Coherent Semiconductor Optics From Basic Concepts To Nanostructure Applications 2007 Edition By Meier Torsten Thomas Peter Koch Stephan W 2006 Hardcover

This volume is a jubilee issue and contains some specially designed computer generated holograms for this occasion, together with a description of how to obtain the holographic effect.

This new edition features numerous updates and additions. Especially 4 new chapters on Fiber Optics, Integrated Optics, Frequency Combs and Interferometry reflect the changes since the first edition. In addition, major complete updates for the chapters: Optical Materials and Their Properties, Optical Detectors, Nanooptics, and Optics far Beyond the Diffraction Limit. Features Contains over 1000 two-color illustrations. Includes over 120 comprehensive tables with properties of optical materials and light sources. Emphasizes physical concepts over extensive mathematical derivations. Chapters with summaries, detailed index Delivers a wealth of up-to-date references.

Primary goal of this book is to provide a cohesive description of the vast field of semiconductor quantum devices, with special emphasis on basic quantum-mechanical phenomena governing the electro-optical response of new-generation nanomaterials. The book will cover within a common language different types of optoelectronic nanodevices, including quantum-cascade laser sources and detectors, few-electron/exciton quantum devices, and semiconductor-based quantum logic gates. The distinguishing feature of the present volume is a unified microscopic treatment of quantum-transport and coherent-optics phenomena on ultrasmall space- and time-scales, as well as of their semiclassical counterparts.

This revised and updated edition of the well-received book by C. Klingshirn provides an introduction to and an overview of all aspects of semiconductor optics, from IR to visible and UV. It has been split into two volumes and rearranged to offer a clearer structure of the course content. Inserts on important experimental techniques as well as sections on topical research have been added to support research-oriented teaching and learning. Volume 1 provides an introduction to the linear optical properties of semiconductors. The mathematical treatment has been kept as elementary as possible to allow an intuitive approach to the understanding of results of semiconductor spectroscopy. Building on the phenomenological model of the Lorentz oscillator, the book describes the interaction of light with fundamental optical excitations in semiconductors (phonons, free carriers, excitons). It also offers a broad review of seminal research results augmented by concise descriptions of the relevant experimental techniques, e.g., Fourier transform IR spectroscopy, ellipsometry, modulation spectroscopy and spatially resolved methods, to name a few. Further, it picks up on hot topics in current research, like quantum structures, mono-layer semiconductors or Perovskites. The experimental aspects of semiconductor optics are complemented by an in-depth discussion of group theory in solid-state optics. Covering subjects ranging from physics to materials science and optoelectronics, this book provides a lively and comprehensive introduction to semiconductor optics. With over 120 problems, more than 480 figures, abstracts to each chapter, as well as boxed inserts and a detailed index, it is intended for use in graduate courses in physics and neighboring sciences like material science and electrical engineering. It is also a valuable reference resource for doctoral and advanced researchers.

Elements of Quantum Optics

22-24 January, 2007, San Jose, California, USA

Coherent Transient Nonlinear Optical Spectroscopic Studies of Single Semiconductor Quantum Dots

Nonlinear Optical Systems

From Basic Principles to Nano-Fabrication and Nano-Photonics

Bose-Einstein condensation of excitons is a unique effect in which the electronic states of a solid can self-organize to acquire quantum phase coherence. The phenomenon is closely linked to Bose-Einstein condensation in other systems such as liquid helium and laser-cooled atomic gases. This is the first book to provide a comprehensive survey of this field, covering theoretical aspects as well as recent experimental work. After setting out the relevant basic physics of excitons, the authors discuss exciton-phonon interactions as

well as the behaviour of biexcitons. They cover exciton phase transitions and give particular attention to nonlinear optical effects including the optical Stark effect and chaos in excitonic systems. The thermodynamics of equilibrium, quasi-equilibrium, and nonequilibrium systems are examined in detail. The authors interweave theoretical and experimental results throughout the book, and it will be of great interest to graduate students and researchers in semiconductor and superconductor physics, quantum optics, and atomic physics.

The book describes recent progress of near-field optical science and technology. The title of the book implies capabilities of optical near-field not only for imaging/microscopy but also for fabrication/manipulation/processing in nanometric scale. The authors introduce the differences between near-field optics and far-field optics from both an experimental and theoretical perspective. The book touches on a wide range of topics in near-field optics, and can be used both by the novice and experienced researcher already familiar with the subject, to connect the experimental with the theoretical aspects of near-field optics.

