Phys 2053: Homework VIII

due March 23, 2016

1. (*2 pts*) Using the periodic table shown in Fig. 5.2 of the textbook, determine the ground state configuration of the following elements: Fluorine (F), Magnesium (Mg), Silicon (Si), Potassium (K), and Cobalt (Co).

2. (*3 pts*) Using Hund's rule find the ground state L and S of

1. Fluorine (Z=9)
2. Magnesium (Z=12)
3. Iron (Z=26)

3. (*2 pts*) Use the degeneracies of the states with all possible total L and S to find how many different levels the $2p^1 3p^1$ excited state of carbon includes. Compare this result with the result of counting the individual m_l and m_s values, to see how the Pauli principle may restrict the choices of possible combinations of quantum numbers.

4. (*3 pts*) Using the Hartree-Fock applet, obtain the total energy of the neutral neon atom and the neon ion for which a single $2p$ electron has been removed. Use these results to find the binding energy of the $2p$ electrons of neon. How does your result compare with the single-electron energy for the p electron?