.430+7	R	T87
7065.71	HeI	$2p\,^3P_0 - 3s\,^3S_1$	3.030+6	R	T87
7074.90	CI	$3p\,^3D_1 - 4d\,^3D_1$			
7076.50	CI	$3p\,^3D_2 - 4d\,^3D_2$			
7087.80	CI	$3p\,^3D_3 - 4d\,^3D_3$			
7099.8	[PbII]	$^2P - ^2P$			
7103.20	X				
7110.4	[KIV]	$3p^4\,^3P_0 - 3p^4\,^1D_2$	4.540-5	C	M83
7110.90	[CrIV]				
7111.50	CI	$3p\,^3D_1 - 4d\,^3F_2$			
7112.50	CII	$3p'\,^4D_{1/2} - 3d'\,^4F_{3/2}$			
7113.00	CII	$3p'\,^4D_{3/2} - 3d'\,^4F_{5/2}$			
7113.20	CI	$3p\,^3D_3 - 4d\,^3F_4$			
7113.40	SiII	$5p\,^2P_{1/2} - 7s\,^2S_{1/2}$			
7115.20	CI	$3p\,^3D_1 - 5s\,^3P_0$			
7115.20	CI	$3p\,^3D_2 - 4d\,^3F_3$			
7115.60	CII	$3p'\,^4D_{5/2} - 3d'\,^4F_{7/2}$			
7117.00	CI	$3p\,^3D_3 - 5s\,^3P_2$			
7119.70	CI	$3p\,^3D_2 - 5s\,^3P_1$			
7119.90	CII	$3p'\,^4D_{7/2} - 3d'\,^4F_{9/2}$			
7125.70	CII	$3p'\,^4D_{5/2} - 3d'\,^4F_{5/2}$			
7125.80	SiII	$5p\,^2P_{3/2} - 7s\,^2S_{1/2}$			
7135.80	[ArIII]	$3p^4\,^3P_2 - 3p^4\,^1D_2$	0.314+0	C	M83
7152.60	[CoIII]	$^4F - ^4P$			
7155.20	[FeII]				
7160.50	HeI	$3\,^1S - 10\,^3P$			
7160.63	X				
7170.50	[ArIV]	$3p^3\,^2D_{3/2} - 3p^3\,^2P_{3/2}$	0.789+0	C	M83
7172.00	[FeII]				
7177.52	HeII	5-11	3.590+5	R	R80

Table 2 (Continuation)

λ, Å	Ion	Transition	A, s^{-1}	Ex.M.	Ref
7184.00	[FeIV]	$^4D - ^4F$			
7191.60	[FeIV]	$^4D - ^4F$			
7206.60	CIV				
7210.50	CIII	$5p\,^3P_2 - 6d\,^3D_3$			
7212.30	CIII	$5p\,^3P_1 - 6d\,^3D_2$			
7213.50	CIV	$8s - 11p$			
7219.70	[CsIII]	$^2P - ^2P$			
7222.80	[FeIV]	$^4D - ^4F$			
7231.32	CII	$3p\,^2P_{1/2} - 3d\,^2D_{3/2}$	3.600+7	R	R80
7236.42	CII	$3p\,^2P_{3/2} - 3d\,^2D_{5/2}$	4.400+7	R	R80
7238.14	[ArIV]	$3p^3\,^2D_{5/2} - 3p^3\,^2P_{3/2}$	0.598+0	C	M
7254.40	OI	$3p\,^3P_2 - 5s\,^3S_1$			
7255.80	[NiII]				
7261.43	[ClIV]	$3p^2\,^3P_0 - 3p^2\,^1D_2$	1.560-5	C	KL80
7262.96	[ArIV]	$3p^3\,^2D_{3/2} - 3p^3\,^2P_{1/2}$	0.603+0	C	M83
7266.80	X				
7281.35	HeI	$2p\,^1P_1 - 3s\,^1S_0$	1.810+7	R	T87
7291.50	[CaII]				
7297.90	HeI	$3\,^1S - 9\,^3P$			
7307.00	OIII				
7307.70	[NiII]				
7318.63	[OII]	$2p^3\,^2D_{5/2} - 2p^3\,^2P_{1/2}$	0.615-1	C	M8
7319.43	[OII]	$2p^3\,^2D_{5/2} - 2p^3\,^2P_{3/2}$	0.117+0	C	M83
7329.90	[OII]	$2p^3\,^2D_{3/2} - 2p^3\,^2P_{1/2}$	0.102+0	C	M83
7330.70	[OII]	$2p^3\,^2D_{3/2} - 2p^3\,^2P_{3/2}$	0.614-1	C	M83
7332.15	[ArIV]	$3p^3\,^2D_{5/2} - 3p^3\,^2P_{1/2}$	0.119+0	C	M83
7345.20	X				
7354.20	X				
7363.40	CIV				
7365.20	OIII				
7368.00	[BrIV]				
7370.00	CII	$3p'\,^2D - 3d'\,^2P$			
7377.80	[NiII]				
7378.70	[ZrVII]	$^3P_2 - ^3P_1$			
7380.30	CIV	$6p - 7d$			
7382.40	CIV	$6p - 7d$			
7385.10	[BrIII]				
7388.20	[FeII]				
7391.30	[CrIV]				
7411.60	[NiII]				
7414.00	OIII				
7418.00	X				
7423.60	NI	$3s\,^4P_{1/2} - 3p\,^4S_{3/2}$			
7440.20	NV				
7442.30	NI	$3s\,^4P_{3/2} - 3p\,^4S_{3/2}$			
7452.50	[FeII]				

Table 2 (Continuation)

