Chapter Objectives

3: The Experimental Basis of Quantum Theory

Following your study of this chapter, you should be able to:

- follow the discussion in the text on the discovery of x-rays
- derive the ratio of electron's charge to mass, *e*/*m*
- understand the interaction of forces in Milikan's oil drop experiment
- state the difference between Balmer's and Rydberg's equations
- use the equations of Balmer and Rydberg to determine wavelengths
- cite evidence of quantization in experiments and in nature
- note two important observations of a blackbody curve
- calculate wavlengths of maximum intensity using Wien's displacement law
- calculate power emitted if give the temperature using the Stefan-Boltzmann law
- show that Planck's radiation law avoids the ultraviolet catastrophe
- know five experimental facts about the photoelectric effect
- write down the equation for the energy quantum of a photon
- relate the Duane-Hunt rule to the conservation of energy
- explain the Compton effect and know the equation
- apply the rules governing pair production and annihilation