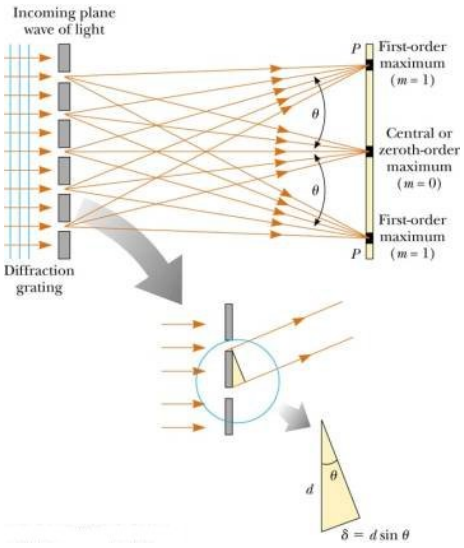
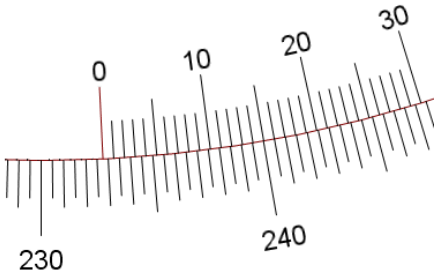
Lab 6 Spectrum of Mercury Tasks

The constructive interference of light passing through a diffraction grating produces intensity maxima at certain angles relative to the grating. The relationship between the spacing of the grating slits *d*, the angle at which the maxima are observed θ, and the wavelength of the constructively interfering light λ is given by $d\sin\theta = m\lambda$, where m is an integer index known as the "order" of the interference (see Ohanian & Markert for a proof of this relation).



1. Use the intensity maxima produced by 589.3 nm yellow light from a sodium lamp to find the spacing of the diffraction grating. Average the angles for corresponding orders on each side of the central maxima, find at least 3 different values for *d* based on these measurements, and calculate the mean and standard error of your results.

2. Use the result for *d* from 1. to calculate the wavelength of at least 5 different color spectral lines from a mercury lamp. Again average the angles for corresponding orders. For each color you should find the wavelength from at least 3 different orders. Use these measurements to find the average wavelength and standard error of each color. Compare your results with values for spectral lines in mercury found at http://physics.nist.gov/PhysRefData/Handbook/Tables/mercurytable2_a.htm, and comment on sources of error that may account for any discrepancies.



Vernier scale reading an angle of 232° 46 ' (232 degrees, 46 minutes), or 232 + 46/60 = 232.766667°.

Vote on due date result:

Vote on sections result: