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## KEY=SOLIDS - PHELPS CABRERA

## Optical Properties of Solids

*Oxford University Press For final year undergraduates and graduate students in physics, this book offers an up-to-date treatment of the optical properties of solid state materials.*

## Optical Properties of Thin Solid Films

*Courier Corporation Authoritative reference treats the formation, structure, optical properties, and uses of thin solid films, emphasizing causes of their unusual qualities. 162 figures. 19 tables. 1955 edition.*

## Introduction to Applied Solid State Physics

## Topics in the Applications of Semiconductors, Superconductors, and the Nonlinear Optical Properties of Solids

*Springer Science & Business Media 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 elec trical engineering textbooks given as references.*

## Optical Interactions In Solids (2nd Edition)

*World Scientific Publishing Company Optical Interactions in Solids presents an extensive and unified treatment of the basic principles of the optical properties of solids. It provides a theoretical background to workers in the field of laser physics and absorption and fluorescence spectroscopy of solid state materials. The book is a comprehensive coverage of the subject and is systematically and didactically organized. The level of presentation is such that it will benefit and interest both advanced students and research workers. Group theory — which is useful throughout — is introduced early in the book advocating the scientific community to overcome the reluctance to employ this powerful method. Consistent emphasis is given throughout the book to the relevance of symmetry and to detailed calculations. Different subjects as various as quantum theory of radiation field, thermal vibrations of molecules and crystals and covalent bonding are brought together in a unified treatment which requires knowledge of all these topics and this points to the interpretation of the spectral properties of solids. The content of this work could be used as a two term graduate course in solid state spectroscopy.br>*

## Optical Properties of Solids

*Oxford University Press, USA Introduction to Econometrics provides a step by step introductory guide to the core areas of this subject.This new edition of Dougherty's highly successful textbook has been substantially updated and revised with the inclusion of new material on specification tests, binary choice models, tobit analysis, sample selection bias, nonstationary time series, and unit root tests and cointegration. In addition, the book will be acompanied by a website containing graphical treatment of allthe topics covered in the text.*

## Electrodynamics of Solids

## Optical Properties of Electrons in Matter

*Cambridge University Press A graduate-level book about the propagation of electromagnetic fields and their interaction with condensed matter.*

## Optical Properties of Solids

*Academic Press Optical Properties of Solids covers the important concepts of intrinsic optical properties and photoelectric emission. The book starts by providing an introduction to the fundamental optical spectra of solids. The text then discusses Maxwell's equations and the dielectric function; absorption and dispersion; and the theory of free-electron metals. The quantum mechanical theory of direct and indirect transitions between bands; the applications of dispersion relations; and the derivation of an expression for the dielectric function in the self-consistent field approximation are also encompassed. The book further tackles current-current correlations; the fluctuation-dissipation theorem; and the effect of surface plasmons on optical properties and photoemission. People involved in the study of the optical properties of solids will find the book invaluable.*

## Optical Properties of Solids

# An Introductory Textbook

*This textbook introduces the general point of views of the optical properties of solids, with an overview of optics in solid state materials. The textbook is designed for all kinds of learners, especially independent learners. The author collects his own academic papers and researches in this textbook to visualize the related theoretical concepts. The problem sets provided in each chapter are written to examine the reader's understanding of each concept. The textbook is divided into two main parts. The first part is combined with the six disciplines, giving readers background on electromagnetic theory. The author then describes optical theory through the remaining nine chapters.*

# Electronic Structure and Magneto-Optical Properties of Solids

*Springer Science & Business Media The aim of this book is to review recent achievements in thetheoretical investigations of the electronic structure, optical, magneto-optical (MO), and x-ray magnetic circular dichroism (XMCD)properties of compounds and Multilayered structures.Chapter 1 of this book is of an introductory character and presentsthe theoretical foundations of the band theory of solids such as thedensity functional theory for ground state properties of solidsincluding local density approximation (LDA). It also presents somemodifications to the LDA, such as gradient correction, self-interaction correction, LDA+U method, orbital polarizationcorrection, GW approximation, and dynamical mean- field theory. Thedescription of the magneto-optical effects and linear response theoryare also presented.The book describes the MO properties for a number of 3d materials, such as elemental ferromagnetic metals (Fe, Co and Ni) andparamagnetic metals in external magnetic fields (Pd and Pt), someimportant 3d compounds such as XPt3 (X=V, Cr, Mn, Fe and Co), Heusleralloys, chromium spinel chalcogenides, MnB and strongly correlatedmagnetite Fe304. It also describes the recent achievements in both theexperimental and theoretical investigations of the electronicstructure, optical and MO properties of transition metal multilayeredstructures (MLS).The book presents also the MO properties of f band ferromagneticmaterials: Tm, Nd, Sm, Ce and La monochalcogenides, some important Y*