Fibre Optics Is A Very Important Constituent Of Modern Information Technology. One Major Economic Benefit Offered By Fibre Optics Is Very High Information Transmission Rate At Low Cost Per Circuit-Km. The First Fibre Optic Telephone Link Went Public In Late 1970S. Ever Since, The Industrially Advanced Nations Around The World Have Been Striving To Deploy Fibre Optics In Almost Every Sector Of Communication Including Computer Networks And Data Links. Rarely, Since The Discovery Of Transistors, Have We Noticed Such A Fantastic Growth Rate Of A New Technology. As An Important Byproduct Of This Phenomenal Progress, A New Class Of Ultra-Sensitive Optical Sensors And Devices Based On Fibre Optics Has Emerged, Which Are Being Developed For Large Scale Use In Industrial And Biomedical Sectors. This Book Provides Semi-Tutorial Presentations Of The Fundamentals Of This Emerging Technology As Applied To Telecommunication And Sensor Development. Each Chapter, Contributed By Leading Researchers, Is Appended With A Large Number Of References To The Original Publications.The Book Is Broadly Divided Into Three Parts. The First Part Is Devoted To Propagation Effects In Optical Waveguides Including Polarization And Non-Linear Effects And Their Measurements. Fabrication And Cabling Technologies Of Optical Fibres Are Also Discussed In This Part. The Second Part Of The Book Deals With Optical Sources, Detectors, Integrated Optical Devices And System Designs Involved In Optical Communication Technology. The Last Part Of The Book Covers Topics Like Intensity Modulated And Interferometric Optical Fibre Sensors, In-Line Fibre Optic Components For Signal Processing And Multiplexing Of Optical Signals, And Application Of Fibre Optics In The Power Sector. The Extensive Coverage Should Prove Useful To Senior Undergraduate And Postgraduate Students, Researchers And Also To R & D Engineers Who Want A Tutorial Introduction To The Technologies Of Fibre Optic Telecommunication And Sensors.

Mathematical methods play a significant role in the rapidly growing field of nonlinear optical materials. This volume discusses a number of successful or promising contributions. The overall theme of this volume is twofold: (1) the challenges faced in computing and optimizing nonlinear optical material properties; and (2) the exploitation of these properties in important areas of application. These include the design of optical amplifiers and lasers, as well as novel optical switches. Research topics in this volume include how to exploit the magnetooptic effect, how to work with the nonlinear optical response of materials, how to predict laser-induced breakdown in efficient optical devices, and how to handle electron cloud distortion in femtosecond processes.

Theory of Semiconductor Quantum Devices

Linear Optical Properties of Semiconductors

Quantum Coherence Correlation and Decoherence in Semiconductor Nanostructures

Advances in Atomic, Molecular, and Optical Physics

Progress in Optics

This valuable professional resource offers a timely, in-depth look at the many new and innovative technologies and systems configurations available to telecommunications engineers who design optical

communications networks. In addition to providing a broad ranging review of state-of-the-art technologies and systems, it arms designers with comprehensive analytical tools with which to comparatively assess available components and systems configurations for performance, reliability, and practicality.

The Seventh Rochester Conference on Coherence and Quantum Optics was held on the campus of the University of Rochester during the four-day period June 7 - 10, 1996. More than 280 scientists from 33 countries participated. This book contains the Proceedings of the meeting. This Conference differed from the previous six in the series in having only a limited number of oral presentations, in order to avoid too many parallel sessions. Another new feature was the introduction of tutorial lectures. Most contributed papers were presented in poster sessions. The Conference was sponsored by the American Physical Society, by the Optical Society of America, by the International Union of Pure and Applied Physics and by the University of Rochester. We wish to express our appreciation to these organizations for their support and we especially extend our thanks to the International Union of Pure and Applied Physics for providing financial assistance to a number of speakers from Third World countries, to enable them to take part in the meeting.

Semiconductor nanostructures are attracting a great deal of interest as the most promising device with which to implement quantum information processing and quantum computing. This book surveys the present status of nanofabrication techniques, near field spectroscopy and microscopy to assist the fabricated nanostructures. It will be essential reading for academic and industrial researchers in pure and applied physics, optics, semiconductors and microelectronics. The first up-to-date review articles on various aspects on quantum coherence, correlation and decoherence in semiconductor nanostructures

Guiding graduate students and researchers through the complex world of laser physics and nonlinear optics, this book provides an in-depth exploration of the dynamics of lasers and other relevant optical systems, under the umbrella of a unitary spatio-temporal vision. Adopting a balanced approach, the book covers traditional as well as special topics in laser physics, quantum electronics and nonlinear optics, treating them from the viewpoint of nonlinear dynamical systems. These include laser emission, frequency generation, solitons, optically bistable systems, pulsations and chaos and optical pattern formation. It also provides a coherent and up-to-date treatment of the hierarchy of nonlinear optical models and of the rich variety of phenomena they describe, helping readers to understand the limits of validity of each model and the connections among the phenomena. It is ideal for graduate students and researchers in nonlinear optics, quantum electronics, laser physics and photonics.

Coherent Control in Atoms, Molecules, and Semiconductors

Optical Coherence and Quantum Optics

Comprehensive Semiconductor Science and Technology

Encyclopedia of Modern Optics

And Coherent Nonlinear Optics with Excitons

Terahertz (THz) and Mid-Infrared (MIR) radiation (TERA-MIR) can be transmitted through nearly any material without causing biological harm. Novel and rapid methods of detection can be created with devices operation in these spectral ranges allowing scanning for weapons, detecting hidden explosives (including plastic landmines), controlling the quality of food and a host of other exciting applications. This book focuses on mathematical and physical aspects of the field, on unifying these two spectral domains (THz and MIR) with regard to common sources, detectors, materials and applications, and on key interdisciplinary topics. The main THz and MIR source is the quantum cascade laser (QCL). Thus significant attention is paid to the challenge of turning this advanced technology into affordable commercial devices so as to exploit its enormous potential. However other alternatives to THz QCLs are also presented, e.g. sub-terahertz imaging from avalanching GaAs bipolar transistors, Josephson junctions as THz sources, semiconductor materials for pulsed THz sources, superconducting THz electronics with Josephson vortices. In summary this book delivers a global picture of the state of the art in TERA-MIR generation, detection and applications.

This is the first book to review in systematic fashion the coherence, amplification and quantum effects in semiconductor lasers. There are three major sections in the text. The first deals with the application of semiconductor lasers for coherent communication and spectroscopy, outlining the fundamental spectral and modulation characteristics of semiconductor lasers. Semiconductor laser amplifiers, particularly the Fabry-Perot cavity amplifier, traveling wave amplifiers and the injection-locked oscillator, are covered in the second section which serves to point out the advantages and problems of optical amplifier technology. The third section discusses the quantum effects in semiconductor lasers, describing squeezed-state generation and inhibition of spontaneous emission as well as general quantum noise properties. This section also examines new research directions in quantum optics and the potential for a noiseless and thresholdless semiconductor laser.

This book will highlight the motivation for coherent optics in access and introduce digital coherent optical system in detail, including advanced modulation formats, architecture of modulation and detection, and DSP flow for both transmitter and receiver. This book will also demonstrate potential approaches to re-design and re-engineer the digital coherent concept from long-haul and metro solutions to the access network, leveraging reduction in complexity and cost as well as the benefits of capacity increases and operational improvements. This book will illustrate the details on optimization of the digital, optical, and electrical complexity and standardization and interoperability.

In recent years the field of semiconductor optics has been pushed to several extremes. The size of semiconductor structures has shrunk to dimensions of a few nanometers, the semiconductor-light interaction is studied on timescales as fast as a few femtoseconds, and transport properties on a length scale far below the wavelength of light have been revealed. These advances were driven by rapid improvements in both semiconductor and optical technologies and were further facilitated by progress in the theoretical description of optical excitations in semiconductors. This book, written by leading experts in the field, provides an up-to-date introduction to the optics of semiconductors and their nanostructures so as to help the reader understand these exciting new developments. It

also discusses recently established applications, such as blue-light emitters, as well as the quest for future applications in areas such as spintronics, quantum information processing, and third-generation solar cells.

From Quantum Physics to Smart Devices

Semiconductor Quantum Optics

Quantum Coherence

Ultrafast Phenomena in Semiconductors and Nanostructure Materials XI and Semiconductor Photodetectors IV

Semiconductor Optics

This volume contains the Proceedings of the International Workshop on Coherent Control of Carrier Dynamics in Semiconductors, held in May 1998 at the University of Illinois at Chicago. Coherent control of charge carrier dynamics has evolved into an interdisciplinary topic involving atomic and molecular physics, condensed matter physics, quantum optics, laser spectroscopy, and the physics of electronic devices. This is reflected by the contributions contained in this volume which, to our knowledge, is the first of its kind on the issue of coherent control. Containing both review articles and latest results in the field in atomic, molecular, and semiconductor physics, it addresses experts and novices alike. All articles have been reviewed and emphasis has been given to clarity and a detailed list of references. Audience: This volume will be of interest to research workers, engineers, students and postgraduates.

Quantum coherence plays a crucial role in various forms of matter. The thriving field of quantum information as well as unconventional approaches to using mesoscopic systems in future optoelectronic devices provide the exciting background for this set of lectures. The lectures originate from the Schladming Winter Schools and are edited to address a broad readership ranging from the graduate student up to the senior scientist.

Advances in Atomic, Molecular, and Optical Physics, Volume 66, provides a comprehensive compilation of recent developments in a field that is in a state of rapid growth as new experimental and theoretical techniques are used on many problems, both old and new. Topics covered include related applied areas, such as atmospheric science, astrophysics, surface physics, and laser physics, with timely articles written by distinguished experts that contain relevant review materials and detailed descriptions of important developments in the field. Presents the work of international experts in the field Contains comprehensive articles that compile recent developments in a field that is experiencing rapid growth, with new experimental and theoretical techniques emerging Ideal for users interested in optics, excitons, plasmas, and thermodynamics Topics covered include atmospheric science, astrophysics, surface physics, and laser physics, amongst others

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 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

Fundamentals of Fibre Optics in Telecommunication and Sensor Systems

Semiconductor Optics 1

Bose-Einstein Condensation of Excitons and Biexcitons

Coherent Optics for Access Networks

NASA Tech Briefs

The updated and enlarged new edition of this book provides an introduction to and an overview of semiconductor optics from the IR through the visible to the UV. It includes coverage of linear and nonlinear optical properties, dynamics, magneto- and electrooptics, high-excitation effects, some applications, experimental techniques and group theory. The mathematics is kept as elementary as possible. The subjects covered extend from physics to materials science and optoelectronics. New or updated chapters add coverage of current topics, while the chapters on bulk materials have been revised and updated.

This book covers the device physics of semiconductor lasers in five chapters written by recognized experts in this field. The volume begins by introducing the basic mechanisms of optical gain in semiconductors and the role of quantum confinement in modern quantum well diode lasers. Subsequent chapters treat the effects of built-in strain, one of the important recent advances in the technology of these lasers, and the physical mechanisms

underlying the dynamics and high speed modulation of these devices. The book concludes with chapters addressing the control of photon states in squeezed-light and microcavity structures, and electron states in low dimensional quantum wire and quantum dot lasers. The book offers useful information for both readers unfamiliar with semiconductor lasers, through the introductory parts of each chapter, as well as a state-of-the-art discussion of some of the most advanced semiconductor laser structures, intended for readers engaged in research in this field. This book may also serve as an introduction for the companion volume, Semiconductor Lasers II: Materials and Structures, which presents further details on the different material systems and laser structures used for achieving specific diode laser performance features. Introduces the reader to the basics of semiconductor lasers Covers the fundamentals of lasing in semiconductors, including quantum confined and microcavity structures Beneficial to readers interested in the more general aspects of semiconductor physics and optoelectronic devices, such as quantum confined heterostructures and integrated optics Each chapter contains a thorough introduction to the topic geared toward the non-expert, followed by an in-depth discussion of current technology and future trends Useful for professionals engaged in research and development Contains numerous schematic and data-containing illustrations

This book introduces the basic theoretical concepts required for the analysis of the optical response of semiconductor systems in the coherent regime. It is the most instructive textbook on the theory and optical effects of semiconductors. The entire presentation is based on a one-dimensional tight-binding model. Starting with discrete-level systems, increasing complexity is added gradually to the model by including band-structure and many-particle interaction. Various linear and nonlinear optical spectra and temporal phenomena are studied. The analysis of many-body effects in nonlinear optical phenomena covers a major part of the book.

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.

