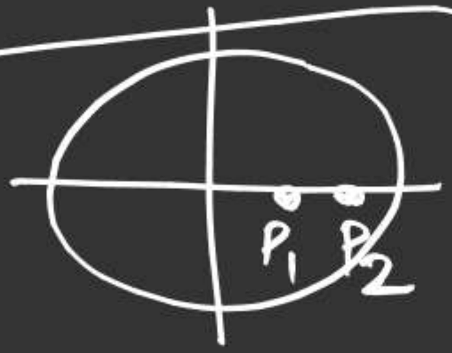
$R(r)$ vs r

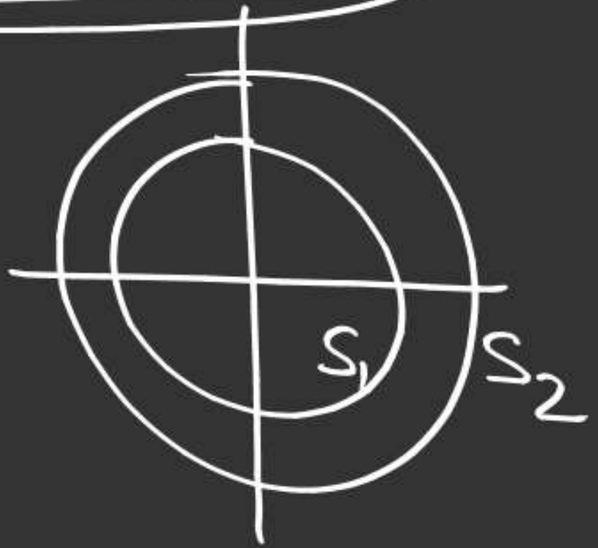
$R^2(r)$ vs r



Tells us the probability of e^- at a point

$4\pi r^2 R^2(r)$ vs r

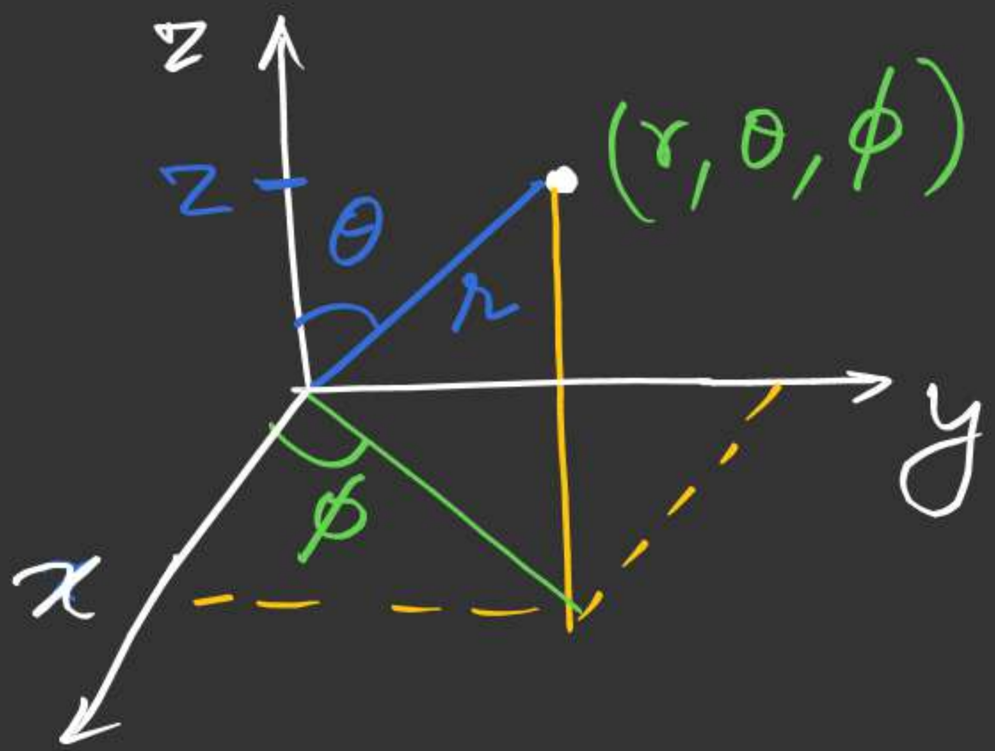
Tells us the radial probability of e^- over the spherical surface



