

Solid State Physics

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A theoretical course on the solid state of matter, particularly the crystalline state. Solid state physics is primarily concerned with the remarkable mechanical, thermal, electronic, magnetic, and optical properties exhibited by atoms and molecules because of their regular arrangement in crystals. Understanding and using these properties have resulted in nearly all modern electronic, optical, and mechanical technologies.

Major Topics: Crystal Structure and Interatomic Forces
X-Ray, Neutron, and Electron Diffraction in Crystals
Reciprocal Lattice
Lattice Vibrations and Phonons; Thermal Properties
The Free-Electron Model
Energy Bands in Solids
Semiconductors, Theory and Devices

Time permitting:
Dielectric and Optical Properties of Solids
Defects in Solids
Superconductivity