Heterostructure And Quantum Well Physics William R

Volume 2: Laser Design and Laser Systems
Advances in Research and Applications: Semiconductor Heterostructures and Nanostructures
Wave Mechanics Applied to Semiconductor Heterostructures
Quantum Dynamics of Simple Systems
Wave Mechanics Applied to Semiconductor Heterostructures
Molecular Beam Epitaxy
Molecular Beam Epitaxy Growth and Characterization of ZnO-based Layers and Heterostructures
Physical Processes and Applications
Physics and Applications of Terahertz Radiation
Advances in Semiconductor Nanostructures
Proceedings of the Winter School Les Houches, France, March 12–21, 1985
Physics Of Semiconductors, The - Proceedings Of The 22nd International Conference (In 3 Volumes)
Ultra-Broadband InAs/InP Quantum-Dash Laser in Optical Communications: Device and System Level Investigation
Quantum Dot Heterostructures
Handbook of Laser Technology and Applications
Microelectronics and Optoelectronics
SiGe and Si Strained-Layer Epitaxy for Silicon Heterostructure Devices
An Introduction
Heterojunctions and Semiconductor Superlattices
Integrated Optics: Theory and Technology
Materials for Optoelectronics
Quantum Wells, Wires and Dots
Semiconductor Heterostructures
Scientific and Technical Aerospace Reports
Wide Bandgap Semiconductor Quantum Well Heterostructures
Quantum Wells

A Short History
Growth, Characterization, Properties and Applications
Semiconductor Quantum Well Intermixing
Nanoscale Semiconductor Lasers
Quantum Wells, Wires and Dots
Heterostructures and Quantum Devices
Transport of Information-Carriers in Semiconductors and Nanodevices
Handbook of Laser Technology and Applications (Three- Volume Set)
Physics of Quantum Well Devices
Exciton Physics and Light Emitters
The Physics of Low-dimensional Semiconductors
Intersubband Transitions in Quantum Wells: Physics and Device Applications
Theoretical and Computational Physics of Semiconductor Nanostructures
Theoretical and Computational Physics of Semiconductor Nanostructures

JASLYN PORTER

Volume 2: Laser Design and Laser Systems John Wiley & Sons Quantum Dot Heterostructures Dieter Bimberg, Marius Grundmann and Nikolai N. Ledentsov Institute of Solid State Physics, Technische Universität Berlin, Germany Quantum dots are nanometer-size semiconductor structures, and represent one of the most rapidly developing areas of current semiconductor research as increases in the speed and decreases in the size of semiconductor devices become more important. They present the utmost challenge to semiconductor technology, making possible fascinating novel devices. This important new reference book focuses on the key phenomena and principles. Chapter 1 provides a brief account of the history of quantum dots, whilst the second chapter surveys the various fabrication techniques used in the past two decades, and introduces the concept of self-organized growth. This topic is expanded in the following chapter, which presents a broad review of self-organization phenomena at surfaces of crystals. Experimental results on growth of quantum dot structures in many different systems and on their structural characterization are presented in Chapter 4. Basic properties of the dots relate to their geometric structure and chemical composition. Numerical modeling of the electronic and optical properties of real dots is presented in Chapter 5, together with general theoretical considerations on carrier capture, relaxation, recombination and properties of quantum dot lasers. Chapters 6

and 7 summarize experimental results on electronic, optical and electrical properties. The book concludes by disoussing highly topical results on quantum-dot-based photonic devices - mainly quantum dot lasers. Quantum Dot Heterostructures is written by some of the key researchers who have contributed significantly to the development of the field, and have pioneered both the theoretical understanding of quantum dot related phenomena and quantum dot lasers. It is of great interest to graduate and postgraduate students, and to researchers in semiconductor physics and technology and optoelectronics.

Advances in Research and Applications: Semiconductor Heterostructures and Nanostructures Elsevier

This invaluable book is devoted to the physics, technology and device applications of semiconductor structures with ultrathin layers where the electronic properties are governed by the quantum-mechanical laws. Such structures called quantum wells or structures with the two-dimensional electron gas, have become one of the most actively investigated objects in modern solid state physics. Electronic properties of quantum wells differ dramatically from those of bulk semiconductors, which allows one to observe new types of physical phenomena, such as the quantum Hall effect and many other so-far-unknown kinetic and optical effects. This, in turn, offers wide opportunities for creating semiconductor devices based on new principles, and it has give birth to the new branch of electronics called nanoelectronics. Contents: General IdeasStructures with Two-Dimensional Electron GasEnergy Spectrum and Carrier StatisticsOptical Properties of Two-Dimensional SystemsKinetic Phenomena in Two-Dimensional SystemsHigh Magnetic Field PhenomenaVertical Transport in a System of Quantum WellsDevice Applications of Two-Dimensional Systems Readership: Students, engineers and solid state physicists. keywords:Quantum Wells;Nanostructures;Superlattices;Heterojunctions;Size Quantization;Quantum Hall Effect;Delta-Layers;Subbands

