

For the spherical harmonics Y_l^m what are the eigenvalues λ_z and λ_{L^2} for the following eigenvalue equations:

1. $L_z Y_l^m = \lambda_z Y_l^m$

2. $L^2 Y_l^m = \lambda_{L^2} Y_l^m$

What are the allowed eigenvalues of L_z in terms of the L^2 eigenvalue?