

Quantum Numbers and Electron Orbitals

ℓ = orbital type $\{\ell = 0, 1, 2, \dots (n-1)\}$,

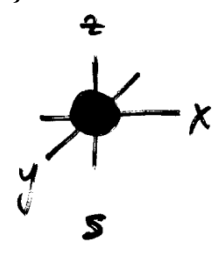
(n = row/energy level,

m_ℓ = individual orbital $\{-\ell, \dots, -1, 0, 1, \dots, +\ell\}$,

m_s = up/down spin of electron $\uparrow\downarrow$ $\{m_s = +1/2$ or $-1/2\}$ in each orbital.)

s – orbitals

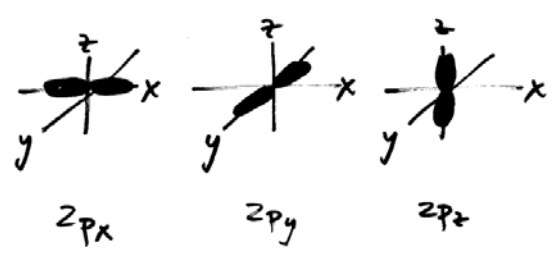
$\ell = 0$



$m_\ell = 0$

p – orbitals

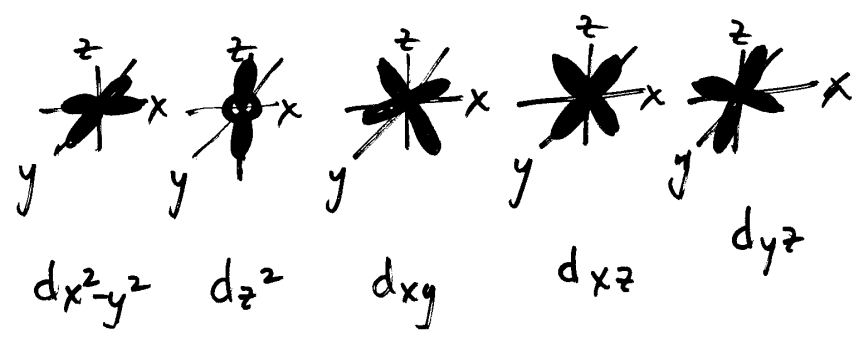
$\ell = 1$



$m_\ell = -1, 0, 1$

d – orbitals

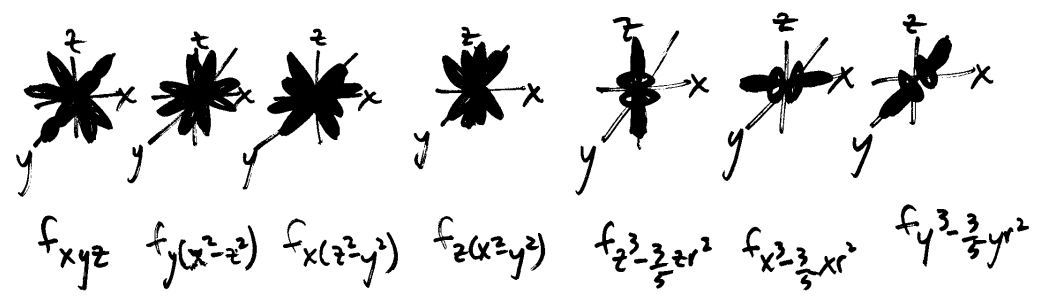
$\ell = 2$



$m_\ell = -2, -1, 0, 1, 2$

f – orbitals

$\ell = 3$



$m_\ell = -3, -2, -1, 0, 1, 2, 3$

imaginary: g- orbitals

$\ell = 4$

(9 orbital pictures)

$m_\ell = -4, -3, -2, -1, 0, 1, 2, 3, 4$