$$\text{Prob}(x_0 < x < x_0 + dx) = |\Psi(x_0)|^2 dx$$

$$\text{Prob}(r_0 < r < r_0 + dr) = |\Psi(r_0)|^2 dV$$

$$= |\Psi(r_0)|^2 r^2 dr$$

$$\text{Prob}(R_1 < r < R_2) = \int_{R_1}^{R_2} |\Psi(r)|^2 r^2 dr$$

$$E = -\frac{\hbar^2}{2ma^2} = -\frac{{m_e}^2 e^4}{32\pi^2 {\epsilon_0}^2 \hbar^2}$$