# Optical Properties of Excited States in Solids

*Springer Science & Business Media This book presents an account of the course "Optical Properties of Excited States in Solids" held in Erice, Italy, from June 16 to 3D, 1991. This meeting was organized by the International School of Atomic and Molecular Spectroscopy of the "Ettore Majorana" Centre for Scientific Culture. The purpose of this course was to present physical models, mathematical formalisms and experimental techniques relevant to the optical properties of excited states in solids. Some active physical species, such as ions or radicals, could survive indefinitely if they were completely 'isolated in space. Other active species, such as excited molecular and solid-state systems, are inherently unstable, even in isolation, due to the spontaneous mechanisms that may convert their excitation energies into radiation or heat. Physical parameters that may be used to characterize these excited systems are the localization or delocalization, and the coherence or incoherence, of their state excitations. In solids the excited states, whether they are localized (as for impurities in insulators) or delocalized (as they may occur in semiconductors), are relevant in several regards. Their de-excitation is extremely sensitive to the nature of the excitations of the systems, and a study of the de-excitation processes can yield a variety of information. For example, the excited states may represent the initial condition of the onset of such processes as Stokes-shifted emission, hot luminescence, symmetry-dependent Jahn-Teller and scattering processes, tunneling processes, energy transfer to like and unlike centers, superradiance, coherent radiation, and excited state absorption.*

# Handbook of Optical Constants of Solids

*Academic Press This handbook--a sequel to the widely used Handbook of Optical Constants of Solids--contains critical reviews and tabulated values of indexes of refraction (n) and extinction coefficients (k) for almost 50 materials that were not covered in the original handbook. For each material, the best known n and k values have been carefully tabulated, from the x-ray to millimeter-wave region of the spectrum by expert optical scientists. In addition, the handbook features thirteen introductory chapters that discuss the determination of n and k by various techniques. * Contributors have decided the best values for n and k * References in each critique allow the reader to go back to the original data to examine and understand where the values have come from * Allows the reader to determine if any data in a spectral region needs to be filled in * Gives a wide and detailed view of experimental techniques for measuring the optical constants n and k * Incorporates and describes crystal structure, space-group symmetry, unit-cell dimensions, number of optic and acoustic modes, frequencies of optic modes, the irreducible representation, band gap, plasma frequency, and static dielectric constant*

# Optical Effects in Solids

*Cambridge University Press An overview of the optical effects in solids, addressing the physics of various materials and their response to electromagnetic radiation. The discussion includes metals, semiconductors, superconductors, and insulators. The book begins by introducing the dielectric function into Maxwell's macroscopic equations and finding their plane-wave solution. The physics governing the dielectric function of various materials is then covered, both classically and using basic quantum mechanics. Advanced topics covered include interacting electrons, the anomalous skin effect, anisotropy, magneto-optics, and inhomogeneous materials. Each subject begins with a connection to the basic physics of the particular solid, after which the measurable optical quantities are derived. It allows the reader to connect measurements (reflectance, optical conductivity and dielectric function) with the underlying physics of solids. Methods of analysing experimental data are addressed, making this an ideal resource for students and researchers interested in solid state physics, optics, and materials science.*

