Core Topics
Waves & Vibrations

- Harmonic oscillators
- Periodic oscillations
- Free oscillators
- Driven oscillators
- Transient phenomena & steady-state
- Coupled oscillators
- Normal modes
- Beat phenomena
- Symmetries in the context of normal modes
- Infinite # coupled oscillators
- Wave equation
  - Standing waves
  - Travelling waves
  - Longitudinal waves & sound waves
  - Waves in cavities
- Maxwell's equations
- Electromagnetic waves & accelerated charges
- Dispersion relation
- Dispersive medium
  - Poynting vector
- Phase velocity
- Group velocity
- Fourier transform representation of waves
- 2-D & 3-D waves
  - Polarization
- Snell's law
- Reflection & transmission of waves
  - Index of refraction
  - Wave in medium
- Snell's law
  - Fresnel equations
  - Brewster's angle
- Interference phenomenon
  - Soap bubble
- Huygens' principle
- Diffraction