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Optoelectronics

Electronic and Optoelectronic Properties of Semiconductor Structures

Properties of III-V Quantum Wells and Superlattices

Fundamentals of Photonics

Photonic Sensing

Quantum Heterostructures

Principles of Electrical Engineering Materials and Devices

Semiconductor Optoelectronics

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Physics of Semiconductor Devices

Quantum-Based Electronic Devices and Systems

Integrated Optics: Theory and Technology
Fundamentals of Photonics
Electronics Fundamentals and Applications
Diode Lasers and Photonic Integrated Circuits
Handbook of Optics: Devices, measurements, and properties
OPTOELECTRONIC DEVICES AND SYSTEMS
Semiconductor Nanowires
Optical Fiber Communications

Optoelectronics By **OMB No.**
Pallab Bhattacharya Pdf **6119082485363 edited**
by

KAMREN CANTRELL

Optoelectronics Cambridge University Press

Quantum Heterostructures provides a detailed description of the key physical and engineering principles of quantum semiconductor heterostructures. Blending important concepts from physics, materials science, and electrical engineering, it also explains clearly the behavior and operating features of modern microelectronic and optoelectronic devices. The authors begin by outlining the trends that have driven development in this field, most importantly the need for high-performance devices in computer,

information, and communications technologies. They then describe the basics of quantum nanoelectronics, including various transport mechanisms. In the latter part of the book, they cover novel microelectronic devices, and optical devices based on quantum heterostructures. The book contains many homework problems and is suitable as a textbook for undergraduate and graduate courses in electrical engineering, physics, or materials science. It will also be of great interest to those involved in research or development in microelectronic or optoelectronic devices.

ELECTRONIC AND OPTOELECTRONIC PROPERTIES OF SEMICONDUCTOR

STRUCTURES

Oxford University Press, USA
Fundamentals of Photonics A complete, thoroughly updated, full-color third edition
Fundamentals of Photonics, Third Edition is a self-contained and up-to-date introductory-level textbook that thoroughly surveys this rapidly expanding area of engineering and applied physics. Featuring a blend of theory and applications, coverage includes detailed accounts of the primary theories of light, including ray optics, wave optics, electromagnetic optics, and photon optics, as well as the interaction of light and matter. Presented at increasing levels of complexity, preliminary sections build toward more advanced topics, such as Fourier optics and holography, photonic-

crystal optics, guided-wave and fiber optics, LEDs and lasers, acousto-optic and electro-optic devices, nonlinear optical devices, ultrafast optics, optical interconnects and switches, and optical fiber communications. The third edition features an entirely new chapter on the optics of metals and plasmonic devices. Each chapter contains highlighted equations, exercises, problems, summaries, and selected reading lists. Examples of real systems are included to emphasize the concepts governing applications of current interest. Each of the twenty-four chapters of the second edition has been thoroughly updated.

PROPERTIES OF III-V QUANTUM WELLS AND SUPERLATTICES

John Wiley & Sons

A unique and comprehensive resource covering the fundamentals of nanolasers, with details of design, fabrication, and applications.

Fundamentals of Photonics Cambridge University Press

This book focuses on the theory of phonon interactions in nanoscale structures with particular emphasis on modern electronic

and optoelectronic devices. The continuing progress in the fabrication of semiconductor nanostructures with lower dimensional features has led to devices with enhanced functionality and even novel devices with new operating principles. The critical role of phonon effects in such semiconductor devices is well known. There is therefore a great need for a greater awareness and understanding of confined phonon effects. A key goal of this book is to describe tractable models of confined phonons and how these are applied to calculations of basic properties and phenomena of semiconductor heterostructures. The level of presentation is appropriate for undergraduate and graduate students in physics and engineering with some background in quantum mechanics and solid state physics or devices. A basic understanding of electromagnetism and classical acoustics is assumed.

PHI Learning Pvt. Ltd.

Principles of Electrical Engineering Materials and Devices has been developed to bridge the gap between traditional electronic circuits texts and semiconductor

texts

Photonic Sensing John Wiley & Sons

Annotation -- A new volume in the field's bestselling optics reference -- an entirely new opus focusing on x-ray, nonlinear, and vision optics -- Provides the same mix of tutorial writing with in-depth reference material that distinguished Volumes I & II.

