

# ELEMENTS OF SOLID STATE PHYSICS

SECOND EDITION

**J.P. SRIVASTAVA**  
Former Professor of Physics  
Aligarh Muslim University  
Aligarh

**PHI Learning** Private Limited

New Delhi-110001

2009

# Elements Of Solid State Physics

**M.R. Rudden**



## **Elements Of Solid State Physics:**

*ELEMENTS OF SOLID STATE PHYSICS* J.P. SRIVASATAVA,2014-12-11 This revised and updated Fourth Edition of the text builds on the strength of previous edition and gives a systematic and clear exposition of the fundamental principles of solid state physics The text covers the topics such as crystal structures and chemical bonds semiconductors dielectrics magnetic materials superconductors and nanomaterials What distinguishes this text is the clarity and precision with which the author discusses the principles of physics their relations as well as their applications With the introduction of new sections and additional information the fourth edition should prove highly useful for the students This book is designed for the courses in solid state physics for B Sc Hons and M Sc students of physics Besides the book would also be useful to the students of chemistry material science electrical electronic and allied engineering disciplines New to the Fourth Edition Solved examples have been introduced to explain the fundamental principles of physics Matrix representation for symmetry operations has been introduced in Chapter 1 to enable the use of Group Theory for treating crystallography A section entitled Other Contributions to Heat Capacity has been introduced in Chapter 5 A statement on Kondo effect minimum has been added in Chapter 14 A section on Graphenes has been introduced in Chapter 16 The section on Carbon Nanotubes in Chapter 16 has been revised A Lesson on Group Theory has been added as Appendix

**Elements of Solid State Physics** H. Y. Fan,1987 This introduction to solid state physics covers the basic problems of condensed matter amorphous or glassy solids and liquid crystals Ion lattice symmetry and its direct consequences are treated in the first chapter Following the adiabatic approximation the treatment is divided into two parts the system of ions and the system of electrons Interactions of the two systems are considered and the various properties of the solid beginning with some general considerations on structure and phase transitions are also dealt with

**Elements of Solid State Physics** Michael Noel Rudden,John Wilson,1980

**Elements of Solid State Physics** J. P. Srivastava,2011 *Elements of Solid State Physics* Michael N. Rudden,2005-09-23 A basic introduction to the principles of solid state physics and the theory of semiconductor devices Assumes no prior knowledge of quantum or statistical mechanics relying instead on simple models to illustrate physical principles This edition has been updated in light of recent developments including high temperature superconductors and optoelectronics Contains numerous new worked examples *Elements of Solid State Physics* Michael Noel Rudden,J. J. Wilson,1980 *Elements of Solid State Physics* Srivastava,2006 This largely revised and updated second edition of the text builds on the strength of the previous edition It gives a systematic and clear exposition of the fundamental principles of solid state physics The text covers topics such as crystal structure and chemical bonds semiconductors dielectrics magnetic materials and superconductors The most notable feature of the second edition is the inclusion of a separate chapter on nanomaterials A brief account of the properties and applications of nanomaterials with a short description of the methods used for their synthesis is given What distinguishes the text is the clarity and precision with which the author discusses the

principles of physics their relations and their applications Intended primarily as a text for courses in solid state physics for B Sc Hons and M Sc students of physics the book would also be extremely useful to students of electrical electronics and allied engineering disciplines Solid State Physics Giuseppe Grosso, Giuseppe Pastori Parravicini, 2013-10-17 Solid State Physics is a textbook for students of physics material science chemistry and engineering It is the state of the art presentation of the theoretical foundations and application of the quantum structure of matter and materials This second edition provides timely coverage of the most important scientific breakthroughs of the last decade especially in low dimensional systems and quantum transport It helps build readers understanding of the newest advances in condensed matter physics with rigorous yet clear mathematics Examples are an integral part of the text carefully designed to apply the fundamental principles illustrated in the text to currently active topics of research Basic concepts and recent advances in the field are explained in tutorial style and organized in an intuitive manner The book is a basic reference work for students researchers and lecturers in any area of solid state physics Features additional material on nanostructures giving students and lecturers the most significant features of low dimensional systems with focus on carbon allotropes Offers detailed explanation of dissipative and nondissipative transport and explains the essential aspects in a field which is commonly overlooked in textbooks Additional material in the classical and quantum Hall effect offers further aspects on magnetotransport with particular emphasis on the current profiles Gives a broad overview of the band structure of solids as well as presenting the foundations of the electronic band structure Also features reported with new and revised material which leads to the latest research *Elements Of Solid State Physics* M.R. Rudden, *Elements of Solid State Physics* Mr. Sanjeev Pandey, 2024-08-16 Covers fundamental concepts of solid state physics including crystal structures electronic properties lattice dynamics and their applications in materials science and engineering *Solid State Physics* Frederick Seitz, David Turnbull, 1961 Solid State Physics V12

