

Central Forces Homework 6

Due 03/16/12

PRACTICE:

1. (McIntyre 8.2) Use the recurrence relation for the radial wave function to construct the $n = 3$ radial states of hydrogen. Calculate the normalization constant for the $R_{32}(r)$ state.
2. (McIntyre 8.5) By direct application of the differential operators, verify that the state $|321\rangle \doteq \psi_{321}(r, \theta, \phi)$ is an eigenstate of H , \mathbf{L}^2 , and L_z and determine the corresponding eigenvalues.
3. (McIntyre 8.6) Calculate the probability that the electron is measured to be within one Bohr radius of the nucleus for the $n = 2$ states of hydrogen. Discuss the differences between the results for the $l = 0$ and $l = 1$ states.

REQUIRED:

4. (McIntyre 8.7) Calculate the probability that the electron is measured to be in the classically forbidden region for the $n = 2$ states of hydrogen. Discuss the differences between the results for the $l = 0$ and $l = 1$ states.
5. McIntyre 8.13
6. McIntyre 8.14