

# Advanced Physics Laboratory

## Overview

This is a one semester laboratory course in advanced physics for both undergraduate and graduate students. There are seven experimental setups. Each person will do three experiments during the semester. You will work on experiments and analyze the data in pairs. However, each student will write their own detailed report.

## Professor

My office is room 323 of the physics building. At times, you may find me instead in the High Energy Physics group's area in the basement of the physics building, usually in room 27. My phone is x62879, and my email is blocker@brandeis.edu. I don't have scheduled office hours but am around much of the time. Drop by my office or send me an email to make an appointment.

## Texts

For each experiment, there are reference materials on the website for the course and in the laboratory. There are also books on reserve in the library.

1. NMR: Slichter, *Principles of Magnetic Resonance*; Abragam, *Principles of Nuclear Magnetism*; Derome, *Modern NMR Techniques for Chemistry Research*.
2. X-Rays: Guinier, *X-Ray Diffraction*; Warren, *X-Ray Diffraction*; Cullity, *Elements of X-Ray Diffraction*.
3. Chaos: Baker and Gollub, *Chaotic Dynamics*; Hilborn, *Chaos and Nonlinear Dynamics*; Strogatz, *Nonlinear Dynamics and Chaos*; Scheck, *Mechanics*.
4. Simulations: Gould and Tobochnik, *An Introduction to Computer Simulations Methods*; Landau and Binder, *A Guide to Monte Carlo Simulations in Statistical Physics*.
5. Laser Tweezers: There are several research articles in the lab rather than books on reserve.
6. Light Scattering: Pecora, *Dynamic Light Scattering*; Berne and Pecora, *Dynamic Light Scattering*.
7. Fourier Optics: Goodman, *Introduction to Fourier Optics*; Steward, *Fourier Optics, An Introduction*.

## Grading

The final grade will be based on participation in the lab and the lab reports. Since this is a writing intensive course for the undergrads, for the first lab report for all members of the class, I will make comments and corrections and ask that you submit a revised report. For the other two lab reports, there will be one submission.

**Disabilities**

If you are a student with a documented disability on record at Brandeis and wish to have a reasonable accommodation in this class, please see me immediately.

**Academic Integrity**

Although you will learn much from the written documents and from your lab partner, you must write your own lab reports. If you wish to quote from sources or use results obtained elsewhere, proper attribution must be given. If you are in doubt, ask me.