

## **2. Semiconductor Physics**

### **2.1 Basic Band Theory**

#### **2.1.1 Essentials of the Free Electron Gas**

#### **2.1.2 Diffraction of Electron Waves**

#### **2.1.3 Energy Gaps and General Band Structure**

#### **2.1.4 Periodic Potentials and Bloch's Theorem**

#### **2.1.5 Band Structures and Standard Representations**

### **2.2 Basic Semiconductor Physics**

#### **2.2.1 Intrinsic Properties in Equilibrium**

#### **2.2.2 Doping, Carrier Density, Mobility, and Conductivity**

#### **2.2.3 Lifetime and Diffusion Length**

#### **2.2.4 Simple Junctions and Devices**

### **2.3 Elements of Advanced Theory**

#### **2.3.1 Effective Masses**

#### **2.3.2 Quasi Fermi Energies**

#### **2.3.3 Shockley-Read-Hall Recombination**

#### **2.3.4 Useful Relations**

#### **2.3.5 Junction Reconsidered**