λ, Å	Ion	Transition	A, s^{-1}	Ex.M.	Ref
7455.30	OIII				
7461.80	CII	$5s\,^2S_{1/2} - 7p\,^2P_{3/2,1/2}$			
7462.30	SiIII	$4d\,^3D_1 - 5p\,^3P_1$			
7468.30	NI	$3s\,^4P_{5/2} - 3p\,^4S_{3/2}$			
7473.50	X				
7486.50	CIII	$5d\,^3D - 6f\,^3F$			
7499.70	HeI	$3\,^1S - 8\,^3P$			
7505.30	CII	$5p\,^2P_{3/2} - 3p'\,^2D_{5/2}$			
7507.60	X				
7510.50	X				
7516.00	OIII				
7519.90	CII	$2p^3\,^2P_{1/2} - 3p'\,^2P_{1/2}$			
7530.83	[ClIV]	$3p^2\,^3P_1 - 3p^2\,^1D_2$	0.723-1	C	KL80
7535.40	[XeIV]				
7574.10	X				
7578.20	CIII	$3d'\,^3F_2 - 5g\,^3G_3$			
7580.60	[CrV]				
7581.50	NIV	$6g\,^1G - 7h\,^1H$			
7582.40	NIV	$6g\,^3G - 7h\,^3H$			
7584.70	[MgI]				
7585.40	NV				
7592.00	OV	$7h\,^{3,1}H - 8i\,^{3,1}I$			
7592.30	CIII	$3d'\,^3F_3 - 5g\,^3G_4$			
7592.75	HeII	5-10	6.080+5	R	R80
7610.90	OV	$7i\,^{3,1}I - 8k\,^{3,1}K$			
7612.60	CIII	$3d'\,^3F_4 - 5g\,^3G_5$			
7618.50	NV	$7ghi - 8hik$			
7637.50	[FeII]				
7677.40	OIV	$6g\,^2G - 7h\,^2H$			
7686.80	NIII	$5d\,^2D - 6f\,^2F$			
7686.90	[FeII]				
7703.00	NIV	$6h\,^3H - 7i\,^3I$			
7706.70	CIV	$6d\,^2D - 7f\,^2F$			
7707.40	CIII	$3p'\,^1P_1 - 3d'\,^1D_2$			
7713.30	OIV	$6h\,^2H - 7i\,^2I$			
7718.80	SiIV	$6g\,^2G - 7h\,^2H$			
7719.50	X				
7722.50	X				
7723.80	SiIV	$6h\,^2H - 7i\,^2I$			
7724.7	[SI]	$3p^4\,^1D_2 - 3p^4\,^1S_0$	1.530+0	C	M83
7726.20	CIV	$6h\,^2H - 7i\,^2I$			
7731.50	X				
7733.20	[FeII]				
7736.00	CIV(8-11?)				
7736.50	OVI(8-9?)				
7741.50	[V IV]				
7746.50	X				

Table 2 (Continuation)

λ, Å	Ion	Transition	A, s^{-1}	Ex.M.	Ref
7751.43	[ArIII]	$3p^4\,^3P_1 - 3p^4\,^1D_2$	0.823-1	C	M83
7772.00	OI	$3s\,^5S_2 - 3p\,^5P_3$			
7774.20	OI	$3s\,^5S_2 - 3p\,^5P_2$			
7775.40	OI	$3s\,^5S_2 - 3p\,^5P_1$			
7777.61	X				
7809.00	X				
7811.60	HeI	$3\,^1S - 13\,^1P$			
7816.00	HeI	$3\,^1S - 7\,^3P$			
7820.70	OIII				
7832.50	OIII				
7839.30	OIII				
7848.30	OIII				
7854.90	X				
7857.30	[V IV]				
7860.80	CIV(9-14?)				
7873.70	OIII				
7876.00	[PII]	$3p^2\,^1D_2 - 3p^2\,^1S_0$		C	
7877.00	MgII	$4p\,^2P_{1/2} - 4d\,^2D_{3/2}$			
7880.80	HeI	$3\,^1S - 12\,^1P$			
7884.40	[CrV]				
7886.70	X				
7889.90	[NiIII]	$^3F - ^1D$			
7892.90	HeI	$3\,^3P - 37\,^3D$			
7895.70	HeI	$3\,^3P - 36\,^3D$			
7896.40	MgII	$4p\,^2P_{3/2} - 4d\,^2D_{5/2}$			
7898.70	HeI	$3\,^3P - 35\,^3D$			
7902.10	HeI	$3\,^3P - 34\,^3D$			
7905.80	HeI	$3\,^3P - 33\,^3D$			
7909.80	HeI	$3\,^3P - 32\,^3D$			
7913.00	X				
7914.10	HeI	$3\,^3P - 31\,^3D$			
7919.00	HeI	$3\,^3P - 30\,^3D$			
7924.40	HeI	$3\,^3P - 29\,^3D$			
7925.00	[FeIV]	$^4D - ^2F$			
7930.30	HeI	$3\,^3P - 28\,^3D$			
7933.30	[TeIII]				
7937.00	HeI	$3\,^3P - 27\,^3D$			
7944.40	HeI	$3\,^3P - 26\,^3D$			
7947.50	OI	$3s'\,^3D_3 - 3p'\,^3F_4$			
7948.10	CIV	$6d\,^2D - 7p\,^2P$			
7950.80	OI	$3s'\,^3D_2 - 3p'\,^3F_3$			
7952.20	OI	$3s'\,^3D_1 - 3p'\,^3F_2$			
7952.80	HeI	$3\,^3P - 25\,^3D$			
7961.40	[ZrVII]	$^3P_2 - ^3P_0$			
7962.30	HeI	$3\,^3P - 24\,^3D$			
7963.50	OIII				
7971.50	HeI	$3\,^1S - 11\,^1P$			
7973.00	HeI	$3\,^3P - 23\,^3D$			

Table 2 (Continuation)

