Harvard University  
Physics 143a: QUANTUM MECHANICS

Instructor  Eugene Demler  
Email: demler@physics.harvard.edu  
Phone: (617) 496-1045  
Office: Lyman 322  
Office hours: Wednesday 3:00 - 4:00 pm  
Assistant: Jennifer Bastin, Lyman 324b, bastin@physics.harvard.edu, (617) 495-8852

Teaching Fellow  David Benjamin  
Email: dbenjam@fas.harvard.edu  
Phone: (801) 706-3440  
Office: Lyman 532  
Office hours: This week Friday 10 am - 12 am, later TBA

Course Meetings:  TTh, 10:00 - 11:30 in Jefferson 256  
Homework:  Weekly problem sets, 20% of grade.  
You are encouraged to discuss problem sets. However, you must write your solutions individually.  
Midterm:  35% of grade  
Exam:  45% of grade

Topics  
Introduction to nonrelativistic quantum mechanics: uncertainty relations; Schrodinger equation; one-dimensional problems including particle in a box, tunneling, and harmonic oscillator; angular momentum, hydrogen atom, spin, Pauli principle; perturbation theory; identical particles.

Primary textbook  

Additional references  
B. Reed, Quantum Mechanics, Jones and Bartlett Publishers (2008).  
Tentative outline of lectures

2. Momentum and angular momentum.
3. The uncertainty principle.
4. Time independent Schroedinger equation. Simple potentials in one dimension: infinite square well, harmonic oscillator.
5. Operator solution of the harmonic oscillator problem.
8. The finite square well. Double square well.
10. Quantum mechanics in three dimensions. Schroedinger equation for spherically symmetric potentials.
11. Angular momentum. Raising and lowering operators. Eigenstates
13. Spin.
15. Addition of angular momenta.
18. Quantum cryptography.
22. Variational calculations.
23. Identical particles. First and second order coherence.