# Handbook of Optical Constants of Solids

# Volume 2

*Academic Press This handbook--a sequel to the widely used Handbook of Optical Constants of Solids--contains critical reviews and tabulated values of indexes of refraction (n) and extinction coefficients (k) for almost 50 materials that were not covered in the original handbook. For each material, the best known n and k values have been carefully tabulated, from the x-ray to millimeter-wave region of the spectrum by expert optical scientists. In addition, the handbook features thirteen introductory chapters that discuss the determination of n and k by various techniques. * Contributors have decided the best values for n and k * References in each critique allow the reader to go back to the original data to examine and understand where the values have come from * Allows the reader to determine if any data in a spectral region needs to be filled in * Gives a wide and detailed view of experimental techniques for measuring the optical constants n and k * Incorporates and describes crystal structure, space-group symmetry, unit-cell dimensions, number of optic and acoustic modes, frequencies of optic modes, the irreducible representation, band gap, plasma frequency, and static dielectric constant*

# Electronic Structure and Optical Properties of Semiconductors

*Springer Science & Business Media*

# Optical Properties of Highly Transparent Solids

*Springer Science & Business Media Although much work has been performed on measure ments and interpretation of light absorption by opaque or nearly opaque solids, it is surprising to note that until recently relatively little reliable experimental data, and much less theoretical work was available on the nature of transparent solids. This, in spite of the fact that a vast majority of engineering and device ap plications of a solid depend on its optical transparency. Needless to say, all solids are both transparent and opa que depending on the spectral region of consideration. The absorption processes that limit the transparency of a solid are either due to lattice vibrations, as in ionic or partially ionic solids, or due to electronic transi tions, both intrinsic and impurity-induced. For most materials, a sufficiently wide spectral window exists be tween these two limits, where the material is transpar ent. In general, the absorption coefficient, in the long wavelength side of, but sufficiently away from, the fun damental absorption edge, is relatively structureless and has an exponential dependence on frequency. Recent evi dence suggests that in the short wavelength side of the one-phonon region, but beyond two- or three-phonon sin gularities, the absorption coefficient of both polar and nonpolar solids is also relatively structureless and de pends exponentially on frequency.*

# Optical Properties of Materials and Their Applications

*John Wiley & Sons Provides a semi-quantitative approach to recent developments in the study of optical properties of condensed matter systems Featuring contributions by noted experts in the field of electronic and optoelectronic materials and photonics, this book looks at the optical properties of materials as well as their physical processes and various classes. Taking a semi-quantitative approach to the subject, it presents a summary of the basic concepts, reviews recent developments in the study of optical properties of materials and offers many examples and applications. Optical Properties of Materials and Their Applications, 2nd Edition starts by identifying the processes that should be described in detail and follows with the relevant classes of materials. In addition to featuring four new chapters on optoelectronic properties of organic semiconductors, recent advances in electroluminescence, perovskites, and ellipsometry, the book covers: optical properties of disordered condensed matter and glasses; concept of excitons; photoluminescence, photoinduced changes, and electroluminescence in noncrystalline semiconductors; and photoinduced bond breaking and volume change in chalcogenide glasses. Also included are chapters on: nonlinear optical properties of photonic glasses; kinetics of the persistent photoconductivity in crystalline III-V semiconductors; and transparent white OLEDs. In addition, readers will learn about excitonic processes in quantum wells; optoelectronic properties and applications of quantum dots; and more. Covers all of the fundamentals and applications of optical properties of materials Includes theory, experimental techniques, and current and developing applications Includes four new chapters on optoelectronic properties of organic semiconductors, recent advances in electroluminescence, perovskites, and ellipsometry Appropriate for materials scientists, chemists, physicists and electrical engineers involved in development of electronic materials Written by internationally respected professionals working in physics and electrical engineering departments and government laboratories Optical Properties of Materials and Their Applications, 2nd Edition is an ideal book for senior undergraduate and postgraduate students, and teaching and research professionals in the fields of physics, chemistry, chemical engineering, materials science, and materials engineering.*

