

Advanced Physics Laboratory

M,W 2:00pm - 4:50pm

Abelson-Bass-Yalem Physics 340

Professor: Seth Fraden

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Office Hours: 9am - 5pm, M-F

Website: <http://fraden.brandeis.edu/courses/phys39/index.html>

Texts: For each experiment, there are reference materials in the laboratory, on the course website and books in the library.

1. NMR: Slichter, *Principles of Magnetic Resonance*; Abragam, *Principles of Nuclear Magnetism*; Derome, *Modern NMR Techniques for Chemistry Research*
2. Chaos: Baker and Gollub, *Chaotic Dynamics*; Hilborn, *Chaos and Nonlinear Dynamics*; Strogatz, *Nonlinear Dynamics and Chaos*; Scheck, *Mechanics*
3. Simulations: Gould and Tobochnik, *An Introduction to Computer Simulation Methods*; Landau and Binder, *A guide to Monte Carlo Simulations in Statistical Physics*
4. Laser Tweezers: There are several research articles in the lab, rather than books on reserve.
5. Light Scattering: Pecora, *Dynamic Light Scattering*; Berne and Pecora, *Dynamic Light Scattering*
6. Fourier Optics: Goodman, *Introduction to Fourier Optics*; Steward, *Fourier Optics, An Introduction*; Hecht *Optics*
7. MATLAB: Beucher, *Introduction to MATLAB & SIMULINK* ; Chapman, *MATLAB programming for engineers*

Material: There are a number of experiments available in the laboratory. Normally, students will work in pairs on three of these in the course of a semester. **Although students work in pairs to perform experiments and analyze data, it is most important that each student write an individual detailed laboratory report on each experiment.**

Grading: The final grade will be based on participation in the lab and on the lab reports. There will be no exams.

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

Academic Integrity: **Although you will learn much from written documents and from your lab partner, you must write your own lab report. If you wish to quote from sources, or use results obtained elsewhere, proper attribution in the form of footnotes and references must be given.**