QUANTUM HETEROSTRUCTURES

Cambridge University Press

This book aims to provide a brief update on the functions of purinergic receptors in various systems, in addition to the signaling pathway activated to mediate these functions. We address the influence of hypoxia by modulating the activity of these receptors under physiological and pathophysiological conditions.

Additionally, we describe the mechanisms of induction of pain and inflammation in different systems. Finally, the book discusses some of the main bioinformatics tools currently used to improve or discover new prototypes capable of selectively acting on these receptors with estimated parameters of satisfactory solubility and toxicity for possible commercial implementation.

PRINCIPLES OF ELECTRICAL ENGINEERING MATERIALS AND DEVICES

Elsevier

Our intent in producing this book was to provide a text that would be comprehensive enough for an introductory course in integrated optics, yet concise enough in its mathematical derivations to be easily readable by a practicing engineer who desires an overview of the field. The response to the first edition has indeed been gratifying; unusually strong demand has caused it to be sold out during the initial year of publication, thus providing us with an early opportunity to produce this updated and improved second edition. This development is fortunate, because integrated optics is a very rapidly progressing field, with significant new research being regularly reported. Hence, a new chapter (Chap. 17) has been added to review recent progress and to provide numerous additional references to the relevant technical literature. Also, thirty-five new problems for practice have been included to supplement those at the ends of chapters

in the first edition. Chapters I through 16 are essentially unchanged, except for brief updating revisions and corrections of typographical errors. Because of the time limitations imposed by the need to provide an uninterrupted supply of this book to those using it as a course text, it has been possible to include new references and to briefly describe recent developments only in Chapter 17. However, we hope to provide details of this continuing progress in a future edition.

SEMICONDUCTOR OPTOELECTRONICS

Springer

Fiber optics is the hottest topic in communications and this book from the world's leading experts clearly lays out all the details of optical communications engineering * Essential technical guide and solutions kit for the super-fast, super-broad fiber systems and devices powering the fastest-growing communications infrastructure * Methods for generating above peak performance * Clear explanations and answers to tough challenges for WDM, DWDM, amplifiers, solitons, and other key technologies

MOLECULAR BEAM EPITAXY

World Scientific

PHOTONIC SENSING A cutting-edge look at safety and security applications of photonic sensors With its many superior qualities, photonic sensing technology is increasingly used in early-detection and early-warning systems for biological hazards, structural flaws, and security threats. Photonic Sensing provides for the first time a comprehensive review of this exciting and rapidly evolving field, focusing on the development of cutting-edge applications in diverse areas of safety and security, from biodetection to biometrics. The book brings together contributions from leading experts in the field, fostering effective solutions for the development of specialized materials, novel optical devices, and networking algorithms and platforms. A number of specific areas of safety and security monitoring are covered, including background information, operation principles, analytical techniques, and applications. Topics include: Document security and structural integrity monitoring, as well as the detection of

food pathogens and bacteria Surface plasmon sensors, micro-based cytometry, optofluidic techniques, and optical coherence tomography Optic fiber sensors for explosive detection and photonic liquid crystal fiber sensors for security monitoring Photonics-assisted frequency measurement with promising electronic warfare applications An invaluable, multidisciplinary resource for researchers and professionals in photonic sensing, as well as safety and security monitoring, this book will help readers jump-start their own research and development in areas of physics, chemistry, biology, medicine, mechanics, electronics, and defense.

SEMICONDUCTOR OPTOELECTRONIC DEVICES

Springer Nature

Semiconductors are at the heart of modern living. Almost everything we do, be it work, travel, communication, or entertainment, all depend on some feature of semiconductor technology.

