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Order of terms and Fine structure levels \rightarrow (Hund's rule)

- (a) The terms arising from equivalent electrons with largest multiplicity lie lowest.
- (b) The terms with given multiplicity from equivalent electrons with largest l value lie lowest.
- (c) The multiplet formed from equivalent electrons in a less than half filled subshell with lowest J lies lowest (normal order)
- (d) The multiplet formed from equivalent electrons in a more than half filled subshell the level with highest J lies lowest (inverted order)
- (e) Terms arising from half filled subshells show only very slight fine structure splitting.
- (f) The lowest term obtained from the half filled subshell are the S term is most stable.

example :- $① 1s^2, 2s^2, 2p^2$ = electronic configuration for 'C' atom

optical e^-s = outer shell e^-s = $2p^2$

Terms value = $^1s_0, ^1D_2, ^3p_0, ^3p_1, ^3p_2$

$^1s_0, ^1D_2, ^3P(0,1,2)$

Applying Hund's rule — $p^2 = \boxed{\uparrow \uparrow \downarrow} =$ less than half filled

therefore increasing order of energy

$^3p_0, ^3p_1, ^3p_2, ^1D_2, ^1s_0$.

② $1s^2, 2s^2, 2p^4$ = electronic configuration of oxygen atom

optical e^-s = outer shell e^-s = $2p^4 = \boxed{\uparrow \downarrow \uparrow \downarrow}$ more than half filled.

terms are similar to p^2 subshell = $^1s_0, ^1D_2, ^3p_0, ^3p_1, ^3p_2$

But here the ground state will be 3p_2 .