

Contents

1. **Introduction to Electronic Properties of Metals**
 - Importance of electron behavior in metallic solids
 - Fundamental concepts of metallic conduction
2. **Electron Theory of Metals**
 - Free-electron model
 - Quantum description of electrons in metals
 - Fermi energy and Fermi surface
3. **Electronic Structure and Band Theory**
 - Energy bands in crystalline solids
 - Bloch states and periodic potentials
 - Density of electronic states
4. **Many-Body Effects and Electron Interactions**
 - Electron–electron interactions
 - Quasi-particles and elementary excitations
 - Landau theory concepts
5. **Transport Properties of Metals**
 - Electrical conductivity
 - Thermal conductivity
 - Magnetotransport phenomena
6. **Magnetic and Optical Properties**
 - Magnetic response of metals
 - Optical behavior and electronic transitions
7. **Advanced Topics and Applications**
 - Modern approaches to metallic electronic systems
 - Relations between metals and semiconductors
 - Contemporary materials science applications