Ions in np^2 and np^4 Configurations

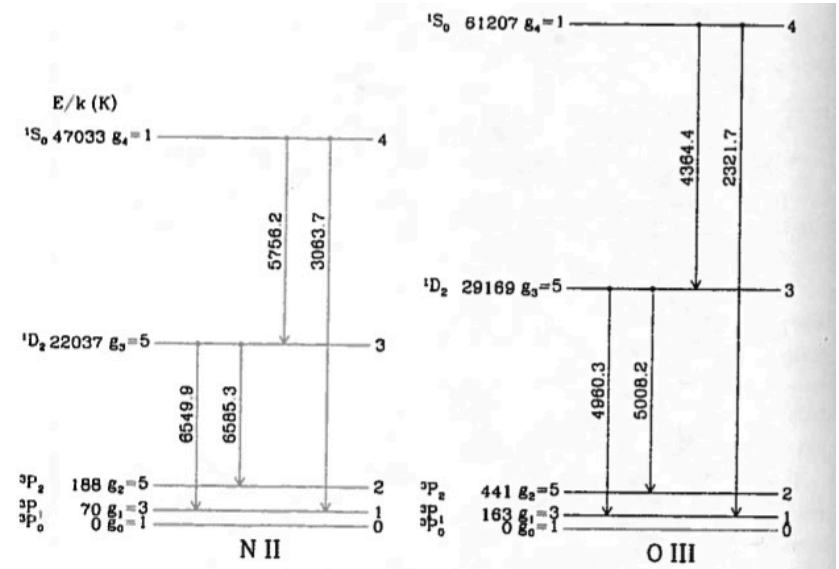


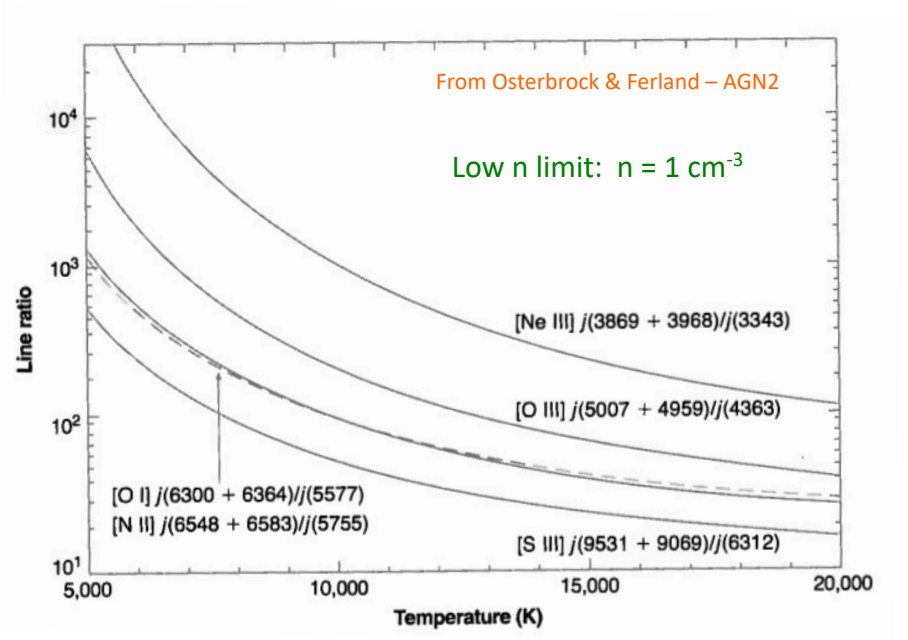
Figure 18.1 Energy levels for temperature diagnostic $2p^2$ ions N II and O III. Transitions are labeled by vacuum wavelength (Å).

