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Nota di contenuto	Solid-State Physics for Electronics; Table of Contents; Foreword; Introduction; Chapter 1. Introduction: Representations of Electron-Lattice Bonds; 1.1. Introduction; 1.2. Quantum mechanics: some basics; 1.2.1. The wave equation in solids: from Maxwell's to Schrodinger's equation via the de Broglie hypothesis; 1.2.2. Form of progressive and stationary wave functions for an electron with known energy (E); 1.2.3. Important properties of linear operators; 1.3. Bonds in solids: a free electron as the zero order approximation for a weak bond; and strong bonds 1.3.1. The free electron: approximation to the zero order1.3.2. Weak bonds; 1.3.3. Strong bonds; 1.3.4. Choosing between approximations for weak and strong bonds; 1.4. Complementary material: basic evidence for the appearance of bands in solids; 1.4.1. Basic solutions for narrow potential wells; 1.4.2. Solutions for two neighboring narrow potential wells; Chapter 2. The Free Electron and State Density

Functions; 2.1. Overview of the free electron; 2.1.1. The model; 2.1.2. Parameters to be determined: state density functions in k or energy spaces
2.6.2. Expression for the state density functions in k space2.6.3. Expression for the state density functions in energy space; 2.7. Problems; 2.7.1. Problem 1: the function Z(E) in 1D; 2.7.2. Problem 2: diffusion length at the metal-vacuum interface; 2.7.3. Problem 3: 2D media: state density function and the behavior of the Fermi energy as a function of temperature for a metallic state; 2.7.4. Problem 4: Fermi energy of a 3D conductor; 2.7.5. Problem 5: establishing the state density function via reasoning in moment or k spaces
2.7.6. Problem 6: general equations for the state density functions expressed in reciprocal (k) space or in energy space

Sommario/riassunto

Describing the fundamental physical properties of materials used in electronics, the thorough coverage of this book will facilitate an understanding of the technological processes used in the fabrication of electronic and photonic devices. The book opens with an introduction to the basic applied physics of simple electronic states and energy levels. Silicon and copper, the building blocks for many electronic devices, are used as examples. Next, more advanced theories are developed to better account for the electronic and optical behavior of ordered materials, such as diamond, and disordered ma