Chapter 9: Photoelectric Effect

Overview

Suggested Reading Assignment

The section on "The Photoelectric Effect" in your modern physics text.
E.g., Section 3-3 of Tipler and Llewellyn, 4th edition.

Pre-lab Questions

1. Explain the photoelectric effect and Einstein's theory of the photoelectric effect.
2. Why does the existence of a cutoff frequency ν in the photoelectric effect favor a particle theory for light rather than a wave theory?
3. What effect, if any, would you expect the temperature of a material to have on the ease with which electrons can be ejected from it in photoelectric effect?
4. What frequency of light is needed to just barely liberate electrons from an aluminum surface?
5. What wavelength of light is needed to liberate electrons from a nickel surface so that they have kinetic energy 2.0 eV? Note: for this lab, and for all nuclear, atomic, or quantum calculations you might make in future coursework, energy should be given in eV rather than Joules. Do not convert to Joules for this question, or on your pre-lab quiz, or in your Journal for this lab.
6. The filters we're using specify an average value, along with a FWHM value. What does this stand for? What does it mean? How does it differ from a standard deviation?