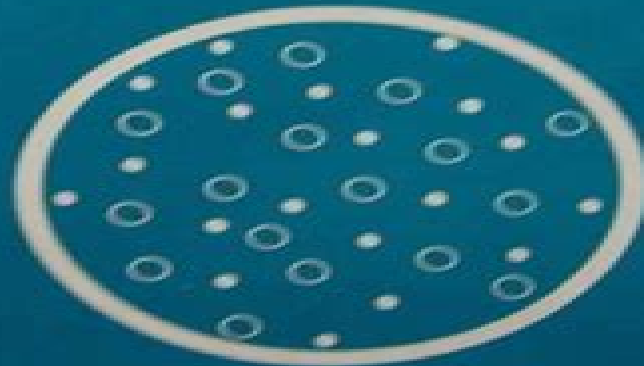


# SOLID-STATE AND SEMICONDUCTOR PHYSICS

*John P. McKelvey*




*Harper & Row*

01.17.2016

# Solid State Semiconductor Physics

**Ija P. Ipatova, Vladimir Vasil'evich  
Mitin**



## **Solid State Semiconductor Physics:**

Fundamentals of Solid-state Electronics Chih-Tang Sah, 1996 This Solution Manual a companion volume of the book Fundamentals of Solid State Electronics provides the solutions to selected problems listed in the book Most of the solutions are for the selected problems that had been assigned to the engineering undergraduate students who were taking an introductory device core course using this book This Solution Manual also contains an extensive appendix which illustrates the application of the fundamentals to solutions of state of the art transistor reliability problems which have been taught to advanced undergraduate and graduate students

Fundamentals of Solid State Engineering Manijeh Razeghi, 2006-06-12 Fundamentals of Solid State Engineering 2nd Edition provides a multi disciplinary introduction to Solid State Engineering combining concepts from physics chemistry electrical engineering materials science and mechanical engineering Basic physics concepts are introduced followed by a thorough treatment of the technology for solid state engineering Topics include compound semiconductor bulk and epitaxial thin films growth techniques current semiconductor device processing and nano fabrication technologies Examples of semiconductor devices and a description of their theory of operation are then discussed including transistors semiconductor lasers and photodetectors Revised throughout this second edition includes new chapters on the reciprocal lattice optical properties of semiconductors semiconductor heterostructures semiconductor characterization techniques and an introduction to lasers Additions and improvements have been made to the material on photodetectors and quantum mechanics as well as to the problem sections

Solid State Physics J. S. Blakemore, 1985-12-12 Updated to reflect recent work in the field this book emphasizes crystalline solids going from the crystal lattice to the ideas of reciprocal space and Brillouin zones and develops these ideas for lattice vibrations for the theory of metals and for semiconductors The theme of lattice periodicity and its varied consequences runs through eighty percent of the book Other sections deal with major aspects of solid state physics controlled by other phenomena superconductivity dielectric and magnetic properties and magnetic resonance

Introduction to Applied Solid State Physics R. Dalven, 2012-12-06 In addition to the topics discussed in the First Edition this Second Edition contains introductory treatments of superconducting materials and of ferromagnetism I think the book is now more balanced because it is divided perhaps 60% 40% between devices of all kinds and materials of all kinds For the physicist interested in solid state applications I suggest that this ratio is reasonable I have also rewritten a number of sections in the interest of hopefully increased clarity The aims remain those stated in the Preface to the First Edition the book is a survey of the physics of a number of solid state devices and materials Since my object is a discussion of the basic ideas in a number of fields I have not tried to present the state of the art especially in semiconductor devices Applied solid state physics is too vast and rapidly changing to cover completely and there are many references available to recent developments For these reasons I have not treated a number of interesting areas Among the lacunae are superlattices heterostructures compound semiconductor devices ballistic transistors integrated