λ, Å	Ion	Transition	A, s^{-1}	Ex.M.	Ref
7985.30	HeI	$3\,^3P - 22\,^3D$			
7992.50	X				
7997.80	[AsII]				
7998.00	[FeII]				
7999.40	HeI	$3\,^3P - 21\,^3D$			
8000.10	[CrII]				
8015.00	CII	$4s'\,^2D_{3/2} - 5p\,^2P_{1/2}$			
8015.80	HeI	$3\,^3P - 20\,^3D$			
8018.60	CI	$3p\,^3P_0 - 4d\,^3D_1$			
8019.10	NIII				
8021.10	CIII	$5d\,^1D_2 - 6f\,^1F_3$			
8021.30	CI	$3p\,^3P_2 - 4d\,^3D_3$			
8023.60	[YV]	$^2P - ^2P$			
8025.50	X				
8035.00	HeI	$3\,^3P - 19\,^3D$			
8036.76	[ArIII]	$3p^4\,^3P_0 - 3p^4\,^1D_2$	2.210-5	C	M83
8040.20	X				
8046.27	[ClIV]	$3p^2\,^3P_2 - 3p^2\,^1D_2$	0.179+0	C	KL80
8049.60	[TeII]				
8051.50	OIII				
8057.30	HeI	$3\,^3P - 18\,^3D$			
8060.10	OIII	$5f\,G - 6g\,H$			
8062.50	OIII				
8070.20	OIII				
8076.80	OIII	$5f\,G - 6g\,H$			
8084.20	HeI	$3\,^3P - 17\,^3D$			
8084.20	OIII				
8094.00	HeI	$3\,^1S - 10\,^1P$			
8102.80	SiIII	$5g\,^{3,1}G_{3,4} - 6h\,^{3,1}H$			
8103.50	SiIII	$5g\,^{3,1}G_5 - 6h\,^{3,1}H$			
8116.30	HeI	$3\,^3P - 16\,^3D$			
8125.14	X				
8125.30	[CrII]				
8127.50	OIII	$5f\,G - 6g\,H$			
8137.20	[FeV]	$^3H - ^1I$			
8140.10	X				
8142.40	[BrIII]				
8145.70	OIII	$5f\,D - 6g\,F$			
8152.30	OIII	$5f\,D - 6g\,F$			
8155.70	HeI	$3\,^3P - 15\,^3D$			
8159.60	NIV	$6p\,^1P - 7s\,^1S$			
8160.20	X				
8168.00	OIII	$5f\,G - 6g\,H$			
8177.50	X				
8184.90	NI	$3s\,^4P_{3/2} - 3p\,^4P_{5/2}$			
8188.00	NI	$3s\,^4P_{1/2} - 3p\,^4P_{3/2}$			
8189.10:	CIII	$5g'\,^3H - 6h'\,^3I$			

Table 2 (Continuation)

λ, Å	Ion	Transition	A, s^{-1}	Ex.M.	Ref
8196.48	CIII	$5g\ ^{1,3}G - 6h\ ^{1,3}H$	1.380+8	R	Kh81
8204.04	X				
8200.40	NI	$3s\,^4P_{1/2} - 3p\,^4P_{1/2}$			
8203.90	HeI	$3\,^3P - 14\,^3D$			
8210.60	[CsVI]	$^3P_2 -^3 P_0$			
8210.70	NI	$3s\,^4P_{3/2} - 3p\,^4P_{3/2}$			
8216.30	NI	$3s\,^4P_{5/2} - 3p\,^4P_{5/2}$			
8223.10	NI	$3s\,^4P_{3/2} - 3p\,^4P_{1/2}$			
8226.20:	CIII	$5f'\,^3G - 6g'\,^3H$			
8227.60	OIII	$5g\,H - 6h\,I$			
8229.70	[CrII]				
8236.78	HeII	5-9	1.100+6	R	R80
8238.50	OIII	$5g\,G - 6h\,H$			
8242.10	HI(P_{44})	$3d\ ^2D - 44f\ ^2F$			
8242.40	NI	$3s\,^4P_{5/2} - 3p\,^4P_{3/2}$			
8243.10	[KrV]				
8244.10	OIII	$5g\,G - 6h\,H$			
8245.70	HI(P_{42})	$3d\ ^2D - 42f\ ^2F$			
8247.80	HI(P_{41})	$3d\ ^2D - 41f\ ^2F$			
8249.90	HI(P_{40})	$3d\ ^2D - 40f\ ^2F$			
8250.80	OIII	$5g\,F - 6h\,G$			
8252.40	HI(P_{39})	$3d\ ^2D - 39f\ ^2F$			
8255.00	HI(P_{38})	$3d\ ^2D - 38f\ ^2F$			
8257.80	HI(P_{37})	$3d\ ^2D - 37f\ ^2F$			
8260.90	HI(P_{36})	$3d\ ^2D - 36f\ ^2F$			
8264.30	HI(P_{35})	$3d\ ^2D - 35f\ ^2F$			
8264.40	HeI	$3\,^3P - 13\,^3D$			
8267.90	HI(P_{34})	$3d\ ^2D - 34f\ ^2F$			
8268.80	OIII	$5g\,H - 6h\,I$			
8271.90	HI(P_{33})	$3d\ ^2D - 33f\ ^2F$			
8276.30	HI(P_{32})	$3d\ ^2D - 32f\ ^2F$			
8281.10	HI(P_{31})	$3d\ ^2D - 31f\ ^2F$			
8286.40	HI(P_{30})	$3d\ ^2D - 30f\ ^2F$			
8286.70	OIII	$5g\,F - 6h\,G$			
8292.30	HI(P_{29})	$3d\ ^2D - 29f\ ^2F$			
8298.80	HI(P_{28})	$3d\ ^2D - 28f\ ^2F$			
8306.10	HI(P_{27})	$3d\ ^2D - 27f\ ^2F$			
8314.30	HI(P_{26})	$3d\ ^2D - 26f\ ^2F$			
8315.10:	CIII	$5g'\,^3F - 6h'\,^3G$			
8319.90	HeII	6-50			
8323.40	HI(P_{25})	$3d\ ^2D - 25f\ ^2F$			
8325.00	HeII	6-49			
8330.20	HeII	6-48			
8333.00	CIII	$4d\,^3D_3 - 3d\,^3F_4$			

Table 2 (Continuation)