Table of Collision Strengths with e^-

Table 4.1. Collision Strengths for Excitation by Electrons

Number of p electrons	Ion	Levels Lower	Levels Upper	E_{jk} (eV)	$\Omega(j,k)$	$\Sigma_j A_{kj}(s^{-1})$
1, 5	C II	$^2P_{1/2}$	$^2P_{3/2}$	0.0079	1.33	2.4×10^{-6}
	Ne II	$^2P_{3/2}$	$^2P_{1/2}$	0.097	0.37	8.6×10^{-3}
	Si II	$^2P_{1/2}$	$^2P_{3/2}$	0.036	7.7	2.1×10^{-4}
2	N II	$^3P_0$	$^3P_1$	0.0061	0.41	2.1×10^{-6}
		$^3P_0$	$^3P_2$	0.0163	0.28	7.5×10^{-6}
		$^3P_1$	$^3P_2$	0.0102	1.38	7.5×10^{-6}
		^3P	$^1D_2$	1.90	2.99	4.0×10^{-3}
		^3P	$^1S_0$	4.05	0.36	1.1
	O III	$^3P_0$	$^3P_1$	0.014	0.39	2.6×10^{-5}
		$^3P_0$	$^3P_2$	0.038	0.21	9.8×10^{-5}
		$^3P_1$	$^3P_2$	0.024	0.95	9.8×10^{-5}
		^3P	$^1D_2$	2.51	2.50	2.8×10^{-2}
		^3P	$^1S_0$	5.35	0.30	1.8
3	O II	$^4S_{3/2}$	$^2D_{5/2}$	3.32	0.88	4.2×10^{-5}
		$^4S_{3/2}$	$^2D_{3/2}$	3.32	0.59	1.8×10^{-4}
		$^2D_{3/2}$	$^2D_{5/2}$	0.0025	1.16	4.2×10^{-5}

T sensitive Line Ratios



Ions in np^3 Configurations

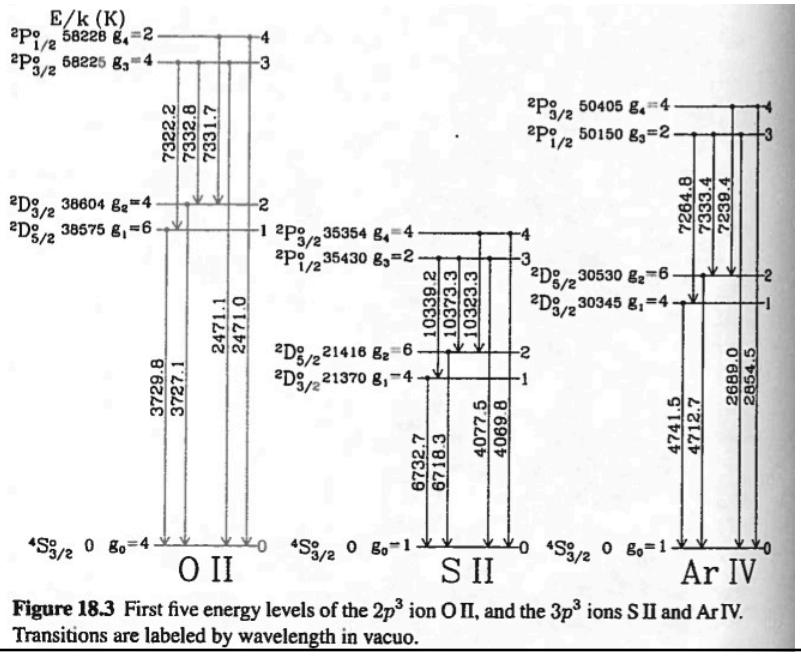


Figure 18.3 First five energy levels of the $2p^3$ ion O II, and the $3p^3$ ions S II and Ar IV. Transitions are labeled by wavelength in vacuo.

Table of Collision Strengths with e-

Table 4.1. Collision Strengths for Excitation by Electrons

Number of p electrons	Ion	Levels Lower	Levels Upper	E_{jk}(eV)	$\Omega(j,k)$	$\Sigma_j A_{kj}(s^{-1})$
1,5	C II	$^2P_{1/2}$	$^2P_{3/2}$	0.0079	1.33	2.4×10^{-6}
	Ne II	$^2P_{3/2}$	$^2P_{1/2}$	0.097	0.37	8.6×10^{-3}
	Si II	$^2P_{1/2}$	$^2P_{3/2}$	0.036	7.7	2.1×10^{-4}
2	N II	$^3P_0$	$^3P_1$	0.0061	0.41	2.1×10^{-6}
		$^3P_0$	$^3P_2$	0.0163	0.28	7.5×10^{-6}
		$^3P_1$	$^3P_2$	0.0102	1.38	7.5×10^{-6}
		^3P	$^1D_2$	1.90	2.99	4.0×10^{-3}
		^3P	$^1S_0$	4.05	0.36	1.1
	O III	$^3P_0$	$^3P_1$	0.014	0.39	2.6×10^{-5}
		$^3P_0$	$^3P_2$	0.038	0.21	9.8×10^{-5}
		$^3P_1$	$^3P_2$	0.024	0.95	9.8×10^{-5}
		^3P	$^1D_2$	2.51	2.50	2.8×10^{-2}
		^3P	$^1S_0$	5.35	0.30	1.8
3	O II	$^4S_{3/2}$	$^2D_{5/2}$	3.32	0.88	4.2×10^{-5}
		$^4S_{3/2}$	$^2D_{3/2}$	3.32	0.59	1.8×10^{-4}
		$^2D_{3/2}$	$^2D_{5/2}$	0.0025	1.16	4.2×10^{-5}