1s 2s 3s

2p 3p 4p

Angular part of wave function



$$Z = r\cos\theta$$

$$x = r\sin\theta\cos\phi$$

$$y = r\sin\theta\sin\phi$$

xy-plane $\theta = 90^\circ$

xz-plane $\phi = 0$

yz-plane $\phi = 90^\circ$

z-axis $\theta = 0$

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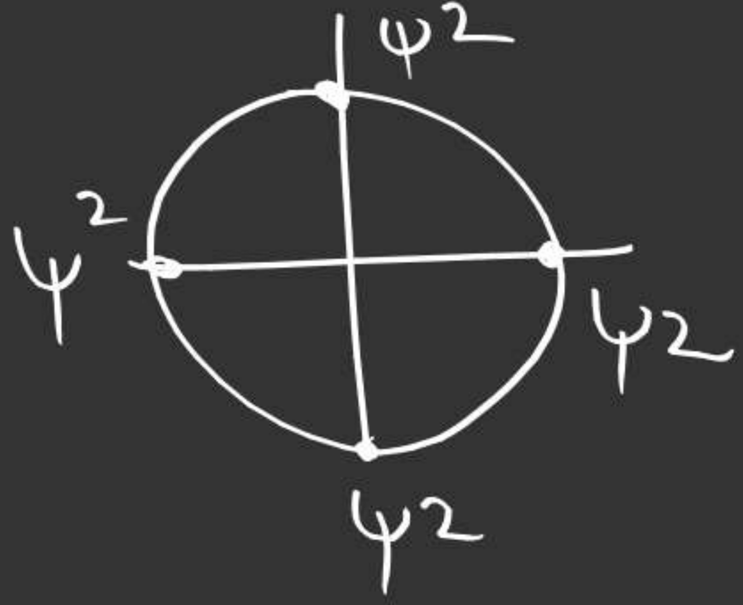
for 's' orbital $\quad l = 0$

ψ is independent of θ & ϕ

$$\psi^2 = R^2(r)$$



'S' orbital is spherically symmetrical

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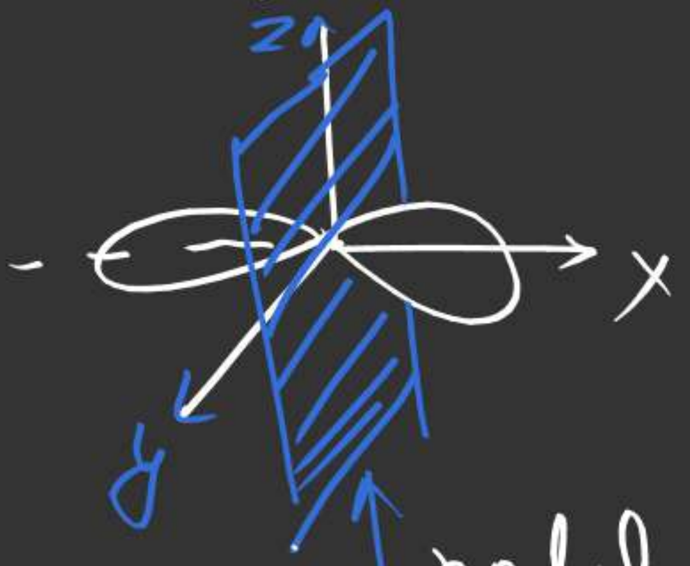
for 'p' orbital

$$P_x = \left(\frac{3}{4\pi}\right)^{1/2} \sin\theta \cos\phi$$

$\phi = 90^\circ \rightarrow$ yz plane



nodal plane or angular node

yz plane

$P_x \rightarrow$ nodal plane yz
$P_y \rightarrow$ nodal plane xz
$P_z \rightarrow$ " " xy

$$P_y = \left(\frac{3}{4\pi}\right)^{1/2} \sin\theta \sin\phi$$

nodal plane $\rightarrow$ xz

$\phi = 0^\circ$

$$P_z = \left(\frac{3}{4\pi}\right)^{1/2} \cos\theta$$

nodal plane xy

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d_{xy} d_{yz} d_{xz} $d_{x^2-y^2}$ d_{z^2}