λ, Å	Ion	Transition	A, s^{-1}	Ex.M.	Ref
8333.80	HI(P_{24})	$3d\ ^2D - 24f\ ^2F$			
8336.00	HeII	6-47			
8338.25	X				
8341.60	CIII	$4d\,^3D_2 - 3d\,^3F_3$			
8342.10	HeII	6-46			
8342.20	HeI	$3\,^3P - 12\,^3D$			
8342.70	[FeV]	$^3H - ^1I$			
8345.60	HI(P_{23})	$3d\ ^2D - 23f\ ^2F$			
8347.6	[FeI]	$4s^2\,^5D_4 - 4s\,^3F_4$		C	
8347.90	CIII	$4d\,^3D_1 - 3d\,^3F_2$			
8348.60	HeII	6-45			
8352.70	X				
8355.50	HeII	6-44			
8357.90	CIII	$4d\,^3D_3 - 3d\,^3F_3$			
8358.70	CIII	$4d\,^3D_2 - 3d\,^3F_2$			
8359.00	HI(P_{22})	$3d\ ^2D - 22f\ ^2F$			
8361.60	HeI	$3\,^1S - 6\,^3P$			
8363.00	HeII	6-43			
8369.30	HeI	$3\,^3P - 12\,^3S$			
8371.00	HeII	6-42			
8374.50	HI(P_{21})	$3d\ ^2D - 21f\ ^2F$			
8376.40	HeI	$3\,^3D - 20\,^3F$			
8377.70	HeI	$3\,^3D - 20\,^3P$			
8378.80	HeI	$3\,^1D - 20\,^1F$			
8379.60	HeII	6-41			
8387.20	X				
8388.90	HeII	6-40			
8392.40	HI(P_{20})	$3d\ ^2D - 20f\ ^2F$			
8397.30	HeI	$3\,^3D - 19\,^3F$			
8397.40	X				
8398.80	HeI	$3\,^3D - 19\,^3P$			
8398.90	HeII	6-39			
8399.70	HeI	$3\,^1D - 19\,^1F$			
8405.80	X				
8409.80	HeII	6-38			
8413.30	HI(P_{19})	$3d\ ^2D - 19f\ ^2F$			
8421.60	HeII	6-37			
8421.80	HeI	$3\,^3D - 18\,^3F$			
8423.70	HeI	$3\,^3D - 18\,^3P$			
8424.30	HeI	$3\,^1D - 18\,^1F$			
8429.30	X				
8433.94	[CIII]	$3p^3\,^2D_{3/2} - 3p^3\,^2P_{3/2}$	0.323+0	C	M83
8434.40	HeII	6-36			
8438.00	HI(P_{18})	$3d\ ^2D - 18f\ ^2F$			
8444.31	X				
8444.40	HeI	$3\,^3P - 11\,^3D$			
8446.40	OI	$3s\,^3S_1 - 3p\,^3P_2$			
8448.40	HeII	6-35			
8451.00	HeI	$3\,^3D - 17\,^3F$			

Table 2 (Continuation)

λ, Å	Ion	Transition	A, s^{-1}	Ex.M.	Ref
8451.55	SI	$4p\,^3P_0 - 6s\,^3S_1$			
8453.20	HeI	$3\,^3D - 17\,^3P$			
8453.50	HeI	$3\,^1D - 17\,^1F$			
8457.30	[VIII]				
8459.20	X				
8463.70	HeII	6-34			
8467.30	HI(P_{17})	$3d\ ^2D - 17f\ ^2F$			
8469.46	X				
8480.50	HeII	6-33			
8480.60	HeI	$3\,^3P - 11\,^3S$			
8481.16	[ClIII]	$3p^3\,^2D_{5/2} - 3p^3\,^2P_{3/2}$	0.316+0	C	M83
8486.20	HeI	$3\,^3D - 16\,^3F$			
8488.60	HeI	$3\,^1D - 16\,^1F$			
8488.80	HeI	$3\,^3D - 16\,^3P$			
8495.00	X				
8498.00	CaII	$3d\,^2D_{3/2} - 4p\,^2P_{3/2}$	8498.90	HeII	6-32
8500.20	[ClIII]	$3p^3\,^2D_{3/2} - 3p^3\,^2P_{1/2}$	0.303+0	C	M83
8502.48	HI(P_{16})	$3d\ ^2D - 16f\ ^2F$	4.650+3	R	Gr90
8517.90	HeI	$3\,^1S - 8\,^1P$			
8519.30	HeII	6-31			
8528.80	HeI	$3\,^1P - 17\,^1D$			
8528.90	HeI	$3\,^3D - 15\,^3F$			
8531.40	HeI	$3\,^1D - 15\,^1F$			
8532.10	HeI	$3\,^3D - 15\,^3P$			
8533.40	HeI	$3\,^1P - 17\,^1S$			
8536.50	[I III]				
8541.80	HeII	6-30			
8542.10	CaII	$3d\,^2D_{5/2} - 4p\,^2P_{3/2}$			
8545.38	HI(P_{15})	$3d\ ^2D - 15f\ ^2F$	6.450+3	R	Gr90
8547.86	X				
8548.17	[ClIII]	$3p^3\,^2D_{5/2} - 3p^3\,^2P_{1/2}$	0.100+0	C	M83
8564.40	HeI	$3\,^1P - 16\,^1D$			
8566.90	HeII	6-29			
8570.10	HeI	$3\,^1P - 16\,^1S$			
8578.50	[FeV]	$^3H - ^1G$			
8578.70	[Cl II]	$3p^4\,^3P_2 - 3p^4\,^1D_2$	0.104+0	C	M83
8581.70	HeI	$3\,^3D - 14\,^3F$			
8582.50	HeI	$3\,^3P - 10\,^3D$			
8582.54	[Cl III]				
8584.30	HeI	$3\,^1D - 14\,^1F$			
8585.80	HeI	$3\,^3D - 14\,^3P$			
8594.80	HeII	6-28			
8598.39	HI(P_{14})	$3d\ ^2D - 14f\ ^2F$	9.160+3	R	Gr90
8605.00	X				
8608.20	HeI	$3\,^1P - 15\,^1D$			
8614.90	HeI	$3\,^1P - 15\,^1S$			
8615.90	[VIII]				
8616.90	[FeII]				

Table 2 (Continuation)