# Electrons in Solids 2e

# An Introductory Survey

*Elsevier Electrons in Solids, Second Edition: An Introductory Survey introduces the reader to electrons in solids and covers topics ranging from particles and waves to the free electron model, energy bands, and junctions. Optical and electrical properties are also discussed, along with magnetic properties. The wavelike properties of all of matter are chosen as an integrating theme into which to weave such themes as crystal lattice vibrations (with their effect on electron mobility and electrical and thermal conductivity), electromagnetic waves (with their effect on optical reflection and absorption), and electronic transport in solids (with its dependence on the wavelike properties of electrons). This book is comprised of 11 chapters and begins with an overview of particles and waves, together with classical views of electrons, light, and energy. The general properties of waves are then discussed, with particular reference to traveling waves, standing waves, transverse waves, and longitudinal waves. Lattice waves, light waves, and matter waves are also considered. The reader is also introduced to wave equations, boundary conditions, and general wave properties. The remaining chapters are devoted to optical, electrical, and magnetic properties as well as junctions, including metal-metal junctions, metal-semiconductor junctions, and metal-semiconductor junctions. This monograph is intended for undergraduates and first-year graduate students with a background primarily in materials science, metallurgy, or one of the other engineering disciplines.*

# Optical Properties Of Solids - Proceedings Of The Taiwan-japan Workshop On Solid-state Optical Spectroscopy

*#N/A This proceedings volume contains review articles on solid-state spectroscopies by leading researchers in Japan and Taiwan. Topics include excitons and biexcitons, size effects in quantum dots and microcrystals, nonlinear optical properties, optical spectra of disordered systems, electronic and optical properties of metal-dielectric and semiconductor superlattices, photoemission, Raman spectroscopy, and photoreflectance studies on solids.*

# Handbook of Optical Constants of Solids

*Academic Press This is the third volume of the very successful set. This updated volume will contain non-linear properties of some of the most useful materials as well as chapters on optical measurement techniques. Contributors have decided the best values for n and k References in each critique allow the reader to go back to the original data to examine and understand where the values have come from Allows the reader to determine if any data in a spectral region needs to be filled in Gives a wide and detailed view of experimental techniques for measuring the optical constants n and k Incorporates and describes crystal structure, space-group symmetry, unit-cell dimensions, number of optic and acoustic modes, frequencies of optic modes, the irreducible representation, band gap, plasma frequency, and static dielectric constant*

# Band Theory and Electronic Properties of Solids

*Oxford University Press Band theory is evident all around us and yet is one of the most stringent tests of quantum mechanics. This textbook, one of the first in the new Oxford Master Series in Physics, attempts to reveal in a quantitative and fairly rigorous fashion how band theory leads to the everyday properties of materials. The book is suitable for final-year undergraduate and first-year graduate students in physics and materials science.*

# Quantum Field Theory in a Nutshell

# Second Edition

*Princeton University Press A fully updated edition of the classic text by acclaimed physicist A. Zee Since it was first published, Quantum Field Theory in a Nutshell has quickly established itself as the most accessible and comprehensive introduction to this profound and deeply fascinating area of theoretical physics. Now in this fully revised and expanded edition, A. Zee covers the latest advances while providing a solid conceptual foundation for students to build on, making this the most up-to-date and modern textbook on quantum field theory available. This expanded edition features several additional chapters, as well as an entirely new section describing recent developments in quantum field theory such as gravitational waves, the helicity spinor formalism, on-shell gluon scattering, recursion relations for amplitudes with complex momenta, and the hidden connection between Yang-Mills theory and Einstein gravity. Zee also provides added exercises, explanations, and examples, as well as detailed appendices, solutions to selected exercises, and suggestions for further reading. The most accessible and comprehensive introductory textbook available Features a fully revised, updated, and expanded text Covers the latest exciting advances in the field Includes new exercises Offers a one-of-a-kind resource for students and researchers Leading universities that have adopted this book include: Arizona State University Boston University Brandeis University Brown University California Institute of Technology Carnegie Mellon College of William & Mary Cornell Harvard University Massachusetts Institute of Technology Northwestern University Ohio State University Princeton University Purdue University - Main Campus Rensselaer Polytechnic Institute Rutgers University - New Brunswick Stanford University University of California - Berkeley University of Central Florida University of Chicago University of Michigan University of Montreal University of Notre Dame Vanderbilt University Virginia Tech University*