optics and light wave communications Suggested references to those subjects are given in an appendix I have tried to cover some of the recent revolutionary developments in superconducting materials Solid State and Semiconductor Physics John Philip MacKelvey,1966 Introduction to Applied Solid State Physics Richard Dalven,2012-12-06 The aim of this book is a discussion at the introductory level of some applications of solid state physics The book evolved from notes written for a course offered three times in the Department of Physics of the University of California at Berkeley The objects of the course were a to broaden the knowledge of graduate students in physics especially those in solid state physics b to provide a useful course covering the physics of a variety of solid state devices for students in several areas of physics c to indicate some areas of research in applied solid state physics To achieve these ends this book is designed to be a survey of the physics of a number of solid state devices As the italics indicate the key words in this description are physics and survey Physics is a key word because the book stresses the basic qualitative physics of the applications in enough depth to explain the essentials of how a device works but not deeply enough to allow the reader to design one The question emphasized is how the solid state physics of the application results in the basic useful property of the device An example is how the physics of the tunnel diode results in a negative dynamic resistance Specific circuit applications of devices are mentioned but not emphasized since expositions are available in the electrical engineering textbooks given as references Introduction to Solid State Electronics Franklin F. Y. Wang,1980 Solid State Physical Electronics Aldert Van der Ziel,1976 **Solid State Electronic Devices** Ben Streetman,Sanjay Banerjee,2014-09-02 For undergraduate electrical engineering students or for practicing engineers and scientists interested in updating their understanding of modern electronics One of the most widely used introductory books on semiconductor materials physics devices and technology Solid State Electronic Devices aims to 1 develop basic semiconductor physics concepts so students can better understand current and future devices and 2 provide a sound understanding of current semiconductor devices and technology so that their applications to electronic and optoelectronic circuits and systems can be appreciated Students are brought to a level of understanding that will enable them to read much of the current literature on new devices and applications Teaching and Learning Experience This program will provide a better teaching and learning experience for you and your students It will help Provide a Sound Understanding of Current Semiconductor Devices With this background students will be able to see how their applications to electronic and optoelectronic circuits and systems are meaningful Incorporate the Basics of Semiconductor Materials and Conduction Processes in Solids Most of the commonly used semiconductor terms and concepts are introduced and related to a broad range of devices Develop Basic Semiconductor Physics Concepts With this background students will be better able to understand current and future devices **Solid-State Physics** James Patterson,Bernard Bailey,2007-08-06 Learning solid state physics involves a certain degree of maturity since it involves tying together diverse concepts from many areas of physics The objective is to understand in a basic way how solid materials behave To do this one needs both a good physical

and mathematical background One definition of solid state physics is that it is the study of the physical e g the electrical dielectric magnetic elastic and thermal properties of solids in terms of basic physical laws In one sense solid state physics is more like chemistry than some other branches of physics because it focuses on common properties of large classes of materials It is typical that solid state physics emphasizes how physics properties link to electronic structure We have retained the term solid state physics even though condensed matter physics is more commonly used Condensed matter physics includes liquids and non crystalline solids such as glass which we shall not discuss in detail Modern solid state physics came of age in the late thirties and forties and had its most extensive expansion with the development of the transistor integrated circuits and microelectronics Most of microelectronics however is limited to the properties of inhomogeneously doped semiconductors Solid state physics includes many other areas of course among the largest of these are ferromagnetic materials and superconductors Just a little less than half of all working physicists are in condensed matter A course in solid state physics typically begins with three broad areas 1 How and why atoms bind together to form solids 2 Lattice vibrations and phonons and 3 Electrons in solids One would then typically apply the above to 4 Interactions especially of electrons with phonons 5 Metals the Fermi surface and alloys 6 Semiconductors 7 Magnetism 8 Superconductivity 9 Dielectrics and ferroelectrics 10 Optical properties 11 Defects and 12 Certain other modern topics such as layered materials quantum Hall effect mesoscopics nanophysics and soft condensed matter In this book we will consider all of these 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

**Elements of Solid State Physics** Michael N. Rudden, John Wilson, 1993-05-24 Elements of Solid State Physics Second Edition M N Rudden and J Wilson University of Northumbria at Newcastle Newcastle upon Tyne UK This textbook provides a basic introduction to the principles of solid state physics and semiconductor devices and will prove essential for first and second year students of physics materials science and electrical electronic engineering courses It assumes no prior

knowledge of quantum or statistical mechanics and relies on simple models to illustrate the physical principles. However, the opportunity has been taken in this edition to extend the concept of energy bands to a consideration of  $E-k$  curves and certain new material has been added notably relating to superconductivity and optoelectronic devices including lasers following significant developments in these areas.