nodal plane

xz, yz xy, xz xy, yz

$$d_{yz} = \left(\frac{15}{4\pi}\right)^{1/2} \sin\theta \cos\theta \sin\phi$$

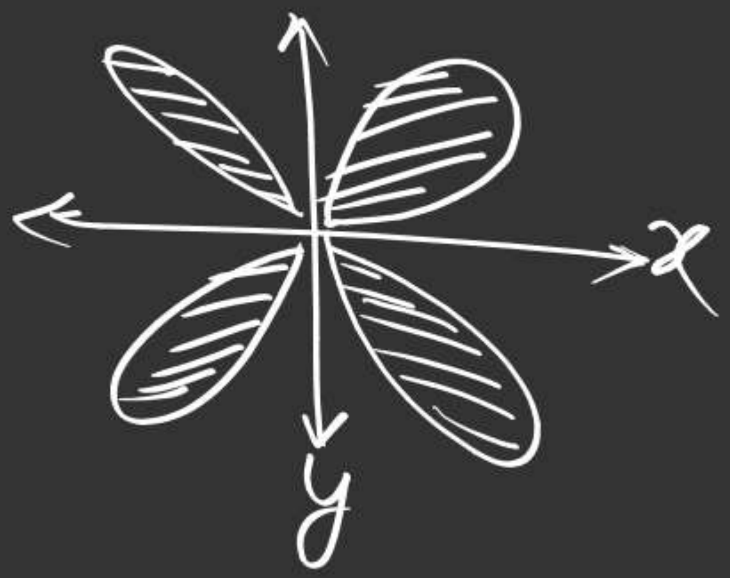
$$d_{xy} = \left(\frac{15}{4\pi}\right)^{1/2} \sin^2\theta \sin 2\phi$$

$\theta = 90^\circ$ xy

$\phi = 0$ xz

$\phi = 0$ xz

$\phi = 90^\circ$ yz



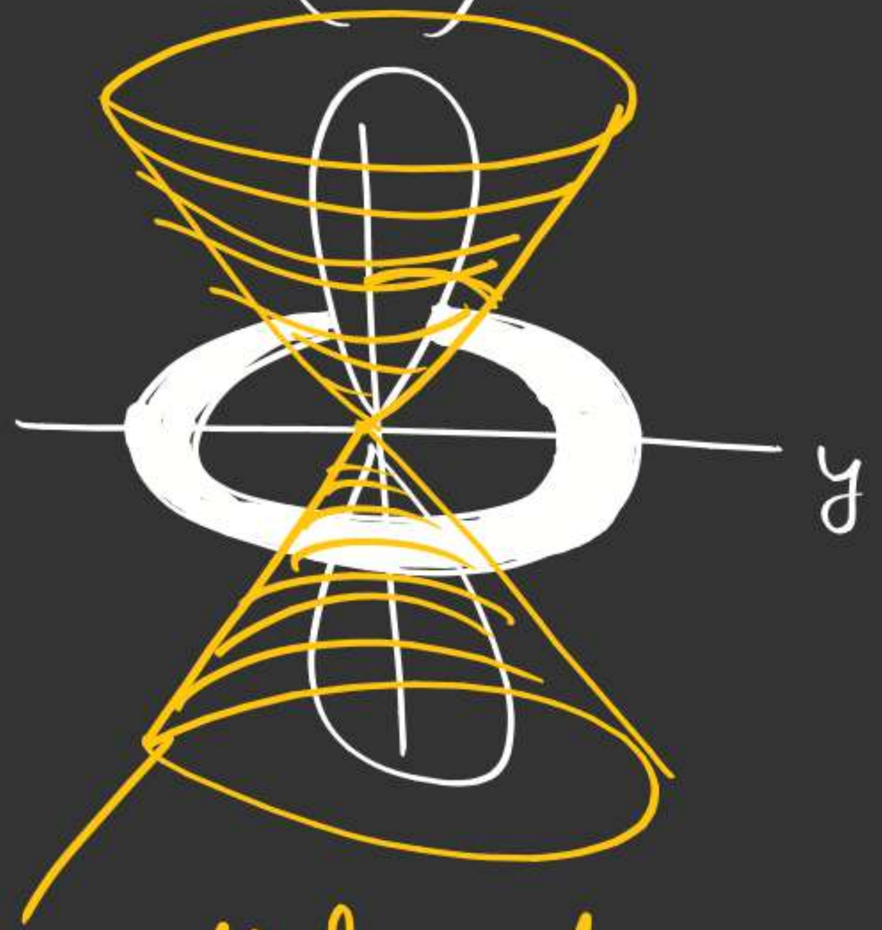
$$d_{z^2} = \left(\frac{5}{16\pi}\right)^{1/2}(3\cos^2\theta - 1)$$

$$\cos\theta = \pm \frac{1}{\sqrt{3}}$$

no. of Angular ~~radial~~ node $= l$

Total no. of node $= n - l - 1 + l$

$= n - 1$



radial node
or
nodal cone

$$mvr = n\frac{h}{2\pi}$$ (from Bohr model)