n sensitive Line Ratios of np^3

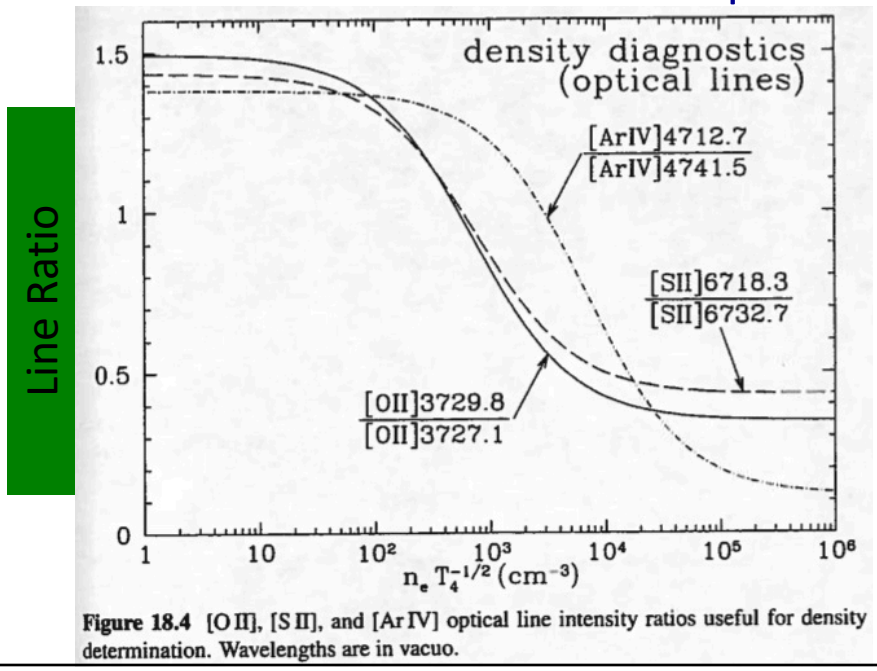
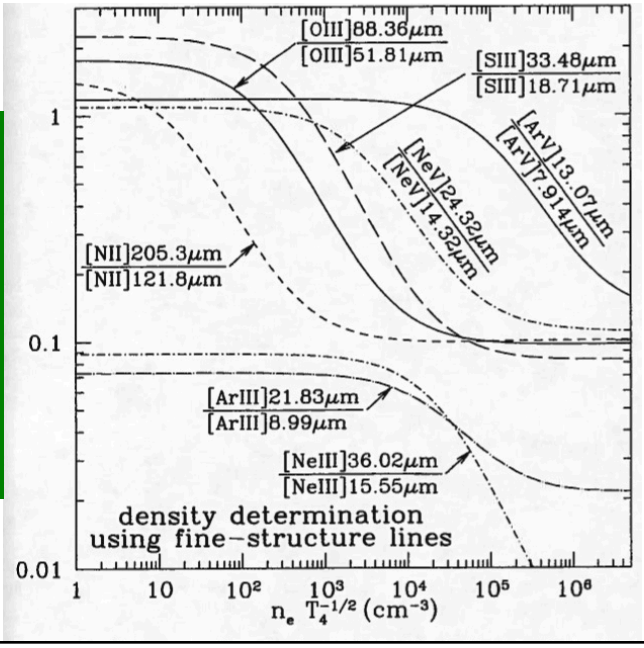


Figure 18.4 [O II], [S II], and [Ar IV] optical line intensity ratios useful for density determination. Wavelengths are in vacuo.

n sensitive Line Ratios of Fine Structure Lines

Line Ratio



HII Region Line Cooling Rates

Cooling rate