Chem. 540
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Angular Momentum – Problem 4

Consider a particle moving on a sphere, with wavefunction in spherical polar coordinates given by

$$\Psi(\theta,\phi) = A\left\{Y_{1,+1}(\theta,\phi) + Y_{1,-1}(\theta,\phi)\right\},$$

where Y_{lm} is the usual spherical harmonic.

a) Determine the value of *A* in order for Ψ to be normalized. (Notice that the individual spherical harmonics are normalized, so you don't need to evaluate tedious integrals.)

b) What will be the distribution of results corresponding to individual measurements of L^2 and L_z on many identically prepared systems?