

Physical Foundations of Solid-State Devices

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Introduction

Quantum mechanics plays an essential role in modern semiconductor heterostructure devices. The spatial dimensions of such devices are frequently on the scale of just Angstroms. In the domain of microscopic structures with dimensions comparable to the electron de Broglie wavelength, size quantization occurs. Classical and semi-classical physics no longer gives a correct description of many physical processes. The inclusion of quantum mechanical principles becomes mandatory and provides a most useful description of many physical processes in electronic and photonic heterostructure devices.

Table of Contents

- 1 Classical mechanics and the advent of quantum mechanics
 - 1.1 Newtonian mechanics
 - 1.2 Energy
 - 1.3 Hamiltonian formulation of Newtonian mechanics
 - 1.4 Breakdown of classical mechanics
- 2 The postulates of quantum mechanics
 - 2.1 The five postulates of quantum mechanics
 - 2.2 The de Broglie hypothesis
 - 2.3 The Bohr–Sommerfeld quantization condition
- 3 Position and momentum space
 - 3.1 Group and phase velocity
 - 3.2 Position-space and momentum-space representation, and Fourier transform
 - 3.3 Illustrative example: Position and momentum of particles in a square well
- 4 Operators
 - 4.1 Quantum mechanical operators
 - 4.2 Eigenfunctions and eigenvalues
 - 4.3 Linear operators
 - 4.4 Hermitian operators
 - 4.5 The Dirac bracket notation
 - 4.6 The Dirac delta function
- 5 The Heisenberg uncertainty principle
 - 5.1 Definition of uncertainty
 - 5.2 Position–momentum uncertainty
 - 5.3 Energy–time uncertainty
- 6 The Schrödinger equation
 - 6.1 The time-dependent Schrödinger equation
 - 6.2 The time-independent Schrödinger equation

- 6.3 The superposition principle
- 6.4 The orthogonality of eigenfunctions
- 6.5 The complete set of eigenfunctions

- 7 Applications of the Schrödinger equation in nonperiodic semiconductor structures
 - 7.1 The infinite square-shaped quantum well
 - 7.2 The asymmetric and symmetric finite square-shaped quantum well
 - 7.3 The square-shaped quantum barrier
 - 7.4 The “attempt to escape model”

- 8 Applications of the Schrödinger equation in periodic semiconductor structures
 - 8.1 Free electrons
 - 8.2 The Bloch theorem
 - 8.3 The Kronig–Penney model
 - 8.4 The effective mass
 - 8.5 Semiconductor superlattices

- 9 Approximate solutions of the Schrödinger equations
 - 9.1 The WKB method
 - 9.2 The connection formulas in the WKB method
 - 9.3 The WKB method for bound states
 - 9.4 The variational method

- 10 Time-independent perturbation theory
 - 10.1 First-order time-independent perturbation theory
 - 10.2 Second-order time-independent perturbation theory
 - 10.3 Example for first-order perturbation calculation

- 11 Time-dependent perturbation theory
 - 11.1 Time-dependent perturbation theory
 - 11.2 Step-function-like perturbation
 - 11.3 Harmonic perturbation and Fermi’s Golden Rule

- 12 Density of states
 - 12.1 Density of states in bulk semiconductors (3D)
 - 12.2 Density of states in semiconductors with reduced dimensionality (2D, 1D, 0D)
 - 12.3 Effective density of states in 3D, 2D, 1D, 0D semiconductors

- 13 Classical and quantum statistics
 - 13.1 Probability and distribution functions
 - 13.2 Ideal gases of atoms and electrons
 - 13.3 Maxwell velocity distribution
 - 13.4 The Boltzmann factor
 - 13.5 The Fermi–Dirac distribution
 - 13.6 The Fermi–Dirac integral of order $j = + 1/2$
 - 13.7 The Fermi–Dirac integral of order $j = 0$
 - 13.8 The Fermi–Dirac integral of order $j = - 1/2$

- 14 Carrier concentrations

- 14.1 Intrinsic semiconductors
- 14.2 Extrinsic semiconductors (single donor species)
- 14.3 Extrinsic semiconductors (two donor species)
- 14.4 Compensated semiconductors

- 15 Impurities in semiconductors
 - 15.1 Bohr's hydrogen atom model
 - 15.2 Hydrogenic donors
 - 15.3 Hydrogenic acceptors
 - 15.4 Central cell corrections
 - 15.5 Impurities associated with subsidiary minima
 - 15.6 Deep impurities

- 16 High doping effects
 - 16.1 Screening of impurity potentials
 - 16.2 The Mott transition
 - 16.3 The Burstein – Moss shift
 - 16.4 Impurity bands
 - 16.5 Band tails
 - 16.6 Bandgap narrowing

- 17 Heterostructures
 - 17.1 Band discontinuities
 - 17.2 Semiconductor heterostructures

- 18 Tunneling in heterostructures
 - 18.1 Ohmic contact structures
 - 18.2 Metal-oxide-semiconductor structures

- 19 Some electrical device structures
 - 19.1 Modulation-doped structures
 - 19.2 Resonant-tunneling structures

- 20 Some optical device structures
 - 20.1 Quantum well LEDs and lasers
 - 20.2 Devices using the quantum-confined Stark effect
 - 20.3 Devices using intersubband transitions