

Quantum Chemistry

Exercises 5

1. A particle in a spherically symmetric potential is in a state described by the wavefunction:

$$\psi(x, y, z) = C(xy + yz + zx)e^{-ar^2}$$

- What is the probability that a measurement of the square of the angular momentum ($\hat{L}^2$) yields zero?
- What is the probability that it yields $6\hbar^2$?
- If the value of l is found to be 2, what are the relative probabilities for $m=-2, -1, 0, 1, 2$?

Hint: write the wavefunction in terms of the spherical harmonics