**Introduction to Solid State Physics and Crystalline Nanostructures** Giuseppe Iadonisi, Giovanni Cantele, Maria Luisa Chiofalo, 2014-06-13 This textbook provides conceptual procedural and factual knowledge on solid state and nanostructure physics It is designed to acquaint readers with key concepts and their connections to stimulate intuition and curiosity and to enable the acquisition of competences in general strategies and specific procedures for problem solving and their use in specific applications To these ends a multidisciplinary approach is adopted integrating physics chemistry and engineering and reflecting how these disciplines are converging towards common tools and languages in the field Each chapter discusses essential ideas before the introduction of formalisms and the stepwise addition of complications Questions on everyday manifestations of the concepts are included with reasoned linking of ideas from different chapters and sections and further detail in the appendices The final section of each chapter describes experimental methods and strategies that can be used to probe the phenomena under discussion Solid state and nanostructure physics is constantly growing as a field of study where the fascinating quantum world emerges and otherwise imaginary things can become real engineered with

increasing creativity and control from tinier and faster technologies realizing quantum information concepts to understanding of the fundamental laws of Physics Elements of Solid State Physics and of Crystalline Nanostructures will offer the reader an enjoyable insight into the complex concepts of solid state physics *Solid State Physics* John J. Quinn, Kyung-Soo Yi, 2009-09-18 Intended for a two semester advanced undergraduate or graduate course in Solid State Physics this treatment offers modern coverage of the theory and related experiments including the group theoretical approach to band structures Moessbauer recoil free fraction semi classical electron theory magnetoconductivity electron self energy and Landau theory of Fermi liquid and both quantum and fractional quantum Hall effects Integrated throughout are developments from the newest semiconductor devices e g space charge layers quantum wells and superlattices The first half includes all material usually covered in the introductory course but in greater depth than most introductory textbooks The second half includes most of the important developments in solid state researches of the past half century addressing e g optical and electronic properties such as collective bulk and surface modes and spectral function of a quasiparticle which is a basic concept for understanding LEED intensities X ray fine structure spectroscopy and photoemission So both the fundamental principles and most recent advances in solid state physics are explained in a class tested tutorial style with end of chapter exercises for review and reinforcement of key concepts and calculations **Solid State Physics** Gerald Burns, 2013-11-06 Solid State Physics International Edition covers the fundamentals and the advanced concepts of solid state physics The book is comprised of 18 chapters that tackle a specific aspect of solid state physics Chapters 1 to 3 discuss the symmetry aspects of crystalline solids while Chapter 4 covers the application of X rays in solid state science Chapter 5 deals with the anisotropic character of crystals Chapters 6 to 8 talk about the five common types of bonding in solids while Chapters 9 and 10 cover the free electron theory and band theory Chapters 11 and 12 discuss the effects of movement of atoms and Chapter 13 talks about the optical properties of crystals Chapters 14 to 18 cover the other relevant areas of solid state physics such as ferroelectricity magnetism surface science and artificial structure The book will be of great use both to novice and experienced researchers in the field of solid state physics **Introductory Solid State Physics** H.P. Meyers, 2014-04-21 Assuming an elementary knowledge of quantum and statistical physics this book provides a guide to principal physical properties of condensed matter as well as the underlying theory necessary for an understanding of their origins **Solid State Physics** Neil W. Ashcroft, N. David Mermin, 1976 This book provides an introduction to the field of solid state physics for undergraduate students in physics chemistry engineering and materials science *Solid State Physics*, 1980-09-01 Solid State Physics *Nuclear Science Abstracts*, 1976 **Transplutonium Elements** Charles E. Stuber, 1977 *Solid State Physics* Mohammad Abdul Wahab, 2005 Solid State Physics a comprehensive study for the undergraduate and postgraduate students of pure and applied sciences and engineering disciplines is divided into eighteen chapters The First seven chapters deal with structure related aspects such as lattice and crystal structures bonding packing

and diffusion of atoms followed by imperfections and lattice vibrations Chapter eight deals mainly with experimental methods of determining structures of given materials While the next nine chapters cover various physical properties of crystalline solids the last chapter deals with the anisotropic properties of materials This chapter has been added for benefit of readers to understand the crystal properties anisotropic in terms of some simple mathematical formulations such as tensor and matrix

New to the Second Edition Chapter on Anisotropic Properties of Materials

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