Phys 4910 Spectroscopy
The Fabry Perot Etalon

Introduction

The Fabry Perot etalon is a multi interference device which relies on the same multi beam interference model that we used to describe the diffraction grating. However, it uses a different physical arrangement and so the definition of the phase difference between beams is different. A description of the etalon is to be found in any text on optics, and on line. Since other students have not seen the etalon in class a substantial portion of your presentation should include a description of the device and
- its resolution (look under finesse)
- that the pattern is a series of circles, with r^2 being proportional to the order number.

Spectra

The etalon is always used to measure small differences in wavelength, and usually cannot be used to find the absolute wavelength (since you will rarely know the order number). Here are some suggestions
- Record (photograph) the interference pattern from a light source. Show that r^2 is indeed proportional to the order number. If you record the fringe pattern from a sodium lamp you can easily show that there are two sequences, one from each of the sodium D lines, and that the difference between them corresponds to their difference in wavelength.
- From one of the circular fringes use its width to estimate the finesse of your etalon.

Note: If you photograph the interference patterns, then I have a small program which will allow you to measure the radii of the circles quite easily.