# Handbook of Optical Constants of Solids, Five-Volume Set

# Handbook of Thermo-Optic Coefficients of Optical Materials with Applications

*Elsevier This set of five volumes, four volumes edited by Edward D. Palik and a volume by Gorachand Ghosh, is a unique resource for any science and technology library. It provides materials researchers and optical device designers with reference facts in a context not available anywhere else. The singular functionality of the set derives from the unique format for the three core volumes that comprise the Handbook of Optical Constants of Solids. The Handbook satisfies several essential needs: first, it affords the most comprehensive database of the refractive index and extinction (or loss) coefficient of technically important and scientifically interesting dielectrics. This data has been critically selected and evaluated by authorities on each material. Second, the dielectric constant database is supplemented by tutorial chapters covering the basics of dielectric theory and reviews of experimental techniques for each wavelength region and material characteristic. As an additional resource, two of the tutorial chapters summarize the relevant characteristics of each of the materials in the database. The data in the core volumes have been collected and analyzed over a period of twelve years, with the most recent completed in 1997. The volumes systematically define the dielectric properties of 143 of the most engaging materials, including metals, semiconductors, and insulators. Together, the three Palik books contain nearly 3,000 pages, with about 2/3 devoted to the dielectric constant data. The tutorial chapters in the remaining 1/3 of the pages contain a wealth of information, including some dielectric data. Hence, the separate volume, Index to Handbook of Optical Constants of Solids, which is included as part of the set, substantially enhances the utility of the Handbook and in essence, joins all the Palik volumes into one unit. It isthen of great importance to users of the set. A final volume rounds out the set. The Handbook of Thermo-Optic Coefficients of Optical Materials with Applications collects refractive index measurements and their temperature dependence for a large number of crystals and glasses. Mathematical models represent these data, and in turn are used in the design of nonlinear optical devices. * Unique source of extremely useful optical data for a very broad community of scientists, researchers, and practitioners * Will be of great practical applicability to both industry and research * Presents optical constants for a broadest spectral range, for a very large number of materials: Paliks three volumes include 143 materials including 43 elements; Ghoshs volume includes some 70 technologically interesting crystals and many commercial glasses * Includes a special index volume that enables the user to search for the information in the three Palik volumes easily and quickly * Critique chapters in the Palik volumes discuss the data and give reference to most of the literature available for each material * Presents various techniques for measuring the optical constants and mathematical models for analytical calculations of some data*

# Electrical, Optical, and Magnetic Properties of Organic Solid State Materials: Volume 247

*Materials Research Society The MRS Symposium Proceeding series is an internationally recognised reference suitable for researchers and practitioners.*

# Hydrogen in Intermetallic Compounds II

## Surface and Dynamic Properties, Applications

*Springer The topic of hydrogen in an on metals and alloys is important in a number ofdisciplines including solid-state physics, materials science, physical chemistry, and energy technology. This volume treats the dynamics of hydrogen in intermetallic compounds, surface properties, kinetics, and applications of metal hydrides in energy technology. In addition, selected experimental methods are described. The introductory chapter will enable non-specialists to gain an overall picture of the field and to appreciate the relevant scientific issue. The companion volume, Hydrogene in Intermetallic Compounds I, was published as Vol. 63 of Topics in Applied Physics.*

# Semiconductor Optics

*Springer Science & Business Media New chapters add coverage of current topics such as cavity polaritons, photonic structures, bulk semiconductors and structures of reduced dimensionality. The mathematics is kept as elementary as possible, sufficient for an intuitive understanding of the experimental results and techniques treated.*

# Solid State Properties

## From Bulk to Nano

*Springer This book fills a gap between many of the basic solid state physics and materials sciencebooks that are currently available. It is written for a mixed audience of electricalengineering and applied physics students who have some knowledge of elementaryundergraduate quantum mechanics and statistical mechanics. This book, based on asuccessful course taught at MIT, is divided pedagogically into three parts: (I) ElectronicStructure, (II) Transport Properties, and (III) Optical Properties. Each topic is explainedin the context of bulk materials and then extended to low-dimensional materials whereapplicable. Problem sets review the content of each chapter to help students to understandthe material described in each of the chapters more deeply and to prepare them to masterthe next chapters.*

# Solid-State Physics

## Introduction to the Theory

*Springer Science & Business Media While the standard solid state topics are covered, the basic ones often have more detailed derivations than is customary (with an empasis on crystalline solids). Several recent topics are introduced, as are some subjects normally included only in condensed matter physics. Lattice vibrations, electrons, interactions, and spin effects (mostly in magnetism) are discussed the most comprehensively. Many problems are included whose level is from "fill in the steps" to long and challenging, and the text is equipped with references and several comments about experiments with figures and tables.*

