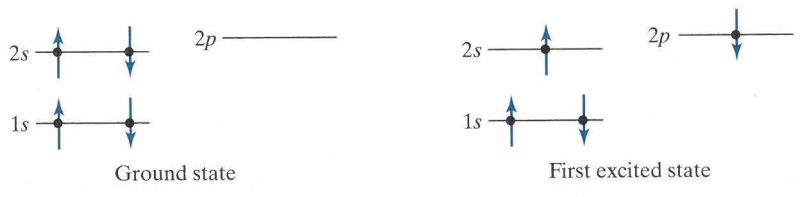
# HOMEWORK SET 14: ELECTRON CONFIGURATIONS
## Due Friday, March 26, 2025

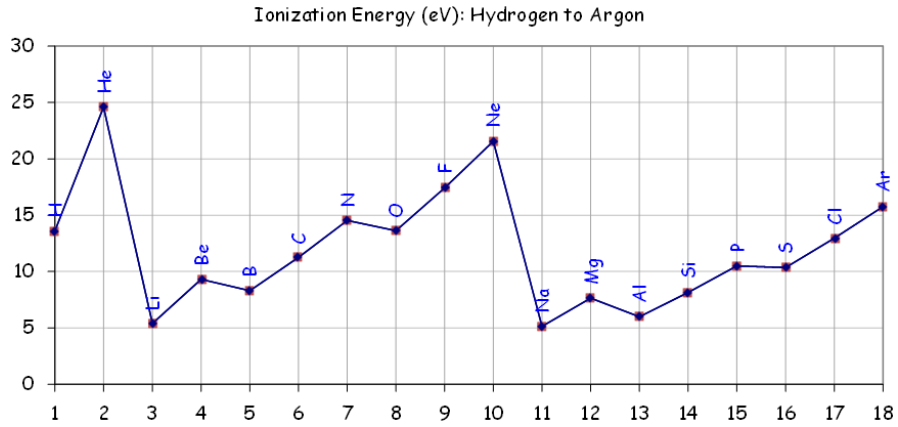
Problems adapted from TZDII[1]

**10.15)** Draw four energy-level diagrams like TZDII Fig. 10.7 showing the ground states of $_5$B, $_9$F, $_{10}$Ne, and $_{11}$Na.

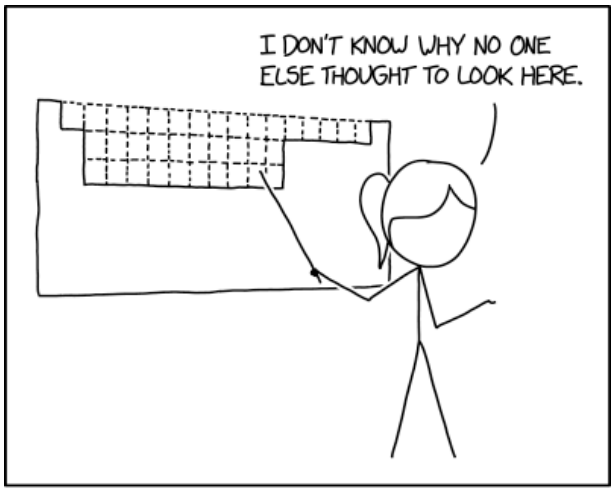
**FIGURE 10.7**
Excitation of beryllium ($Z = 4$) requires only 2.7 eV to lift one of the $2s$ electrons to the nearby $2p$ level. In the excited state the spins of the $2s$ and $2p$ electrons can point either way.




**10.17)** In the plot of ionization energy agains atomic number, it is clear that within each shell, the ionization energy tends to increase with Z. However, there is a small drop as one moves from $_4$Be to $_5$B and another from $_7$N to $_8$O. Explain these drops.




**10.32) a)** Find the ground state configurations of nickel and copper from the periodic table you were given (or inside TZD back cover).
**b)** Draw an energy-level diagrams similar to TZDII Fig. 10.7 to illustrate these two ground states. Do you think the electron configuration of copper may contribute to its electrical conductivity? Explain. (NOTE: GENERALLY , THE 4S LEVEL IS FILLED BEFORE THE 3D LEVEL, HOWEVER, THE 4S AND 3D LEVELS ARE VERY CLOSE SO THAT THE 4S CAN LOSE AN ELECTRON TO THE 3D AS OCCURS IN COPPER. )




[1] Taylor, Zafiratos, & Dubson, *Modern Physics for Scientists and Engineers*, 2nd Editon, Pearson, Prentice Hall, 2004