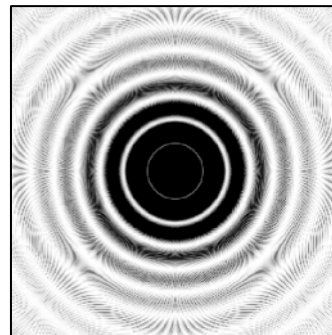


# Optics and Modern Physics Lab

(Phys 226)

**Fall 2011**

**What am I doing here?** The main objective of this course is to give you some first-hand experience with some of the ideas you are wrestling with in Analytical Physics III. At the end of this course, you will have directly examined some of the fundamental behaviors of light and matter, including wave propagation speeds, interference & diffraction, polarization, the photoelectric effect, black-body radiation, quantization of energy levels in the Hydrogen atom, radioactive decay, and chaos. Some of the labs will be simulations. In addition, you will learn some new computational methods for performing analysis and uncertainty analysis.



In this course, emphasis will be placed on good laboratory practice in: (1) carrying out experiments successfully, (2) recording and analyzing data, and (3) organizing and presenting your work in a neat and coherent manner.

**Where is the lab manual?** The lab manual for this course will be distributed incrementally throughout the semester. You will be given the necessary pages of the manual one week prior to each lab experiment, and you will be required to maintain the manual in a 3-ring binder as the course progresses. Also, you will maintain a hard cover experimental journal in which you will record your lab progress. Various rules for the maintenance of these journals can be found at the beginning of the lab manual.

**How will I be graded?** Your grade will be determined by:

Weekly Quizzes	25%
Journal	20%
Worksheets and Abstracts	40%
<u>Oral Presentation</u>	<u>15%</u>
Lab journals	100%

A pre-lab assignment will be distributed (with the relevant lab manual pages) one week in advance of each experiment. Pre-lab must be completed before coming to lab. Each week, there will be a quiz based on the pre-lab assignment and/or the previous week's experiment. Your Lab Journals may be graded at any time without prior warning.

You will often be required to write a one-page (double spaced) abstract of the experiment, written independently from your lab partner (or anyone else). As a reminder, abstracts must define the purpose of the experiment, the methodology of the experiment and the analysis, a discussion of possible sources of error, and numerical results. Be sure to also include a final interpretation of the results (i.e., a conclusion). A copy of the abstract should also be typed and stapled or taped into your lab notebook.

Finally, at the end of the semester, you will be required to make an oral presentation based on one of your experiments. This presentation will be graded on physics (doing the experiment correctly and understanding it), content (correctly identifying the most important elements of the experiment), visual support (showing graphics that are helpful, clear, and not distracting), oral quality (speaking loudly enough without mumbling, making eye contact), and your ability to ask relevant questions of the other speakers.

**What is the lab schedule?** Labs will meet on the following days:

<b>Lab 0:</b>	<b>Introduction</b>	<b>Aug 30 – Sep 1</b>
<b>Lab 1</b>	<b>Index of Refraction of Glass/Lenses</b>	<b>Sep 6 – Sep 8</b>
<b>Lab 2</b>	<b>Permittivity of Free Space</b>	<b>Sep 13 – Sep 15</b>
<b>Lab 3</b>	<b>Polarization of Light</b>	<b>Sep 20 – Sep 22</b>
<b>Lab 4</b>	<b>Ultrasonic Interference and Diffraction</b>	<b>Sep 27 – Sep 29</b> <b>Oct 4 – Oct 6</b>
<b>Lab 5</b>	<b>The Speed of Light</b>	<b>Oct 18 – Oct 20</b> <b>Oct 25 – Oct 27</b>
<b>Lab 6</b>	<b>The Bohr Atom</b>	<b>Nov 1 – Nov 3</b>
<b>Lab 7</b>	<b>The Michelson Interferometer</b>	<b>Nov 8 – Nov 10</b>
<b>Lab 8</b>	<b>Blackbody Radiation</b>	<b>Nov 15 – Nov 17</b>
	<i>Thanksgiving Break</i>	<i>Nov 24 – Nov 26</i>
<b>Lab 9</b>	<b>Photoelectric Effect</b>	<b>Nov 29 – Dec 1</b>
<b>Lab 10</b>	<b>Chaos – Computer Simulation</b>	<b>Dec 6 – Dec 8</b>
	<b>Oral Presentations</b>	<b>Fri, Dec 16, 12:00pm</b>

Also, your assigned lab partners are listed on the course web site. Note that you'll have a different partner each week. To determine your lab partner(s) for any experiment, find the row corresponding to your name, and then scan across until you find the number of the lab you are performing (as listed above). The name above this number is your partner. If an experiment number is colored pink, then you will make an oral presentation on your work for that experiment on December 16.