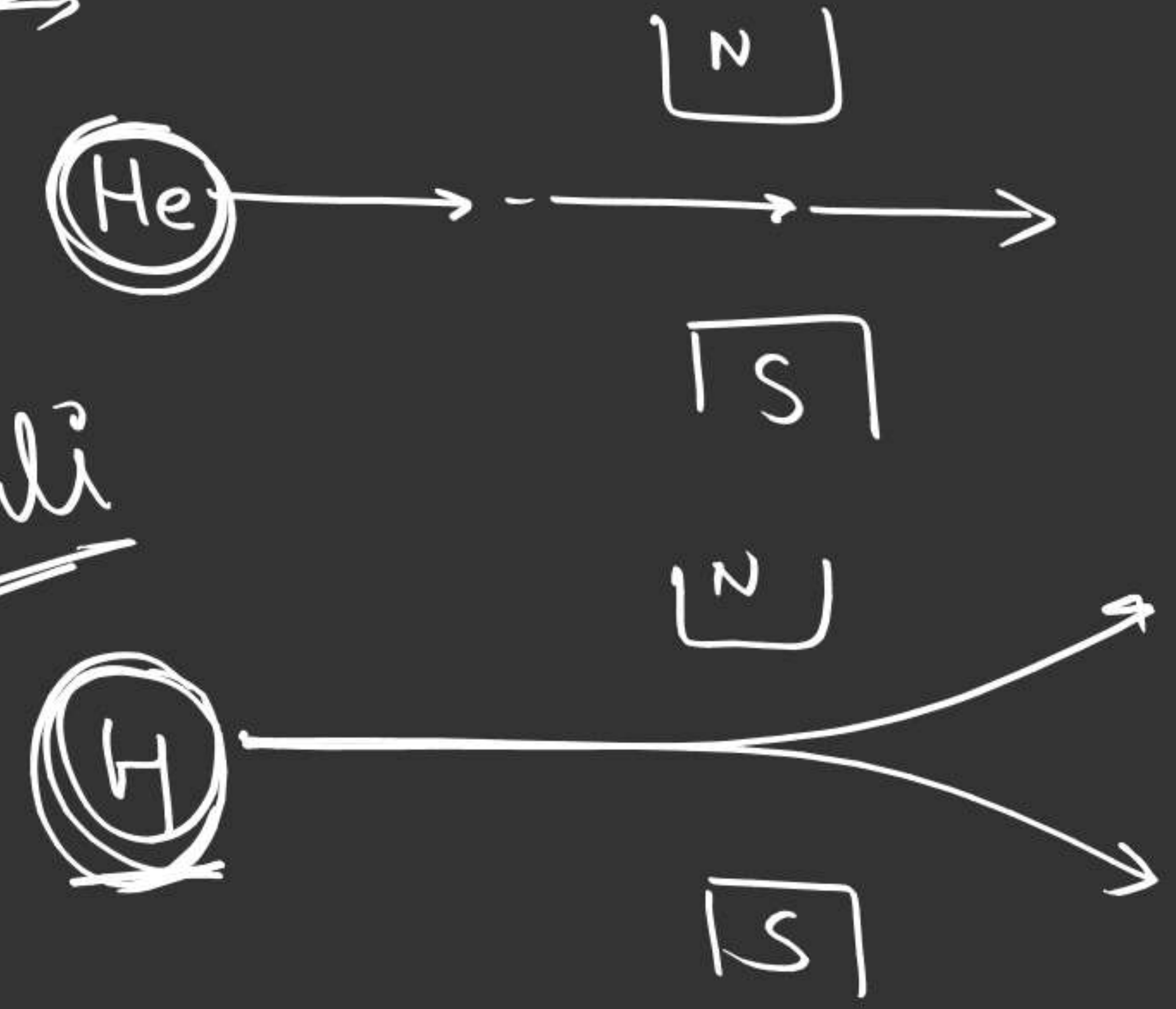
angular momentum

$$\text{orbital angular momentum} = \sqrt{l(l+1)}\,\frac{h}{2\pi}$$

for 's' orbital = 0

depends on l, m

Pauli



$$\text{Spin angular momentum} = \sqrt{s(s+1)}\,\frac{h}{2\pi} = \sqrt{\frac{3}{4}}\,\frac{h}{2\pi}$$

$$s = \pm 1/2$$

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magnetic moment $= \sqrt{n(n+2)}$ B.M. (Bohr Magneton)

$n \rightarrow$ no. of unpaired e^-

NSEC

INChO

IChO

JEE-Main