

Solution

At what radius are you most likely to find the electron?

Looks like a no-brainer. $r = 0$, of course!

Well, that's not the answer.

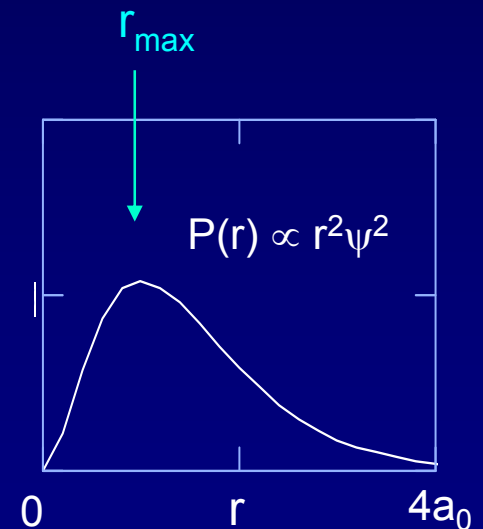
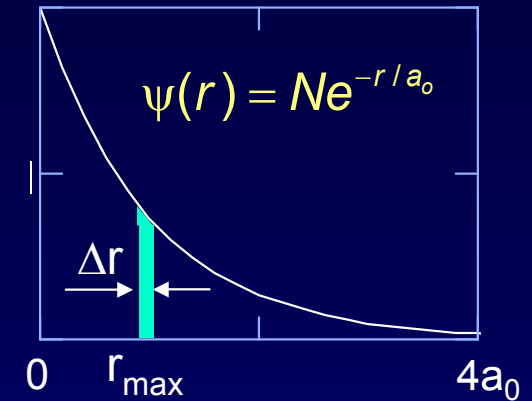
You must find the probability $P(r)\Delta r$ that the electron is in a shell of thickness Δr at radius r . For a given Δr the volume, ΔV , of the shell increases with radius.

The radial probability has an extra factor of r^2 :

$$P(r)\Delta r = |\psi(r)|^2 \Delta V = Cr^2 e^{-2r/a_0} \Delta r$$

Set $dP/dr = 0$ to find:

$$r_{\max} = a_0 !$$



More volume
at larger r .

No volume
at $r = 0$.