Comprehensive Semiconductor Science and Technology, Six Volume Set captures the breadth of this important field, and presents it in a single source to the large

audience who study, make, and exploit semiconductors. Previous attempts at this achievement have been abbreviated, and have omitted important topics. Written and Edited by a truly international team of experts, this work delivers an objective yet cohesive global review of the semiconductor world. The work is divided into three sections. The first section is concerned with the fundamental physics of semiconductors, showing how the electronic features and the lattice dynamics change drastically when systems vary from bulk to a low-dimensional structure and further to a nanometer size. Throughout this section there is an emphasis on the full understanding of the underlying physics. The second section deals largely with the transformation of the conceptual framework of solid state physics into devices and systems which require the growth of extremely high purity, nearly defect-free bulk and epitaxial materials. The last section is devoted to exploitation of the knowledge described in the previous sections to highlight the spectrum of devices we see all around us. Provides a comprehensive global picture

of the semiconductor world Each of the work's three sections presents a complete description of one aspect of the whole Written and Edited by a truly international team of experts

SEMICONDUCTOR DEVICES FOR HIGH-SPEED OPTOELECTRONICS

Cambridge University Press

Discusses the basic physical principles underlying Biomedical Photonics, spectroscopy and microscopy This volume discusses biomedical photonics, spectroscopy and microscopy, the basic physical principles underlying the technology and its applications. The topics discussed in this volume are:

Biophotonics; Fluorescence and Phosphorescence; Medical Photonics; Microscopy; Nonlinear Optics; Ophthalmic Technology; Optical Tomography; Optofluidics; Photodynamic Therapy; Image Processing; Imaging Systems; Sensors; Single Molecule Detection; Futurology in Photonics. Comprehensive and accessible coverage of the whole of modern photonics Emphasizes processes and applications that specifically exploit photon attributes of light Deals with the

rapidly advancing area of modern optics. Chapters are written by top scientists in their field. Written for the graduate level student in physical sciences; Industrial and academic researchers in photonics, graduate students in the area; College lecturers, educators, policymakers, consultants, Scientific and technical libraries, government laboratories, NIH.

Physics of Semiconductor Devices BoD – Books on Demand

Developed as an introductory course, this up-to-date text discusses the major building blocks of present-day fiber-optic systems and presents their use in communications and sensing. Starting with easy-to-understand ray propagation in optical fibers, the book progresses towards the more complex topics of wave propagation in planar and cylindrical waveguides. Special emphasis has been given to the treatment of single-mode fibers the backbone of present-day optical communication systems. It also offers a detailed treatment of the theory behind optoelectronic sources (LEDs and injection laser diodes), detectors, modulators, and optical amplifiers. Contemporary in terms of technology, it presents topics such as

erbium-doped fiber amplifiers (EDFAs) and wavelength-division multiplexing (WDM) along with dense WDM. Building upon these fundamental principles, the book introduces the reader to system design considerations for analog and digital fiber-optic communications. Emphasis has also been given to fiber-optic sensors and laser-based systems along with their industrial and other applications. This student-friendly text would be very useful to undergraduate students pursuing instrumentation, electronics, and communication engineering. It would also prove to be a good text for postgraduate students of physics.

Quantum-Based Electronic Devices and Systems Wiley-Interscience

The third edition of this popular text and reference book presents the fundamental principles for understanding and applying optical fiber technology to sophisticated modern telecommunication systems. Optical-fiber-based telecommunication networks have become a major information-transmission-system, with high capacity links encircling the globe in both terrestrial and undersea installations. Numerous passive and active optical

devices within these links perform complex transmission and networking functions in the optical domain, such as signal amplification, restoration, routing, and switching. Along with the need to understand the functions of these devices comes the necessity to measure both component and network performance, and to model and stimulate the complex behavior of reliable high-capacity networks.

Integrated Optics: Theory and Technology Elsevier

The Third Edition of this best-selling textbook continues the successful approach adopted by previous editions - It is an introduction to optoelectronics for all students, undergraduate or postgraduate, and practicing engineers requiring a treatment that is not too advanced but gives a good introduction to the quantitative aspects of the subject. The book aims to put special emphasis on the fundamental principles which underlie the operation of devices and systems. Readers will then be able to appreciate the operation of devices not covered in the book and to understand future developments within the subject. All the

material in this edition has been fully updated.

Fundamentals of Photonics Woodhead Publishing

This brief deals with various forms of supercapacitors starting from traditional carbon based supercapacitors to advanced next generation hybrid supercapacitors. The primary focus is to investigate the successive evolution in the core components of a typical supercapacitor which will bring significant observations regarding their feasibility and overall impact on the charge storage capacity so as to reach at par with the current battery technology. The authors present a critical review of the current collectors, electrode materials and electrolytic components which have distinctive impact on both the power and energy density of a supercapacitor. Emerging trends in the fabrication of hybrid supercapacitor technology bring together the exceptional power density of a double layer capacitor and energy density of a rechargeable battery, which promises a brighter future for the electrical energy storage system.