λ, Å	Ion	Transition	A, s^{-1}	Ex.M.	Ref
8626.10	HeII	6-27			
8629.00	X				
8632.60	HeI	$3\,^3P - 10\,^3S$			
8633.50	X				
8648.10	HeI	$3\,^3D - 13\,^3F$			
8650.70	HeI	$3\,^1D - 13\,^1F$			
8652.60	CIII	$5d\,^3D_3 - 6p\,^3P_2$			
8653.30	HeI	$3\,^3D - 13\,^3P$			
8661.40	HeII	6-26			
8662.00	HeI	$3\,^1P - 14\,^1D$			
8662.10	CaII	$3d\,^2D_{3/2} - 4p\,^2P_{1/2}$			
8663.65	CIII	$5f\ ^3F_3 - 6g\ ^3G_4$		R	
8665.02	HI(P_{13})	$3d\ ^2D - 13f\ ^2F$	1.340+4	R	Gr90
8665.22	CIII	$5f\ ^3F_4 - 6g\ ^3G_5$		R	
8670.40	HeI	$3\,^1P - 14\,^1S$			
8680.30	NI	$3s\,tP_{5/2} - 3p\,^4D_{7/2}$			
8682.80	[VIII]				
8683.40	NI	$3s\,tP_{3/2} - 3p\,^4D_{5/2}$			
8686.16	NI	$3s\,tP_{1/2} - 3p\,^4D_{3/2}$			
8694.83	X				
8701.30	HeII	6-25			
8703.25	NI	$3s\,tP_{1/2} - 3p\,^4D_{1/2}$			
8706.60	CIV				
8707.00	X				
8711.71	NI	$3s\,tP_{3/2} - 3p\,^4D_{3/2}$			
8718.84	NI	$3s\,tP_{5/2} - 3p\,^4D_{5/2}$			
8727.13	[CI]	$2p^2\,^1D_2 - 2p^2\,^1S_0$	0.528+0	C	M83
8729.70	HeI	$3\,^1P - 13\,^1D$			
8733.30	HeI	$3\,^3D - 12\,^3F$			
8735.90	HeI	$3\,^1D - 12\,^1F$			
8739.90	HeI	$3\,^3D - 12\,^3P$			
8740.40	HeI	$3\,^1P - 13\,^1S$			
8746.80	HeII	6-24			
8750.47	HI(P_{12})	$3d\ ^2D - 12f\ ^2F$	2.010+4	R	Gr90
8761.10	X				
8767.30	X				
8776.60	HeI	$3\,^3P - 9\,^3D$			
8787.60	[PI]				
8791.30	X				
8793.80	CII	$3p\,^2D_{5/2} - 3d\,^2F_{7/2}$			
8798.90	HeII	6-23			
8799.90	CII	$3p\,^2D_{3/2} - 3d\,^2F_{5/2}$			
8800.10	[FeV]	$^3H\ -^1G$			
8806.76	MgI	$3p\,^1P_0 - 3d\,^1D_2$			
8816.50	HeI	$3\,^1P - 12\,^1D$			
8829.00	OIV	$3p'''\,^2P - 5p'\,^2D$			

Table 2 (Continuation)

λ, Å	Ion	Transition	A, s^{-1}	Ex.M.	Ref
8829.70	[SIII]				
8830.40	HeI	$3\,^1P - 12\,^1S$			
8831.5	[SIII]	$3p^2\,^3P_0 - 3p^2\,^1D_2$	5.820-6	C	M83
8845.20	HeI	$3\,^3D - 11\,^3F$			
8847.90	HeI	$3\,^1D - 11\,^1F$			
8849.00	HeI	$3\,^3P - 9\,^3S$			
8854.10	HeI	$3\,^3D - 11\,^3P$			
8854.20	[SeIII]				
8857.40	CIV				
8859.10	HeII	6-22			
8862.78	HI(P_{11})	$3d\ ^2D - 11f\ ^2F$	3.140+4	R	Gr90
8873.70	X				
8877.20	X				
8885.40	X				
8891.90	[FeII]				
8898.60	X				
8914.60	HeI	$3\,^1S - 7\,^1P$			
8920.00	X				
8923.57	MgI	$4s\,^1S_0 - 5p\,^1P_1$			
8925.70	NV				
8929.00	HeII	6-21			
8929.20	NV				
8930.60	HeI	$3\,^1P - 11\,^1D$			
8933.20	X				
8986.50	X				
8992.60	X				
8996.80	HeI	$3\,^3D - 10\,^3F$			
8999.60	HeI	$3\,^1D - 10\,^1F$			
9004.80	X				
9009.00	HeI	$3\,^3D - 10\,^3P$			
9011.20	HeII	6-20			
9014.91	HI(P_{10})	$3d\ ^2D - 10f\ ^2F$	5.130+4	R	Gr90
9021.70	X				
9024.30	X				
9028.92	NI	$3p\,^2S_{1/2} - 3d\,^2P_{1/2}$			
9033.50	[FeII]				
9051.90	[FeII]				
9063.29	X				
9068.90	[S III]	$3p^2\,^3P_1 - 3p^2\,^1D_2$	0.221-1	C,Ch	KL80
9078.28	CI	$3s\,^3P_1 - 3p\,^3P_1$			
9079.90	X				
9085.30	HeI	$3\,^1P - 10\,^1D$			
9088.51	CI	$3s\,^3P_1 - 3p\,^3P_0$			
9094.83	CI	$3s\,^3P_2 - 3p\,^3P_2$			
9103.80	X				
9108.50	HeII	6-19			
9110.90	HeI	$3\,^1P - 10\,^1S$			
9111.8	CI	$3s\,^3P_2 - 3p\,^3P_1$			
9114.10	X				

Table 2 (Continuation)

