

# Advanced Topics - Electrodynamics

## Chapter 1: Electromagnetic Waves

The Wave Equation in One Dimension

One Dimensional Scattering

Two Dimensional Scattering

Electromagnetic Plane Waves

Electromagnetic Scattering - Nonconducting Case

Electromagnetic Scattering - Conducting Case

Model of Constitutive Relations for Nonconductors

Wave Guides

## Chapter 2: Potentials and Fields

Potential formulation

Gauge transformations

Retarded potentials

Point particle fields

Moving point particle field example

## Chapter 3: Radiation

Arbitrary source radiation

Multipole expansion

Electric and magnetic multipole results

Lienard result and circular accelerators