Wave Mechanics Applied to Semiconductor Heterostructures John Wiley & Sons

Nanoscale Semiconductor Lasers focuses on specific issues relating to laser nanomaterials and their use in laser technology. The book presents both fundamental theory and a thorough overview of the diverse range of applications that have been developed using laser technology based on novel nanostructures and nanomaterials. Technologies covered include nanocavity lasers, carbon dot lasers, 2D material lasers, plasmonic lasers, spasers, quantum dot lasers, quantum dash and nanowire lasers. Each chapter outlines the fundamentals of the topic and examines material and optical properties set alongside device properties, challenges, issues and trends. Dealing with a scope of materials from organic to carbon nanostructures and nanowires to semiconductor quantum dots, this book will be of interest to graduate students, researchers and scientific professionals in a wide range of fields relating to laser development and semiconductor technologies. Provides an overview of the active field of nanostructured lasers, illustrating the latest topics and applications Demonstrates how to connect different classes of material to specific applications Gives an overview of several approaches to confine and control light emission and amplification using nanostructured materials and nano-scale cavities

Quantum Dynamics of Simple Systems Springer
The composition of modern semiconductor heterostructures can be controlled precisely on the atomic scale to create low-dimensional systems. These systems have revolutionised semiconductor physics, and their impact on technology, particularly for semiconductor lasers and ultrafast transistors, is widespread and burgeoning. This book provides an introduction to the general principles that underlie low-dimensional semiconductors. As far as possible, simple physical explanations are used, with reference to examples from actual devices. The author shows how, beginning with fundamental results from quantum mechanics and solid-state physics, a formalism can be developed that describes the properties of low-dimensional semiconductor systems. Among numerous examples, two key systems are studied in detail: the two-dimensional electron gas, employed in field-effect transistors, and the quantum well, whose optical properties find application in lasers and other opto-electronic devices. The book includes many exercises and will be invaluable to undergraduate and first-year graduate physics or electrical engineering students taking courses in low-dimensional systems or heterostructure device physics.

Wave Mechanics Applied to Semiconductor Heterostructures Elsevier
Optoelectronics ranks one of the highest increasing rates among the different industrial branches. This activity is closely related to devices which are themselves extremely dependent on materials. Indeed, the history of optoelectronic devices has been following closely that of the materials. KLUWER Academic Publishers has thus rightly identified "Materials for Optoelectronics" as a good opportunity for a book in the series entitled "Electronic Materials; Science and Technology". Although a sound background in solid state physics is recommended, the authors have confined their contribution to a graduate student level, and tried to define any concept they use, to render the book as a whole as self-consistent as possible. In the first section the basic aspects are developed. Here, three chapters consider semiconductor materials for optoelectronics under various aspects. Prof. G. E. Stillman begins with an introduction to the field from the point of view of the optoelectronic market. Then he describes how III-V materials, especially the Multi Quantum Structures meet the requirements of optoelectronic functions, including the support of microelectronics for optoelectronic integrated circuits. In chapter 2, Prof.

Molecular Beam Epitaxy Cambridge University Press
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.

Molecular Beam Epitaxy Growth and Characterization of ZnO-based Layers and Heterostructures CRC Press

Quantum well devices have been the objects of intensive research during the last two decades. Some of the devices have matured into commercially useful products and form part of modern electronic circuits. Some others require further dev- opment, but have the promise of being useful commercially in the near future. Study of the devices is, therefore, gradually becoming compulsory for electronics specialists. The functioning of the devices, however, involve aspects of physics which are not dealt with in the available text books on the physics of semicond- tor devices. There is, therefore, a need for a book to cover all these aspects at an introductory level. The present book has been written with the aim of meeting this need. In fact, the book grew out of introductory lectures given by the author to graduate students and researchers interested in this rapidly developing area of electron devices. The book covers the subjects of heterostructure growth techniques, band-offset theory and experiments, electron states, electron-photon interaction and related phenomena, electron transport and the operation of electronic, opto-electronic and photonic quantum well devices. The theory as well as the practical aspects of the devices are discussed at length. The aim of the book is to provide a comprehensive treatment of the physics underlying the various devices. A reader after going through the book should find himself equipped to deal with all kinds of quantum well devices.

