

1. Record Nr.	UNINA9910458719403321
Autore	Grosso Giuseppe
Titolo	Solid state physics [[electronic resource] /] / Giuseppe Grosso, Giuseppe Pastori Parravicini
Pubbl/distr/stampa	San Diego, : Academic Press, c2000
ISBN	1-281-11892-3 9786611118921 0-08-048102-7
Descrizione fisica	1 online resource (741 p.)
Altri autori (Persone)	Pastori ParraviciniGiuseppe
Disciplina	530.4/1
Soggetti	Solid state physics Solids Electronic books.
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Front Cover; Solid State Physics; Copyright Page; Contents; Preface; Chapter I. Electrons in one-dimensional periodic potentials; 1 The Bloch theorem for one-dimensional periodicity; 2 Energy levels in a periodic array of quantum wells; 3 Electron tunneling and energy bands; 4 The tight-binding approximation; 5 Plane waves and nearly free-electron approximation; 6 Some dynamical aspects of electrons in band theory; Further reading; Chapter II. Geometrical description of crystals: direct and reciprocal lattices; 1 Simple lattices and composite lattices 2 Geometrical description of some crystal structures3 Wigner-Seitz primitive cells; 4 Reciprocal lattices; 5 Brillouin zones; 6 Translational symmetry and quantum mechanical aspects; 7 Density-of-states and critical points; Further reading; Chapter III. The Sommerfeld free-electron theory of metals; 1 Quantum theory of the free-electron gas; 2 Fermi-Dirac distribution function and chemical potential; 3 Electronic specific heat in metals and thermodynamic functions; 4 Thermionic emission from metals; Appendix A. Outline of statistical physics and thermodynamic relations A1. Microcanonical ensemble and thermodynamic quantitiesA2.

Canonical ensemble and thermodynamic quantities; A3. Grand canonical ensemble and thermodynamic quantities; Appendix B. Fermi-Dirac and Bose-Einstein statistics for independent particles; Appendix C. Modified Fermi-Dirac statistics in a model of correlation effects; Further reading; Chapter IV. The one-electron approximation and beyond; 1 Introductory remarks on the many-electron problem; 2 The Hartree equations; 3 Identical particles and determinantal wavefunctions; 4 Matrix elements between determinantal states 5 The Hartree-Fock equations6 Overview of approaches beyond the one-electron approximation; 7 Electronic properties and phase diagram of the homogeneous electron gas; 8 The density functional theory and the Kohn-Sham equations; Appendix A. Bielectronic integrals among spin-orbitals; Appendix B. Outline of second quantization formalism for identical fermions; Appendix C. An integral on the Fermi sphere; Further reading; Chapter V. Band theory of crystals; 1 Basic assumptions of the band theory; 2 The tight-binding method (LCAO method); 3 The orthogonalized plane wave (OPW) method 4 The pseudopotential method5 The cellular method; 6 The augmented plane wave (APW) method; 7 The Green's function method (KKR method); 8 Other methods and developments in electronic structure calculations; Further reading; Chapter VI. Electronic properties of selected crystals; 1 Band structure and cohesive energy of rare-gas solids; 2 Electronic properties of ionic crystals; 3 Covalent crystals with diamond structure; 4 Band structures and Fermi surfaces of some metals; Further reading; Chapter VII. Excitons, plasmons and dielectric screening in crystals; 1 Exciton states in crystals 2 Plasmon excitations in crystals

Sommario/riassunto

Although there are many books published in solid state physics, there is a wide gap between the active field of research and the conceptstraditionally taught in solid state courses. This book fills that gap. The style is tutorial, simple, and completely self-contained. Solid State Physicsexplains to readers the newest advances in the area of condensed matter physics with rigorous, but lucid mathematics. Examples are an integral part of the text, and they are carefully designed to apply the fundamental principles illustrated in the text to currently active topics of research.