ELECTRONICS FUNDAMENTALS AND APPLICATIONS

Prentice Hall
B.Sc. Practical Physics

DIODE LASERS AND PHOTONIC INTEGRATED CIRCUITS

S. Chand Publishing
The first true "introduction" to semiconductor optoelectronic devices, this book provides an accessible, well-organized overview of optoelectronic devices that emphasizes basic principles. Coverage begins with an optional review of key concepts— such as properties of compound semiconductor, quantum mechanics, semiconductor statistics, carrier transport properties, optical processes, and junction theory— then progress gradually through more advanced topics. The "Second Edition" has been both updated and expanded to include the recent developments in the field.

HANDBOOK OF OPTICS: DEVICES, MEASUREMENTS, AND PROPERTIES

New Age International

The book is a history of Molecular Beam Epitaxy (MBE) as applied to the growth of semiconductor thin films (note that it does not cover the subject of metal thin films). It begins by examining the origins of MBE, first of all looking at the nature of molecular beams and considering their application to fundamental physics, to the development of nuclear magnetic resonance and to the invention of the microwave MASER. It shows how molecular beams of silane (SiH_4) were used to study the nucleation of silicon films on a silicon substrate and how such studies were extended to compound semiconductors such as GaAs. From such surface studies in ultra-high vacuum the technique developed into a method of growing high quality single crystal films of a wide range of semiconductors. Comparing this with earlier evaporation methods of deposition and with other epitaxial deposition methods such as liquid phase and vapour phase epitaxy (LPE and VPE). The text describes the development of MBE machines from the early 'home-made' variety to that of commercial equipment and show how MBE was gradually refined to produce high

quality films with atomic dimensions. This was much aided by the use of various in-situ surface analysis techniques, such as reflection high energy electron diffraction (RHEED) and mass spectrometry, a feature unique to MBE. It looks at various modified versions of the basic MBE process, then proceed to describe their application to the growth of so-called 'low-dimensional structures' (LDS) based on ultra-thin heterostructure films with thickness of order a few molecular monolayers. Further chapters cover the growth of a wide range of different compounds and describe their application to fundamental physics and to the fabrication of electronic and optoelectronic devices. The authors study the historical development of all these aspects and emphasise both the (often unexpected) manner of their discovery and development and the unique features which MBE brings to the growth of extremely complex structures with monolayer accuracy.

OPTOELECTRONIC DEVICES AND SYSTEMS

John Wiley & Sons

In recent years, photonics has found

increasing applications in such areas as communications, signal processing, computing, sensing, display, printing, and energy transport. Now, *Fundamentals of Photonics* is the first self-contained introductory-level textbook to offer a thorough survey of this rapidly expanding area of engineering and applied physics. Featuring a logical blend of theory and applications, coverage includes detailed accounts of the primary theories of light, including ray optics, wave optics, electromagnetic optics, and photon optics, as well as the interaction of light with matter, and the theory of semiconductor materials and their optical properties. Presented at increasing levels of complexity, these sections serve as building blocks for the treatment of more advanced topics, such as Fourier optics and holography, guidedwave and fiber optics, photon sources and detectors, electro-optic and acousto-optic devices, nonlinear optical devices, fiber-optic communications, and photonic switching and computing. Included are such vital

topics as: Generation of coherent light by lasers, and incoherent light by luminescence sources such as light-emitting diodes Transmission of light through optical components (lenses, apertures, and imaging systems), waveguides, and fibers Modulation, switching, and scanning of light through the use of electrically, acoustically, and optically controlled devices Amplification and frequency conversion of light by the use of wave interactions in nonlinear materials Detection of light by means of semiconductor photodetectors Each chapter contains summaries, highlighted equations, problem sets and exercises, and selected reading lists. Examples of real systems are included to emphasize the concepts governing applications of current interest, and appendices summarize the properties of one- and two-dimensional Fourier transforms, linear-systems theory, and modes of linear systems. An Instructor's Manual presenting detailed solutions to all the problems in the book is available from the Wiley editorial department.

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