Physical Processes and Applications Academic Press

Examines the basic electronic and optical properties of two-dimensional semiconductor heterostructures based on III-V and II-VI compounds. Explores various consequences of one-dimensional size-quantization on the most basic physical properties of heterolayers. Beginning with basic quantum mechanical properties of idealized quantum wells and superlattices, it discusses the occurrence of bound states when the heterostructure is imperfect or when it is shone with near bandgap light.

Physics and Applications of Terahertz Radiation CRC Press

Examines the basic electronic and optical properties of two-dimensional semiconductor heterostructures based on III-V and II-VI compounds. Explores various consequences of one-dimensional size-quantization on the most basic physical properties of heterolayers. Beginning with basic quantum mechanical properties of idealized quantum wells and superlattices, it discusses the occurrence of bound states when the heterostructure is imperfect or when it is shone with near bandgap light.

Advances in Semiconductor Nanostructures Springer Science & Business Media

Semiconductor Quantum Well Intermixing is an international collection of research results dealing with several aspects of the

diffused quantum well (DFQW), ranging from Physics to materials and device applications. The material covered is the basic interdiffusion mechanisms of both cation and anion groups as well as the properties of band structure modifiations. Its comprehensive coverage of growth and pos-growth processing technologies along with its presentation of the various interesting and advanced features of the DFQW materials make this book an essential reference to the study of QW layer intermixing.

Proceedings of the Winter School Les Houches, France, March 12–21, 1985 Elsevier

Long Wave Polar Modes in Semiconductor Heterostructures is concerned with the study of polar optical modes in semiconductor heterostructures from a phenomenological approach and aims to simplify the model of lattice dynamics calculations. The book provides useful tools for performing calculations relevant to anyone who might be interested in practical applications. The main focus of Long Wave Polar Modes in Semiconductor Heterostructures is planar heterostructures (quantum wells or barriers, superlattices, double barrier structures etc) but there is also discussion on the growing field of quantum wires and dots. Also to allow anyone reading the book to apply the techniques discussed for planar heterostructures, the scope has been widened to include cylindrical and spherical geometries. The book is intended as an introductory text which guides the reader through basic questions and expands to cover state-of-the-art professional topics. The book is relevant to experimentalists wanting an instructive presentation of a simple phenomenological model and theoretical tools to work with and also to young theoreticians by providing discussion of basic issues and the basis of advanced theoretical formulations. The book also provides a brief respite on the physics of piezoelectric waves as a coupling to polar optical modes.

Physics Of Semiconductors, The - Proceedings Of The 22nd International Conference (In 3 Volumes) Springer Science & Business Media

In the last couple of decades, high-performance electronic and optoelectronic devices based on semiconductor heterostructures have been required to obtain increasingly strict and well-defined performances, needing a detailed control, at the atomic level, of the structural composition of the buried interfaces. This goal has been achieved by an improvement of the epitaxial growth techniques and by the parallel use of increasingly sophisticated characterization techniques and of refined theoretical models based on ab initio approaches. This book deals with description of both characterization techniques and theoretical models needed to understand and predict the structural and electronic properties of semiconductor heterostructures and nanostructures. - Comprehensive collection of the most powerful characterization techniques for semiconductor heterostructures and nanostructures - Most of the chapters are authored by scientists that are among the top 10 worldwide in publication ranking of the specific field - Each chapter starts with a didactic introduction on the technique - The second part of each chapter deals with a selection of top examples highlighting the power of the specific technique to analyze the properties of semiconductors

Ultra-Broadband InAs/InP Quantum-Dash Laser in Optical Communications: Device and System Level Investigation World Scientific

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.

Quantum Dot Heterostructures EDP Sciences

Heterostructure and quantum-mechanical devices promise significant improvement in the performance of electronic and optoelectronic integrated circuits (ICs). Though these devices are the subject of a vigorous research effort, the current literature is often either highly technical or narrowly focused. This book presents heterostructure and quantum devices to the nonspecialist, especially electrical engineers working with high-performance semiconductor devices. It focuses on a broad base of technical applications using semiconductor physics theory to develop the next generation of electrical engineering devices. The text covers existing technologies and future possibilities within a common framework of high-performance devices, which will have a more immediate impact on advanced semiconductor physics-particularly quantum effects-and will thus form the basis for longer-term technology development.

