**Physics 214 Quiz 3-8 Week 4**

A beam of neutrons is incident on a crystal. Scattering is observed, and can be modeled as N-slit interference of neutrons. The neutrons have a wavelength of = 0.17 nm and a mass of 1.675 x 10-27kg.

1. What is the kinetic energy of these neutrons?

2. The spacing between atomic rows in the crystal is *d* = 0.4 nm. At what angle is the **second** order diffraction maximum observed?

3. What energy x-rays would scatter through the same angle?

4. Consider x-rays and neutrons that scatter through the same angle. What is the ratio of the momentum of the x-rays to the momentum of the neutrons?

5. Consider neutron diffraction again. If you cover half of the scattering surface of the crystal (so that neutrons no longer scatter off that half), what happens to the intensity of the second order diffraction maximum?