

Hydrogen Separated Equation Solutions

n	ℓ	m _ℓ	F(φ)	P(θ)	R(r)	<input checked="" type="checkbox"/> n=1,2 <input type="checkbox"/> n=3 <input checked="" type="checkbox"/> Separated <input type="checkbox"/> Combined
1	0	0	$\frac{1}{\sqrt{2\pi}}$	$\frac{1}{\sqrt{2}}$	$\frac{2}{a_0^{3/2}} e^{-r/a_0}$	
2	0	0	$\frac{1}{\sqrt{2\pi}}$	$\frac{1}{\sqrt{2}}$	$\frac{1}{2\sqrt{2}} \frac{1}{a_0^{3/2}} \left[2 - \frac{r}{a_0}\right] e^{-r/2a_0}$	
2	1	0	$\frac{1}{\sqrt{2\pi}}$	$\frac{\sqrt{6}}{2} \cos \theta$	$\frac{1}{2\sqrt{6}} \frac{1}{a_0^{3/2}} \frac{r}{a_0} e^{-r/2a_0}$	
2	1	±1	$\frac{1}{\sqrt{2\pi}} e^{\pm i\phi}$	$\frac{\sqrt{3}}{2} \sin \theta$	$\frac{1}{2\sqrt{6}} \frac{1}{a_0^{3/2}} \frac{r}{a_0} e^{-r/2a_0}$	

Source: Beiser, A., Perspectives of Modern Physics, McGraw-Hill, 1969.
Table 9.1

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