Handbook of Laser Technology and Applications CRC Press

Heterostructures and Quantum DevicesElsevier

Microelectronics and Optoelectronics Cambridge University Press

Starting with the first transistor in 1949, the world has experienced a technological revolution which has permeated most aspects of modern life, particularly over the last generation. Yet another such revolution looms up before us with the newly developed capability to control matter on the nanometer scale. A truly extraordinary research effort, by scientists, engineers, technologists of all disciplines, in nations large and small throughout the world, is directed and vigorously pressed to develop a full understanding of the properties of matter at the nanoscale and its possible applications, to bring to fruition the promise of nanostructures to introduce a new generation of electronic and optical devices. The physics of low dimensional semiconductor structures, including heterostructures, superlattices, quantum wells, wires and dots is reviewed and their modeling is discussed in detail. The truly exceptional material, Graphene, is reviewed; its functionalization and Van der Waals interactions are included here. Recent research on optical studies of quantum dots and on the physical properties of one-dimensional quantum wires is also reported. Chapters on fabrication of nanowire – based nanogap devices by the dielectrophoretic assembly approach. The broad spectrum of

research reported here incorporates chapters on nanoengineering and nanophysics. In its presentation of tutorial chapters as well as advanced research on nanostructures, this book is ideally suited to meet the needs of newcomers to the field as well as experienced researchers interested in viewing colleagues' recent advances.

SiGe and Si Strained-Layer Epitaxy for Silicon Heterostructure Devices Academic Press

Rapid developments in technology have led to enhanced electronic systems and applications. When utilized correctly, these can have significant impacts on communication and computer systems. Transport of Information-Carriers in Semiconductors and Nanodevices is an innovative source of academic material on transport modelling in semiconductor material and nanoscale devices. Including a range of perspectives on relevant topics such as charge carriers, semiclassical transport theory, and organic semiconductors, this is an ideal publication for engineers, researchers, academics, professionals, and practitioners interested in emerging developments on transport equations that govern information carriers.

An Introduction Elsevier

This book covers the latest advances in the techniques employed to manage the THz radiation and its potential uses. It has been subdivided in three sections: THz Detectors, THz Sources, Systems and Applications. These three sections will allow the reader to be introduced in a logical way to the physics problems of sensing and generation of the terahertz radiation, the implementation of these devices into systems including other components and finally the exploitation of the equipment for real applications in some different field. All of the sections and chapters can be individually addressed in order to deepen the understanding of a single topic without the need to read the whole book. The THz Detectors section will address the latest developments in detection devices based on three different physical principles: photodetection, thermal power detection, rectification. The THz Sources section will describe three completely different generation methods, operating in three separate scales: quantum cascade lasers, free electron lasers and non-linear optical generation. The Systems and Applications section will take care of introducing many of the aspects needed to move from a device to an equipment perspective: control of terahertz radiation, its use in imaging or in spectroscopy, potential uses in security, and will address also safety issues. The text book is at a level appropriate to graduate level courses up to researchers in the field who require a reference book covering all aspects of terahertz technology.

Heterojunctions and Semiconductor Superlattices Elsevier

The present level of experimental sophistication in quantum physics allows physicists to explore domains unimaginable just a decade ago and to test the most fundamental laws of quantum mechanics. This has led to renewed interest in devising new tests, experiments, and devices where it is possible to observe the interaction and localization of just a few atoms or photons. These techniques have been used to reveal new nonclassical effects, to question the limit of the principle of correspondence, and to force quantum behavior in semiconductors. With contributions from leading experts in quantum systems, Quantum

Dynamics of Simple Systems provides an overview of the present range of quantum dynamics, exploring their use and exotic behaviors. It covers specific subjects of quantum dynamics in a competent and detailed way with emphasis on simple systems where few atoms or electrons are involved. This volume will prove to be a useful tool for graduate students as well as experienced physicists.

Integrated Optics: Theory and Technology CRC Press

The Winter School held in Les Houches on March 12-21, 1985 was devoted to Semiconductor Heterojunctions and Superlattices, a topic which is recognized as being now one of the most interesting and active fields in semiconductor physics. In fact, following the pioneering work of Esaki and Tsu in 1970, the study of these two-dimensional semiconductor heterostructures has developed rapidly, both from the point of view of basic physics and of applications. For instance, modulation-doped heterojunctions are nowadays currently used to investigate the quantum Hall effect and to make very fast transistors. This book contains the lectures presented at this Winter School, showing in particular that many aspects of semiconductor heterojunctions and super lattices were treated, extending from the fabrication of these two-dimensional systems to their basic properties and applications in micro-and opto-electron ics. Among the subjects which were covered, one can quote as examples: molecular beam epitaxy and metallorganic chemical vapor deposition of semi conductor compounds; band structure of superlattices; properties of elec trons in heterojunctions, including the fractional quantum Hall effect; opti cal properties of two-dimensional heterostructures; quantum well lasers; and two-dimensional electron gas field effect transistors. It is clear that two-dimensional semiconductor systems are raising a great deal of interest in many industrial and university laboratories. From the number of applications which were received and from the reactions of the participants, it can certainly be asserted that this School corresponded to a need and came at the right time.

Related with Heterostructure And Quantum Well Physics William R:
• Biggest Blowout In Cfp Championship History : click here