For the state

$$|\Psi\rangle = \sqrt{\frac{7}{10}}|2,1,0\rangle + \sqrt{\frac{1}{10}}|3,2,1\rangle + i\sqrt{\frac{2}{10}}|3,1,1\rangle$$

Calculate

- $\mathcal{P}(L_z = \hbar)$
- $\langle L_z \rangle$

  Then, if you have time, continue with these calculations:
- $\mathcal{P}(L^2 = 2\hbar^2)$
- $\langle L^2 \rangle$
- $\mathcal{P}(E = -13.6eV/3^2 = -1.51eV)$
- $\langle E \rangle$
- What measurements can be degenerate on the Hydrogen atom?
- What is the time development of this state?
- What is the probability of finding the particle in the region $0 < \theta < \pi/6$, $\pi/3 < \phi < \pi/2$, and $r_1 < r < r_2$?