

Table 1.7. Some common optical and infrared forbidden lines of atoms

Atom	transition	wavelength	n_{crit} cm^{-3}
Cl	${}^3\text{P}_1 \rightarrow {}^3\text{P}_0$	610 μm	(500)
	${}^3\text{P}_2 \rightarrow {}^3\text{P}_1$	371 μm	(1000)
	${}^2\text{P}_{3/2} \rightarrow {}^2\text{P}_{1/2}$	158 μm	(3000)
NII (N ⁺)	${}^1\text{D}_2 \rightarrow {}^3\text{P}_2$	6583 Å	66 000
	${}^1\text{D}_2 \rightarrow {}^3\text{P}_1$	6548 Å	66 000
OI	${}^1\text{D}_2 \rightarrow {}^3\text{P}_2$	6300 Å	2×10^6
	${}^3\text{P}_1 \rightarrow {}^3\text{P}_2$	63.2 μm	(10 ⁶)
	${}^3\text{P}_0 \rightarrow {}^3\text{P}_1$	145.5 μm	(10 ⁵)
OIII(O ⁺)	${}^2\text{D}_{5/2} \rightarrow {}^4\text{S}_{3/2}$	3729 Å	3 400
	${}^2\text{D}_{3/2} \rightarrow {}^4\text{S}_{3/2}$	3726 Å	15 000
OIII (O ⁺⁺)	${}^1\text{D}_2 \rightarrow {}^3\text{P}_2$	5007 Å	7×10^5
	${}^1\text{D}_2 \rightarrow {}^3\text{P}_1$	4959 Å	7×10^5
	${}^1\text{S}_0 \rightarrow {}^1\text{D}_2$	4363 Å	2×10^7
	${}^3\text{P}_2 \rightarrow {}^3\text{P}_1$	51.8 μm	(4000)
	${}^3\text{P}_1 \rightarrow {}^3\text{P}_0$	88.4 μm	(2000)
NeII (Ne ⁺)	${}^2\text{P}_{1/2} \rightarrow {}^2\text{P}_{3/2}$	12.8 μm	7×10^5
NeIII (Ne ⁺⁺)	${}^3\text{P}_1 \rightarrow {}^3\text{P}_2$	15.6 μm	2×10^5
	${}^3\text{P}_0 \rightarrow {}^3\text{P}_1$	36.0 μm	3×10^4
Nev (Ne ⁺⁴)	${}^1\text{D}_2 \rightarrow {}^3\text{P}_2$	3426 Å	2×10^7
SII (S ⁺)	${}^2\text{D}_{5/2} \rightarrow {}^4\text{S}_{3/2}$	6716 Å	2 000
	${}^2\text{D}_{3/2} \rightarrow {}^4\text{S}_{3/2}$	6731 Å	2 000
SIII (S ⁺⁺)	${}^3\text{P}_2 \rightarrow {}^3\text{P}_1$	18.7 μm	10 000
	${}^3\text{P}_1 \rightarrow {}^3\text{P}_0$	33.5 μm	2 000
SIII (Si ⁺)	${}^2\text{P}_{3/2} \rightarrow {}^2\text{P}_{1/2}$	34.8 μm	(3×10^5)
FeII (Fe ⁺⁺)	$a^4\text{D}_{7/2} \rightarrow a^4\text{D}_{9/2}$	1.64 μm	3×10^5

The line is close to maximum strength at the critical density n_{crit} . This density is calculated for collision with electrons at $T = 10\,000\,\text{K}$, except quantities in () which refer to collisions with H atoms or molecules near 100 K.