**Elements of Solid State Physics** Second Edition presents the student with an essentially non-mathematical approach to the subject. Arranged in a logical sequence with many clear illustrations, each chapter has a number of worked examples and discussion points as well as questions and answers. Readers of this fully revised and updated edition will receive a thorough grounding in the principles of solid state physics and should have sufficient knowledge about modern electronic devices to proceed to more advanced texts in this area.

**Main Contents:** Some Aspects of Modern Physics, Structure of Crystalline Solids, Theories of Conduction and Magnetism, Energy Bands in Solids, Quantum Theory of Conduction, Semiconductor Devices.

**Solid State Physics**, 2014 *Solid-State Physics* Harald Ibach, Hans Lüth, 1991-04-30. In recent decades solid state physics has seen many dramatic new developments and has become one of the largest independent branches of physics. It has simultaneously expanded into many new areas playing a vital role in fields that were once the domain of the engineering and chemical sciences. A consequence of this explosive development is that no single university lecturer can today be expected to have a detailed knowledge of all aspects of this vast subject; likewise it is impossible to conceive of a course that could offer students a comprehensive understanding of the entire discipline and its many applications. In view of this situation it is particularly valuable to have a textbook that gives a concise account of the essential elements of the physics of solids. In this book the fundamental aspects of solid state physics are presented according to the scheme: Chemical bonding, structure, lattice dynamics and electronic properties. We believe that this sequence is the optimum choice for tutorial purposes. It enables the more difficult concepts to be introduced at a point where a basic understanding of fundamental ideas has already been achieved through the study of simple models and examples. In addition to this carefully structured exposition of classical solid state theory based on the periodic solid and the one-electron approximation, the book also includes comprehensive descriptions of the most active areas in modern research: Magnetism, superconductivity and semiconductor physics.

**Solid State Physics and Electronics** RK Puri | VK Babbar, 2008. The present edition is brought up to incorporate the useful suggestions from a number of readers and teachers for the benefit of students. A topic on common collector configuration is added to the chapter XIII. A new chapter on logic gates is introduced at the end. Keeping in view the present style of university Question papers, a number of very short, short and long, thoroughly revised and corrected to remove the errors which crept into earlier editions.

**Solid State and Semiconductor Physics** John P. MacKelvey, 1969 *Solid State Physics* Dr. Om Prakash Pahuja, 2005-12. Introduction to Solid-state Electronics Ija P. Ipatova, Vladimir Vasil'evich Mitin, 1996-01. Introduction to Solid State Electronics combines a modern presentation of semiconductor physics with a description of the principles of semiconductor devices. It unites the

authors extensive teaching and research experience with the requirements of an introductory graduate course in Solid State Electronics for engineering students Since a crystal is an object of high symmetry some simple techniques which do not require knowledge of the mathematical groups at the professional level are used for the application of symmetry to the analysis of band structures The textbook outlines the properties of low dimensional structures in parallel with those of bulk materials The authors have made the mathematical derivations both as self contained and as simple as possible without using arguments of the type it can be easily shown that This technique is just one of many that enables the book to provide a clear comprehensive understanding of the main properties of semiconductors and their relations to device structures

*Solid State Physics* Ajay Kumar Saxena, **Out of the Crystal Maze** Lillian Hoddeson, 1992 Focuses on the field of solid state physics also referred to as condensed matter physics which grew to maturity between 1920 and 1960 The history of some exciting developments is told here in an easy to follow text accessible to general readers while maintaining standards of high scholarship

Immerse yourself in heartwarming tales of love and emotion with Crafted by is touching creation, **Solid State Semiconductor Physics** . This emotionally charged ebook, available for download in a PDF format ( PDF Size: \*), is a celebration of love in all its forms. Download now and let the warmth of these stories envelop your heart.

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