

PHYS 201--Fundamentals of Physics: List of Key Phenomena

Periodic Motion

- Simple Harmonic Oscillator
- Energy in Simple Harmonic Motion
- Simple and Physical Pendulum
- Damped Oscillations
- Forced (Driven) Oscillations and Resonance

Mechanical Waves and Sound

- Transverse versus Longitudinal Waves
- Superposition
- Speed of the Wave Propagation
- Energy Transfer / Intensity
- Sound Amplitude and Pressure
- Standing Waves on a String
- Standing Waves in a Pipe (with open/open or open/closed ends)

Electromagnetic Waves

- Maxwell's Equations and Linear Wave Equation
- Poynting Vector
- Energy and Momentum of EM Waves
- Radiation Pressure
- RC Circuit and Production of EM Waves

Diffraction and Interference

- Double-Slit, Single Slit, Diffraction Grating
- Interference on Thin Films

Atomic Physics

- Atomic Emission and Absorption Spectra – Rydberg's Equation
- Bohr's Model of Hydrogen Atom

Special Theory of Relativity

- Inertial Frames and Speed of Light
- Time Dilation and Length Contraction
- Muon Decay Experiment
- Twins Paradox
- Relativistic Momentum and Energy

Introduction to Quantum Physics and Quantum Mechanics

- Blackbody Radiation and Planck's Spectral Intensity
- Stefan's Law and Wien's Law
- Photoelectric Effect
- X-Ray Production (Breaking Radiation)
- Compton Scattering
- Particle – Wave Duality
- Photon and Matter Waves – De Broglie Relationship
- Wave Function / Wave Amplitude and Probability Density
- Heisenberg's Uncertainty Principle
- Steady-State Schrödinger Equation
- Particle in a Box / Particle in an Infinite Well Potential
- Tunneling