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2. Electronic States of Atoms and Molecules

2.1 Atoms

[Exercise-2.1] Fill the blanks in the table.

term	L	S	g_{LS}	g_J	J	fine structure
1D	2	0	5		2	$(^1D_2)$
2S		1/2	2	2		$(^2S_{1/2})$
2P	1					
				2	3/2	$^2P_{3/2}$
				4		
3P		1	9		0	
						3P_1
				5		3P_2

2.2 Linear molecules

[Exercise-2.2] Fill the blanks.

desig.	Λ	Σ	$g_{\Lambda\Sigma}$	g_Λ	$\Lambda+\Sigma$	fine structure
$^1\Delta$		0	2	2	2	
$^2\Sigma$	0	1/2	2	1	$\pm 1/2$	
$^2\Pi$		1/2	4			$^2\Pi_{1/2}$
				2	3/2	
$^3\Pi$	1					$^3\Pi_0$
					1	$^3\Pi_1$
				2		$^3\Pi_2$

2.3 Non-linear molecules

[Exercise-2.3] Fill the blanks.

desig.	S	$g_{\Gamma S}$	g_Γ	fine structure
1T	0	3		
$^2A'$		2	1	
2E	1/2			$^2E_{1/2}$
			2	$^2E_{3/2}$