

## AST 300B – Spring 2019

### In-class/take-home Problems Due: Monday April 22

37. Let's understand the spectrum/energy level diagram of Helium. The ground state electronic configuration of Helium is  $1s^2$
- What is the term for this configuration? Hint: you have to use Pauli's exclusion principle to eliminate one term.
  - If one electron is excited to the  $1s^12s^1$  configuration, what are the terms? Does Pauli Exclusion apply here? Why or why not?
  - If one electron is excited to the  $1s^12p^1$  configuration, what are the terms?
  - Using what you have determined above and the fact that spin multiplicity does not change in an electric dipole transition, explain why there are two separate energy level diagrams in the Figure on the back for Helium. Label the energy levels with the terms you derived in parts a, b, and c. Also explain why there is no  $1s$  level for "orthohelium". NOTE: this energy level diagram does not show splitting for different  $J$ .