# Handbook of Optical Constants of Solids

*Elsevier While bits and pieces of the index of refraction n and extinction coefficient k for a given material can be found in several handbooks, the Handbook of Optical Constants of Solids gives for the first time a single set of n and k values over the broadest spectral range (ideally from x-ray to mm-wave region). The critiquers have chosen the numbers for you, based on their own broad experience in the study of optical properties. Whether you need one number at one wavelength or many numbers at many wavelengths, what is available in the literature is condensed down into a single set of numbers. Contributors have decided the best values for n and k References in each critique allow the reader to go back to the original data to examine and understand where the values have come from Allows the reader to determine if any data in a spectral region needs to be filled in Gives a wide and detailed view of experimental techniques for measuring the optical constants n and k Incorporates and describes crystal structure, space-group symmetry, unit-cell dimensions, number of optic and acoustic modes, frequencies of optic modes, the irreducible representation, band gap, plasma frequency, and static dielectric constant*

# Tellurite Glasses Handbook

## Physical Properties and Data

*CRC Press Non-crystalline solid tellurite glasses continue to intrigue both academic and industry researchers not only because of their many technical applications, but also because of a fundamental interest in understanding their microscopic mechanisms. Tellurite Glasses Handbook: Physical Properties and Data is the first and only comprehensive source of physical constants and properties of these unique, non-crystalline solids. The author has collected rigid data from experiments conducted over the last 50 years and presents here their elastic, anelastic, optical, electrical, and thermal properties. He also provides details of the experimental techniques, explores applications, and suggests directions of future research. The interference and independence of physical processes occurring simultaneously are key problems in material science. With the Tellurite Glasses Handbook, researchers can begin to understand these physical processes, overcome current technological problems, and open up a new area of glass science: the Physics of Non-Crystalline Solids*

# Introduction to Applied Solid State Physics

## Topics in the Applications of Semiconductors, Superconductors, Ferromagnetism, and the Nonlinear Optical Properties of Solids

*Springer 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 ma terials. 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 semi conductor 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 superiattices, 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.*

# Optical Properties of Solids

## Optical Spectroscopy of Inorganic Solids

*Oxford University Press This text describes the technique of optical spectroscopy applied to problems in condensed matter physics. It relates theoretical understanding to experimental measurement, including discussion of the optical spectroscopy of inorganic insulators, with many illustrative examples. Symmetry arguments are developed from a formal group theoretical basis and are frequently used, and a special effort is made to treat the subject of lattice vibrations and to show how these can affect the spectroscopic properties of solids. The elements of laser theory are developed, and the authors also explore the use of optically detected magnetic resonance techniques for the investigation of semiconducting materials.*

# Solid State Physics

*Academic Press 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*

# Optical Characterization of Solids

*Springer Science & Business Media Gives a comprehensive and coherent account of the basic methods to characterize a solid through its interaction with an electromagnetic field.*

# Solid State Chemistry and Its Applications

*John Wiley & Sons The first broad account offering a non-mathematical, unified treatment of solid state chemistry. Describes synthetic methods, X-ray diffraction, principles of inorganic crystal structures, crystal chemistry and bonding in solids; phase diagrams of 1, 2 and 3 component systems; the electrical, magnetic, and optical properties of solids; three groups of industrially important inorganic solids--glass, cement, and refractories; and certain aspects of organic solid state chemistry, including the ``organic metal'' of new materials.*

# Optical Properties of Photonic Crystals

*Springer Deals not only with the properties of the radiation modes inside the crystals but also with their peculiar optical response to external fields. A general theory of linear and nonlinear optical response is presented in a clear and detailed fashion using the Green’s function method. Important recent developments such as the enhancement of stimulated emission, second harmonic generation, quadrature-phase squeezing, and low-threshold lasing are likewise treated in detail and made understandable. Numerical methods are also emphasised. This book provides both introductory knowledge for graduate and undergraduate students and important ideas for researchers.*