λ, Å	Ion	Transition	A, s^{-1}	Ex.M.	Ref
9116.10	OIII	$4p\,^3D - 4d\,^3F$			
9123.60	[Cl II]				
9125.8	[CIII]	$3p^4\,^3P_1 - 3p^4\,^1D_2$	0.292-1	C	M83
9133.30	OIII	$4p\,^3D - 4d\,^3F$			
9165.10	NIV				
9174.20	OIII	$4p\,^3D - 4d\,^3F$			
9174.40	HeI	$3\,^3P - 8\,^3S$			
9182.20	NIV				
9210.20	HeI	$3\,^3D - 9\,^3F$			
9213.10	HeI	$3\,^1D - 9\,^1F$			
9214.83	X				
9218.25	MgII	$4s\,^2S_{1/2} - 4p\,^2P_{3/2}$			
9223.00	NIV				
9225.20	HeII	6-18			
9227.70	HeI	$3\,^3D - 9\,^3P$			
9229.02	HI(P_9)	$3d\,^2D - 9f\,^2F$	8.850+4	R	Gr90
9229.50	CII				
9231.10	CII				
9236.80	CII				
9244.27	MgII	$4s\,^2S_{1/2} - 4p\,^2P_{1/2}$			
9260.93	OI	$3p\,^5P_1 - 3d\,^5D_2$			
9262.77	OI	$3p\,^5P_2 - 3d\,^5D_3$			
9266.00	OI	$3p\,^5P_3 - 3d\,^5D_4$			
9267.50	[FeII]				
9303.00	HeI	$3\,^1P - 9\,^1D$			
9318.80	X				
9344.94	HeII	5-8	2.210+6	R	R80
9354.00	X				
9358.37	CIII	$4s\,^1S_0 - 4p\,^1P_1$			
9367.00	HeII	6-17			
9381.00	X				
9381.8	[CIII]	$3p^4\,^3P_0 - 3p^4\,^1D_2$	9.820-6	C	M83
9386.80	NI	$3s\,^2P_{1/2} - 3p\,^2D_{3/2}$			
9401.30	[V IV]				
9404.30	X				
9405.73	CI	$3s\,^1P_1 - 3p\,^1D_2$			
9412.0	NIII	$4s\,^2S_{1/2} - 4p\,^2P_{3/2}$		R	
9426.40	X				
9448.52	[BrIV]				
9460.40	X				
9463.40	HeI	$3\,^1S - 5\,^3P$			
9479.70	X				
9493.00	X				
9499.50	X				
9516.50	HeI	$3\,^3P - 7\,^3D$			
9526.00	HeI	$3\,^3D - 8\,^3F$			
9529.10	HeI	$3\,^1D - 8\,^1F$			
9531.00	[S III]	$3p^2\,^3P_2 - 3p^2\,^1D_2$	0.576-1	C	KL80
9542.00	HeII	6-16			
9545.97	HI(P_8)	$3d\,^2D - 8f\,^2F$	1.640+5	R	Gr90

Table 2 (Continuation)

λ, Å	Ion	Transition	A, s^{-1}	Ex.M.	Ref
9552.80	HeI	$3\,^3D - 8\,^3P$			
9572.30	X				
9625.60	HeI	$3\,^1P - 8\,^1D$			
9701.10	CIII	$3p\,^3P_0 - 3d\,^3D_1$			
9702.50	HeI	$3\,^3P - 7\,^3S$			
9705.30	[TiIII]				
9705.39	CIII	$3p\,^3P_1 - 3d\,^3D_2$			
9706.44	CIII	$3p\,^3P_1 - 3d\,^3D_1$			
9715.11	CIII	$3p\,^3P_2 - 3d\,^3D_3$		R	
9717.73	CIII	$3p\,^3P_2 - 3d\,^3D_2$		R	
9719.50	X				
9762.10	HeII	6-15			
9808.32	[CI]	$2p^2\,^3P_0 - 2p^2\,^1D_2$	7.770-8	C	M83
9824.13	[CI]	$2p^2\,^3P_1 - 2p^2\,^1D_2$	8.210-5	C	M83
9850.26	[CI]	$2p^2\,^3P_2 - 2p^2\,^1D_2$	2.440-4	C	M83
9902.70	[KrIII]	$4p^4\,^3P_1 - 4p^4\,^1D_2$			
9903.50	CII				
9942.50	X				
9980.20	X				
9982.40	OII	$4fG - 5g$			
9988.50	OII	$4fG - 5g$			
9990.30	OII	$4fD - 5g$			
10008.9	OII	$4fG - 5g$			
10010.9	OII	$4fG - 5g$			
10017.7	X				
10023.0	HeI	$3\,^1D - 7\,^1P$			
10023.3	NII	$4f' - 5g'$			
10027.73	HeI	$3\,^3D - 7\,^3F$			
10031.16	HeI	$3\,^1D - 7\,^1F$			
10035.4	NII	$4f' - 5g'$			
10045.2	HeII	6-14			
10049.38	HI-P$_\delta$	$3d\,^2D - 7f\,^2F$	3.360+5	R	S77
10065.1	NII	$4f' - 5g'$			
10070.1	NII	$4f' - 5g'$			
10071.9	HeI	$3\,^3D - 7\,^3P$			
10092.16	MgII	$4f\,^2F - 5g\,^2G$			
10108.1	NII				
10108.89	NI	$3p\,^4D_{3/2} - 3d\,^4F_{5/2}$			
10110.4	OII	$4fF - 5g$			
10112.48	NI	$3p\,^4D_{5/2} - 3d\,^4F_{7/2}$			
10114.64	NI	$3p\,^4D_{7/2} - 3d\,^4F_{9/2}$			
10123.61	HeII	4-5	4.320+7	R	R80
10138.3	HeI	$3\,^1P - 7\,^1D$			
10167.9	CIII	$5f^1 - 6g^1$			
10172.2	X				
10203.4	X				
10206.5	[XeIII]	$5p^4\,^3P_2 - 5p^4\,^3P_1$			

Table 2 (Continuation)

