Shells, subshells, orbits and number of electrons

→ How many subshells does the P shell have?

P → $n = 6$: this shell has 6 subshells: s, p, d, f, g, h

→ How many orbits does this P shell have?

Shell n has n^2 orbits.
Shell $n = 6$ has $n^2 = 36$ orbits:

$$1 + 3 + 5 + 7 + 9 + 11 = 36$$

→ How many electrons can shell P hold?

Shell n can hold $2n^2$ electrons, two electrons per orbit.

Electronic structure of the elements

Single electron notation:

Which atom has the $1s^1$ electron configuration?

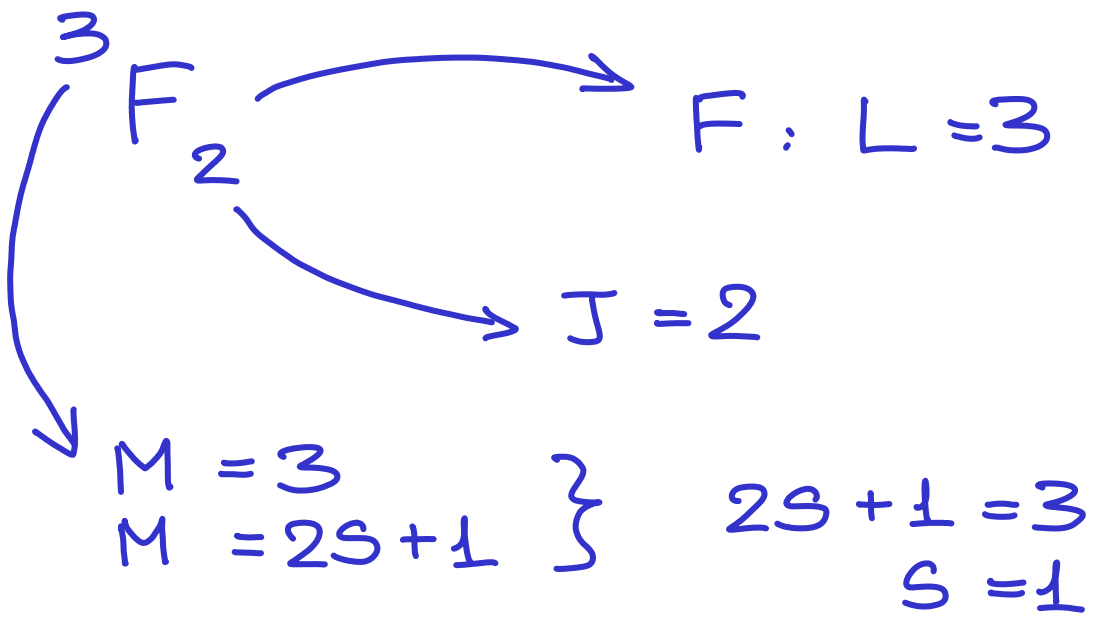
$1s^1$: H : Hydrogen

$1s^2$: He : Helium

$1s^2$ $2s^1$: Li : Lithium

$4d^{10}$: Pd : Palladium

Determining quantum numbers from spectroscopic symbols



Double check:

S = 1 and L = 3

can give J = 2

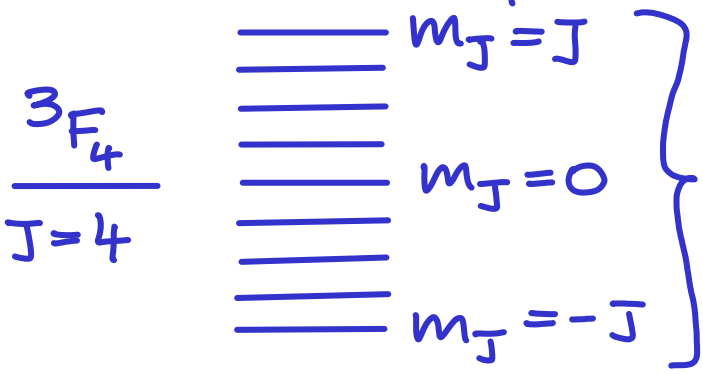
Anomalous Zeeman effect

State: $^3F_4$

$F: L=3$

$J=4$

$M=3 \Rightarrow S=1$



split to $(2J+1)$ states

$$\Delta E = g \cdot \Delta m_J \cdot \mu_B \cdot B$$

$\downarrow$ Landé factor

$B = 0.300\,T$

$\mu_B = 5.7884 \cdot 10^{-5} \frac{eV}{T}$

$\Delta m_J = 1$

$$g = 1 + \frac{J(J+1)+S(S+1)-L(L+1)}{2J(J+1)}$$

$$g = 1 + \frac{4\cdot 5 + 1\cdot 2 - 3\cdot 4}{2\cdot 4\cdot 5} = 1 + \frac{10}{40} = 1.25$$

Landé factor: how the magnetic moment from orbital angular momentum L and spin S are combined together.

$g = 1$ for pure L $(J=L, S=0)$

$g = 2$ for pure S $(L=0, J=S)$