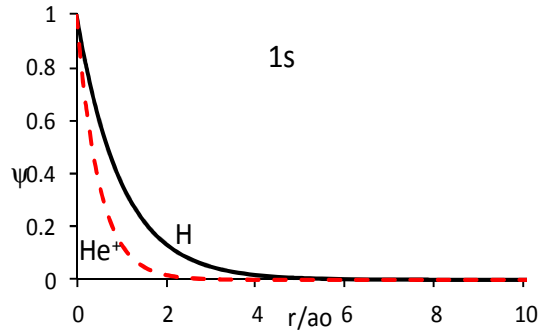
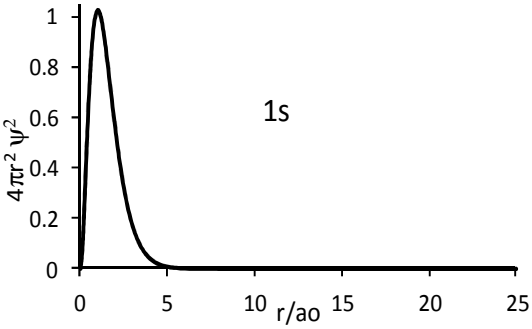
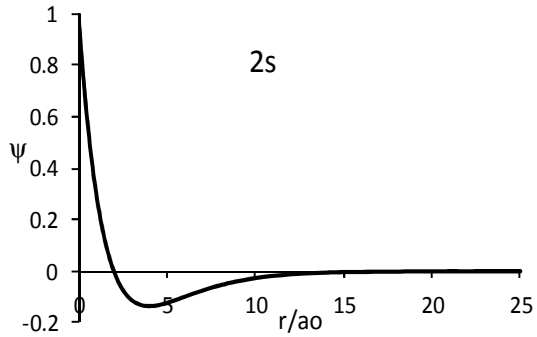
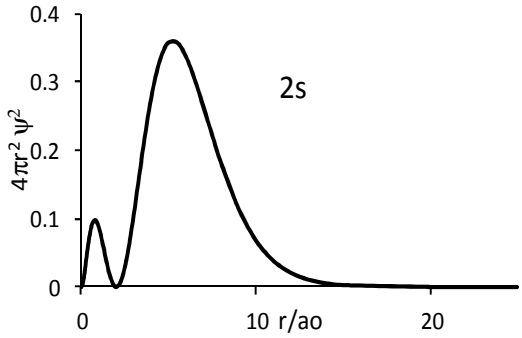
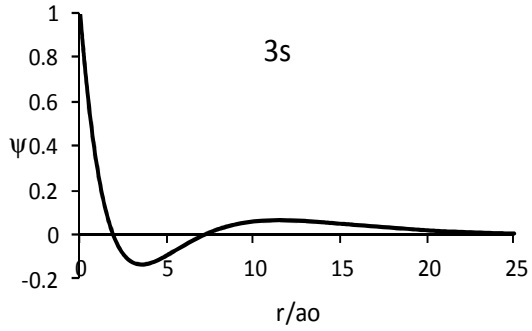
s-Orbitals for the Hydrogen Atom

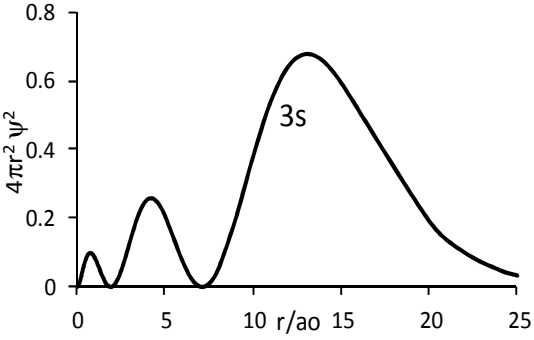












$$\Psi_{2s} = \frac{1}{4\sqrt{2\pi}}\left(\frac{Z}{a_o}\right)^{3/2}\left(2-\frac{Zr}{a_o}\right)e^{-Zr/2ao}$$

normalization *polynomial* *asymptotic form*

$$\Psi_{3s} = \frac{1}{18\sqrt{3\pi}}\left(\frac{Z}{a_o}\right)^{3/2}\left(6-\frac{4Zr}{a_o}+\frac{4Z^2r^2}{9a_o^2}\right)e^{-Zr/3ao}$$

normalization *polynomial* *asymptotic form*

2s-node: $\Psi_{2s} = 0$ $\left(2-\frac{Zr}{a_o}\right) = 0$ or $r = 2\ a_o/Z$