λ, Å	Ion	Transition	A, s^{-1}	Ex.M.	Ref
10232.9	HeI	$3\,^1P - 7\,^1S$			
10276.9	[SrIV]	$^2P - ^2P$			
10287.1	[SII]	$3p^3\,^2D_{3/2} - 3p^3\,^2P_{3/2}$	0.133+0	C	M83
10311.1	HeI	$3\,^3P - 6\,^3D$			
10320.6	[SII]	$3p^3\,^2D_{5/2} - 3p^3\,^2P_{3/2}$	0.179+0	C	M
10338.8	[SII]	$3p^3\,^2D_{3/2} - 3p^3\,^2P_{1/2}$	0.163+0	C	M83
10363.7	X				
10364.8	CII				
10371.27	SiI	$4s\,^3P_1 - 4p\,^3S_1$		R	
10372.6	[SII]	$3p^3\,^2D_{5/2} - 3p^3\,^2P_{1/2}$	0.779-1	C	M83
10397.74	[NI]	$2p^3\,^2D_{5/2} - 2p^3\,^2P_{3/2}$	0.614-1	C	M83
10398.16	[NI]	$2p^3\,^2D_{5/2} - 2p^3\,^2P_{1/2}$	0.345-1	C	M83
10407.17	[NI]	$2p^3\,^2D_{3/2} - 2p^3\,^2P_{3/2}$	0.276-1	C	M83
10407.59	[NI]	$2p^3\,^2D_{3/2} - 2p^3\,^2P_{1/2}$	0.529-1	C	M83
10419.7	HeII	6-13			
10603.43	SiI	$4s\,^3P_1 - 4p\,^3P_2$		R	
10627.65	SiI	$4p\,^1P_1 - 4d^3\,^3P_2$		R	
10689.72	SiI	$4p\,^3D_1 - 4d\,^3F_2$		R	
10691.25	CI	$3s\,^3P_2 - 3p\,^3D_3$		R	
10819.8	[SI]	$3p^4\,^3P_2 - 3p^4\,^1D_2$	0.278-1	C	M83
10829.09	HeI	$2s\,^3S_1 - 2p\,^3P_0$	1.020+7	R	T87
10830.25	HeI	$2s\,^3S_1 - 2p\,^3P_1$	1.020+7	R	T87
10830.34	HeI	$2s\,^3S_1 - 2p\,^3P_2$	1.020+7	R	T87
10938.10	HI-P_γ	$3d\,^2D - 6f\,^2F$	7.780+5	R	S77
10994.0	[SiI]	$3p^2\,^1D_2 - 3p^2\,^1S_0$	1.140+0	C	M83
11305.8	[SI]	$3p^4\,^3P_1 - 3p^4\,^1D_2$	8.160-3	C	M83
11540.1	[SI]	$3p^4\,^3P_0 - 3p^4\,^1D_2$	3.840-6	C	M83
11626.42	HeII	5-7	5.180+6	R	R80
12818.08	HI-P_β	$3d\,^2D - 5f\,^2F$	2.200+6	R	S77
18636.78	HeII	5-6	1.630+7	R	R80
18751.02	HI-P_α	$3d\,^2D - 4f\,^2F$	8.990+6	R	S77
20581.30	HeI	$2s\,^1S_0 - 2p\,^1P_1$	1.970+6	R	T87
4.49μm	[MgIV]	$2p^5\,^2P_{3/2} - 2p^5\,^2P_{1/2}$	0.199+0	C	M83
5.34	[FeII]	$^6D_{9/2} - ^4F_{9/2}$	4.170-5	C	NS88
5.61	[MgV]	$2p^4\,^3P_2 - 2p^4\,^3P_1$	0.127+0	C	M83
6.62	[NiII]	$^2P_{1/2} - ^2P_{3/2}$		C	
6.98	[ArII]	$3p^5\,^2P_{1/2} - 3p^5\,^2P_{3/2}$	5.270-2	C	M83
7.90	[ArV]	$3p^2\,^3P_2 - 3p^2\,^3P_1$	0.272-1	C	KL80
8.99	[ArIII]	$3p^4\,^3P_1 - 3p^4\,^3P_2$	0.308-1	C	M83
10.52	[SIV]	$3p\,^2P_{3/2} - 3p\,^2P_{1/2}$	7.730-3	C	M83
11.76	[ClIV]	$3p^2\,^3P_1 - 3p^2\,^3P_2$	8.250-3	C	KL80
12.8	[NeII]	$2p^5\,^2P_{1/2} - 2p^5\,^2P_{3/2}$	8.550-3	C	M83

Table 2 (Continuation)

λ, Å	Ion	Transition	A, s^{-1}	Ex.M.	Ref
13.10	[ArV]	$3p^2\,^3P_1 - 3p^2\,^3P_0$	7.990-3	C	KL80
13.5	[MgV]	$2p^4\,^3P_1 - 2p^4\,^3P_0$	0.217-1	C	M83
14.3	[NeV]	$2p^2\,^3P_2 - 2p^2\,^3P_1$	4.590-3	C	M83
15.6	[NeIII]	$2p^4\,^3P_1 - 2p^4\,^3P_2$	5.970-3	C	M83
18.7	[SIII]	$3p^2\,^3P_2 - 3p^2\,^3P_1$	2.070-3	C	KL80
20.30	[ClIV]	$3p^2\,^3P_0 - 3p^2\,^3P_1$	2.160-3	C	KL80
21.83	[ArIII]	$3p^4\,^3P_0 - 3p^4\,^3P_1$	5.170-3	C	M83
22.9	[FeIII]	$^5D_3 - ^5D_4$		C	
24.3	[NeV]	$2p^2\,^3P_1 - 2p^2\,^3P_0$	1.280-3	C	M83
25.91	[OIV]	$2p\,^2P_{3/2} - 2p\,^2P_{1/2}$	5.200-4	C	M83
25.98	[FeII]	$4s(^6D_{7/2} - ^6D_{9/2})$	2.130-3	C	NS88
32.59	[OIII]	$2p^2\,^3P_0 - 2p^2\,^3P_2$	3.020-11	C	M83
33.0	[FeIII]	$a^5D_3 - a^5D_2$		C	
33.5	[SIII]	$3p^2\,^3P_1 - 3p^2\,^3P_0$	4.720-4	C	KL80
34.81	[SiII]	$3p\,^2P_{1/2} - 3p\,^2P_{3/2}$	2.170-4	C	M83
35.3	[FeII]	$3d^64s(^6D_{5/2} - ^6D_{7/2})$		C	
36.1	[NeIII]	$2p^4\,^3P_0 - 2p^4\,^3P_1$	1.150-3	C	M83
36.33	[FeV]	$a^5D_1 - a^5D_2$		C	
51.69	[OIII]	$2p^2\,^3P_2 - 2p^2\,^3P_1$	9.760-5	C	M83
57.3	[NIII]	$2p\,^3P_{3/2} - 2p\,^3P_{1/2}$	4.770-5	C	M83
63.17	[OI]	$2p^4\,^3P_1 - 2p^4\,^3P_2$	8.920-5	C	M83
70.35	[FeV]	$a^5D_0 - a^5D_1$		C	
88.16	[OIII]	$2p^2\,^3P_1 - 2p^2\,^3P_0$	2.620-5	C	M83
121.8	[NII]	$2p^2\,^3P_1 - 2p^2\,^3P_2$	7.460-6	C	M83
145.48	[OI]	$2p^4\,^3P_0 - 2p^4\,^3P_1$	1.740-5	C	M83
157.6	[CII]	$2p\,^2P_{3/2} - 2p\,^2P_{1/2}$	2.290-6	C	M83
205.3	[NII]	$2p^2\,^3P_0 - 2p^2\,^3P_1$	2.080-6	C	M83
370.3	[CI]	$2p^2\,^3P_1 - 2p^2\,^3P_2$	2.650-7	C	M83
609.6	[CI]	$2p^2\,^3P_0 - 2p^2\,^3P_1$	7.930-8	C	M83