# Electrons in Solids

# An Introductory Survey

*Academic Press This Third Edition of ELECTRONS IN SOLIDS: AN INTRODUCTORY SURVEY, is the result of a thorough re-examination of the entire text, incorporating suggestions and corrections by students and professors who have used the text. Explanations and descriptions have been expanded, and additional information has been added on high Tc superconductors, diamond films, "buckminsterfullerenes," and thin magnetic materials. Adopted by many colleges and universities, this text has proven to be a solid introduction to the electrical, optical and magnetic properties of materials. Key Features * Contains comprehensive coverage of electronic properties in metals, semiconductors, and insulators at a fundamental level * Stresses the use of wave properties as an integrating theme for the discussion of phonons, photons, and electrons * Includes a complete set of illustrative problems along with exercises and answers * Features a careful indication of both Gaussian and SI unit systems*

# Fundamentals of the Physics of Solids

# Volume II: Electronic Properties

*Springer The reader is holding the second volume of a three-volume textbook on sol- state physics. This book is the outgrowth of the courses I have taught for many years at Eötvös University, Budapest, for undergraduate and graduate students under the titles Solid-State Physics and Modern Solid-State Physics. The main motivation for the publication of my lecture notes as a book was that none of the truly numerous textbooks covered all those areas that I felt should be included in a multi-semester course. Especially, if the course strives to present solid-state physics in a uni?ed structure, and aims at d- cussing not only classic chapters of the subject matter but also (in more or less detail) problems that are of great interest for today's researcher as well. Besides, the book presents a much larger material than what can be covered in a two- or three-semester course. In the ?rst part of the ?rst volume the analysis of crystal symmetries and structure goes into details that certainly cannot be included in a usual course on solid-state physics. The same applies, among others, to the discussion of the methods used in the determination of band structure, the properties of Fermi liquids and non-Fermi liquids, and the theory of unconventional superconductors in the present and third volumes. These parts can be assigned as supplementary reading for interested students, or can be discussed in advanced courses.*

# Fundamentals of Inorganic Glasses

*Elsevier Although several fine volumes have been published on special topics in glass, Fundamentals of Inorganic Glasses is the first book to provide the breadth required of a comprehensive undergraduate textbook. In a clear tutorial style, this volume provides comprehensive coverage of the composition, structure, and properties of inorganic glasses. Designed to serve as the primary text for "glass science" courses at the upper-undergraduate level, this book facilitates learning with a clear discussion of fundamental concepts, chapter-ending problem sets, an emphasis on key ideas, and timely notes on suggested readings. Professor Varshneya has filled a gap in the existing literature by providing a textbook that is uniquely comprehensive while striving always to help the student develop a clear understanding of the fundamentals underlying glass science. Clearly develops fundamental concepts Provides comprehensive discussion of the composition, structure, and properties of inorganic glasses Leads the reader through areas where a deeper understanding is needed Presents necessary mathematics in a readable manner Introduces numerous and interesting real-world examples that give the reader insight into application of the material covered in the text Concludes chapters with problem sets and suggested readings to facilitate self-study*

# Ultrafast Physical Processes in Semiconductors

*Elsevier Since its inception in 1966, the series of numbered volumes known as Semiconductors and Semimetals has distinguished itself through the careful selection of well-known authors, editors, and contributors. The Willardson and Beer series, as it is widely known, has succeeded in producing numerous landmark volumes and chapters. Not only did many of these volumes make an impact at the time of their publication, but they continue to be well-cited years after their original release. Recently, Professor Eicke R. Weber of the University of California at Berkeley joined as a co-editor of the series. Professor Weber, a well-known expert in the field of semiconductor materials, will further contribute to continuing the series' tradition of publishing timely, highly relevant, and long-impacting volumes. Some of the recent volumes, such as Hydrogen in Semiconductors, Imperfections in III/V Materials, Epitaxial Microstructures, High-Speed Heterostructure Devices, Oxygen in Silicon, and others promise that this tradition will be maintained and even expanded. Reflecting the truly interdisciplinary nature of the field that the series covers, the volumes in Semiconductors and Semimetals have been and will continue to be of great interest to physicists, chemists, materials scientists, and device engineers in modern industry.*