

PHY 6646 - Quantum Mechanics II

Spring 2022 - Course Schedule

January 5: The Hydrogen atom

January 7: The degeneracies of the Hydrogen Atom and of the Isotropic Harmonic Oscillator

January 10: The Hartree-Fock approximation

January 12, 14: Spin

January 19: Gyromagnetic ratios

January 21: Paramagnetic resonance

January 24: Spin-Orbit interactions

January 26, 28, 31: Addition of angular momenta

February 2, 4: Irreducible Tensor Operators

February 7: The Wigner-Eckart Theorem

February 9: The Variational Method

February 11, 14: The Wentzel-Kramers-Brillouin Method

February 16: Bound states and the Bohr-Sommerfeld quantization rule

February 18: The Eikonal approximation

February 23, 25: Time-independent Non-degenerate Perturbation Theory

February 28: Selection rules

March 2, 4: The Stark effect

March 14: Degenerate Perturbation Theory

March 16, 18: Fine Structure of the Hydrogen Atom

March 21: Time-dependent Perturbation Theory

March 23, 25: Adiabatic perturbations

March 28: Periodic perturbations and Fermi's Golden Rule

March 30: Absorption and Emission of Light by Atoms

April 1: The Heisenberg Picture and Interacting Picture Formulations

April 4: Motion in a periodic potential

April 6: Scattering Theory and the Optical Theorem

April 8: The Born Approximation

April 11: The Partial Wave Expansion

April 13: Analyticity and Resonant Scattering

April 15: The Dirac Equation

April 18: Plane Wave Solutions and the Dirac Sea

April 20: The Electron Magnetic Moment and the Fine Structure of Hydrogen revisited