NOTE: There will be no class on Tuesday, November 2 because of Election Day. Our next class will be November 9.

1. Do any three problems of 2.5 through 2.10 at the end of Chapter 2 in Lilley’s *Nuclear Physics*.

2. Consider a nucleus as a uniform dense sphere of radius $R = 1.4 A^{1/3}$ fm. Assume also that the charge, $Z$, is also uniformly distributed. Using classical mechanics, answer the following three questions:

   Calculate the angular velocity, $\omega$, of the sphere required to produce an angular momentum equal to $lh$ (where $l$ is a small integer)?

   What is the rotational kinetic energy associated with the rotation?

   Show that the current circulating the axis of rotation is $\omega eZ/2\pi$ (where $e = 1.6 \times 10^{-19}$ C).

   Finally, compute “typical” values for $\omega$, $I\omega^2/2$, and $\omega Z/2\pi$ for $Z = 32, A = 64, R = 5.6$ fm, and $l = 1$.

   Hints: The moment of inertia of a sphere is $I = 2 MR^2/5$ (where $M$ is the mass of the sphere.) Momentum and energy are $I\omega$ and $I\omega^2/2$, respectively.

3. Use the SEMF to estimate the (a) the energy required to remove one neutron from each of $^7\text{Li}$, $^{91}\text{Zr}$, and $^{236}\text{U}$; (b) the energy required to remove one proton from each of $^{20}\text{Ne}$, $^{55}\text{Mn}$, and $^{197}\text{Au}$. 