PHYS 3446 – Lecture #6

Monday, Sept. 25, 2006
Dr. **Jae** Yu

1. Nuclear properties
   - Mott scattering
   - Spin and Magnetic Moments
   - Stability and Instability of Nuclei
- Nature of the Nuclear Force
   - Short Range Nature of the Nuclear Force
   - Shape of the Nuclear Potential
   - Yukawa Potential
   - Range of Yukawa Potential

Announcements

- LPCC Workshop
  - 10am – 5pm, Saturday, Sept. 30
  - CPB303 and HEP experimental areas
  - Need to go on shopping…
  - Need to know who is coming
- First term exam
  - Date and time: 1:00 – 2:30pm, Wednesday, Oct. 4
  - Location: SH105
  - Covers: Ch 1 – Ch 3, Appendix A

Nuclear Properties: Sizes

- At relativistic energies the magnetic moment of electron also contributes to the scattering
  - Neville Mott formulated Rutherford scattering in QM and included the spin effects
  - R. Hofstadter, et al., discovered the effect of spin, nature of nuclear (& proton) form factor in late 1950s
- Mott scattering x-sec (scattering of a point particle) is related to Rutherford x-sec: $\left(\frac{d\sigma}{d\Omega}\right)_{Mott} = 4\cos^2\frac{q}{2}\left(\frac{d\sigma}{d\Omega}\right)_{Rutherford}$
- Deviation from the distribution expected for point-scattering provides a measure of size (structure)