

Assignment 9

1. Hydrogen, deuterium, and singly ionized helium are all examples of one-electron atoms. The deuterium nucleus has the same charge as the hydrogen nucleus, and almost exactly twice the mass. The helium nucleus has twice the charge of the hydrogen nucleus, and almost exactly four times the mass. Make an approximate prediction of the ratios of the ground state energies of these atoms.
2. Consider $n = 3$ state of a hydrogen atom.
 - (a) What l values are possible?
 - (b) For each value of l , what m_l values are possible?
 - (c) Finally, how many degenerate states do we have for $n = 3$?