References
B85 – Bogdanovich et al. (1985) E84 – Egikyan (1984)
G67 – Garstang (1967) Gr90 – Gruzdev (1990)
KL80 – Kafatos & Lynch (1980)
Kh81, Kh93 – Kholtygin (1981, 1993)
M83 – Mendoza (1983) M91 – Morton (1991)
NS84, NS88 – Nussbaumer & Storey (1984, 1988)
R80 – Reader et al. (1980) S77 – Sobelman (1977) T87 – Theodosiou (1987)

5 Conclusion

A list of more than thousand lines observed in the spectra of gaseous nebulae in the UV, optical and IR spectral regions are compiled. Transition probabilities for most of these lines are given. Main mechanisms populating the upper state of transition are presented.

Acknowledgement. *We are grateful to Estonian Science Foundation for partial support by grant.*

References

Aller, L.H., 1984, Physics of the Thermal Gaseous Nebulae, Reidel, N.Y.

Aller, L.H. and Czyzak, S.J., 1979, Ap&SS 62, 397.
Aller, L.H. and Czyzak, S.J., 1983, ApJS 51, 211.
Aller, L.H. and Hyung, S., 1995, MNRAS 276, 1101.
Aller, L.H. and Keyes, C.D., 1987, ApJS 65, 392.
Bogdanovich, P.O., Lukoshyavichus, R., Nikitin, A.A., Rudzikas, Z. , Kholtygin, A.F., 1985, Astrofizika, 22, 551.
Egikyan, A.G., 1984, Astrofizika, 20, 341.
Garstang, R.H., 1967. Planetary Nebulae IAU No 34, 143.
Golovatyj, V.V., Sapar, A.A., Feklistova, T.Kh. and Kholtygin, A.F., 1991, Atomic Data for Spectroscopy of Rarefied Astrophysical Plasma. Gaseous Nebulae, Estonian Academy of Sciences, Tallinn.
Gruzdev, P.F., 1990, Transitions probabilities and mean lives of atomic and ions levels, Energoatomizdat Publ. House, Moscow.
Hyung, S., Aller, L.H. and Feibelman, W.A., 1994, A&AS 93, 465.
Hyung, S. and Aller, L.H., 1996, MNRAS 278, 551.
Kafatos, M. and Lynch, J.P., 1980, ApJS 42, 611.
Kaler, J.B., 1976, ApJS 31, 517.
Kholtygin, A.F., 1981, Thesis, Leningrad.
Kholtygin, A.F., 1990, HII regions, Itogi nauki i tehniki 40, 85.
Kholtygin, A.F., 1993, Unpublished results.
Kholtygin, A.F., Feklistova T., Sapar A., Golovatyj V.V., 1996, Catalogue of atomic data for the low-density plasma of gaseous nebulae, Astron.Astroph. Transactions, in press
Liu, X.-W., Storey, P.J., Barlow, M.J. and Clegg, R.E.S., 1995, MNRAS 272, 369.
Mendoza, C., 1983, Planetary Nebulae. IAU Symp. No 103, Reidel, Dordrecht, 143.
Moore, Ch.E., 1949, Atomic Energy Levels. NBS 467.
Moore, Ch.E., 1970, Selected Tables of Atomic Spectra. NSRDS-NBS 3, Section 3.
Moore, Ch.E., 1971, Selected Tables of Atomic Spectra. NSRDS-NBS 3, Section 4.
Moore, Ch.E., 1975, Selected Tables of Atomic Spectra. NSRDS-NBS 3, Section 5.
Morton, D.C., 1991, ApJS 77, 119.
Nikitin, A.A., Kholtygin, A.F., Sapar, A. and Feklistova, T.,1994, Baltic Astronomy ,3, 112.
Nikitin, A.A., Rudzikas, Z.B., Sapar, A.A., Feklistova, T.Kh., Kholtygin, A.F., 1988, Spectra of the Planetary Nebulae, Valgus Publ. House, Tallinn.
Nussbaumer, H. and Storey, P.J., 1983, A&A 126, 75.
Nussbaumer, H. and Storey, P.J., 1984, A&AS 56, 293.
Nussbaumer, H. and Storey, P.J., 1986, A&AS 64, 545.
Nussbaumer, H. and Storey, P.J., 1987, A&AS 69, 123.
Nussbaumer, H. and Storey, P.J., 1988, A&A 193, 327.
Pequignot, D., Petitjean, D. and Boisson, C., 1991, A&A 251, 680.
Pequignot, D. and Baluteau, J.-P., 1994, A&A 283, 593.
Reader, J., Corliss, C.H., Wiese, W.L. and Martin, G.A., 1980, Wawelengths and Transition Probabilities for Atoms and Atomic Ions, NSRDS-NBS 68.
Rudzikas, Z.B., Nikitin, A.A. and Kholtygin, A.F., 1990, Theoretical Atomic Spectroscopy for Astronomers and Physicists, St. Petersburg University Press, St. Petersburg.
Sobelman, I.I., 1977, Introduction in the Theory of Atomic Spectra, Nauka Publ. House, Moscow.
Striganov, A.R. and Odintsova, G.A., 1982, The Tables of the Atom and Ion Spectral Lines, Energoatomizdat Publ. House, Moscow.
Theodosiou, C.E., 1987, Atom. Data. Nucl. Data Tables 36, 97.
Verner D.A., Barthel P.D., Tytler D. 1994. Astr. Astrophys. Suppl. Ser. Vol. 108, p. 287