Microscopic Modeling and Simulation Strategies
Proceedings of the Seventh Rochester Conference on Coherence and Quantum Optics, held at the University of Rochester, June 7 – 10, 1995
Near-Field Nano-Optics
From Quarks to Solids
Generation, Detection and Applications

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.

The book gives a broad coverage of the basic elements necessary to understand and carry out research in quantum optics. It presents a variety of theoretical tools and important results for two-level and semiconductor media, many of which could only be found in the original literature of in specialized monographs up to now. The text reveals the close connection between many seemingly unrelated topics. The book "e;Quantum Optics"e; has been written to meet the requirement of the degree and post graduate students. The subject matter has been discussed in such a simple way that the students will find no difficult to understand it. Most of the examples given in the book have been selected from various university examination papers and the book cover the syllabus of almost all the universities.

The development and application of low-dimensional semiconductors have been rapid and spectacular during the past decade. Ever improving epitaxial growth and device fabrication techniques have allowed access to some remarkable new physics in quantum confined structures while a plethora of new devices has emerged. The field of optoelectronics in particular has benefited from these advances both in terms of improved performance and the invention of fundamentally new types of device, at a time when the use of optics and lasers in telecommunications, broadcasting, the Internet, signal processing, and computing has been rapidly expanding. An appreciation of the physics of quantum and dynamic electronic processes in confined structures is key to the understanding of many of the latest devices and their continued development. Semiconductor Quantum Optoelectronics covers new physics and the latest device developments in low-dimensional semiconductors. It allows those who already have some familiarity with semiconductor physics and devices to broaden and expand their knowledge into new and expanding topics in low-dimensional semiconductors. The book provides pedagogical coverage of selected areas of new and pertinent physics of low-dimensional structures and presents some optoelectronic devices presently under development. Coverage includes material and band structure issues and the physics of ultrafast, nonlinear, coherent, intersubband, and intracavity phenomena. The book emphasizes various devices, including quantum wells, visible, quantum cascade, and mode-locked lasers; microcavity LEDs and VCSELs; and detectors and logic elements. An underlying theme is high-speed phenomena and devices for increased system bandwidths.

The emerging field of semiconductor quantum optics combines semiconductor physics and quantum optics, with the aim of developing quantum devices with unprecedented performance. In this book researchers and graduate students alike will reach a new level of understanding to begin conducting state-of-the-art investigations. The book combines theoretical methods from quantum optics and solid-state physics to give a consistent microscopic description of light-matter- and many-body-interaction effects in low-dimensional semiconductor nanostructures. It

develops the systematic theory needed to treat semiconductor quantum-optical effects, such as strong light-matter coupling, light-matter entanglement, squeezing, as well as quantum-optical semiconductor spectroscopy. Detailed derivations of key equations help readers learn the techniques and nearly 300 exercises help test their understanding of the materials covered. The book is accompanied by a website hosted by the authors, containing further discussions on topical issues, latest trends and publications on the field. The link can be found at www.cambridge.org/9780521875097.

Semiconductor Optics and Transport Phenomena

Applications to Quantum Information Processing

Optics of Semiconductors and Their Nanostructures

Optical Techniques for Solid-State Materials Characterization

Fundamentals of Photonics

"This volume gives an overview of the manifestations of quantum coherence in different solid state systems, including semiconductor confined systems, magnetic systems, crystals and superconductors. Besides being of paramount importance in fundamental physics, the study of quantum coherence furnishes the starting point for important applications like quantum computing or secure data transmission. The coherent effects discussed mainly involve elementary excitations in solids like polaritons, excitons, magnons, macroscopic quantities like superconductor currents and electron spins. Also, several new aspects of the physics of quasi-particles are understood and discussed in this context. Due to the variety of systems in which quantum coherence may be observed, solid state systems are the natural candidates for applications that rely on coherence, for example quantum computer." --Book Jacket.

Over the last century, numerous optical techniques have been developed to characterize materials, giving insight into their optical, electronic, magnetic, and structural properties and elucidating such diverse phenomena as high-temperature superconductivity and protein folding. Optical Techniques for Solid-State Materials Characterization provides detailed descriptions of basic and advanced optical techniques commonly used to study materials, from the simple to the complex. The book explains how to use these techniques to acquire, analyze, and interpret data for gaining insight into material properties. With chapters written by pioneering experts in various optical techniques, the text first provides background on light – matter interactions, semiconductors, and metals before discussing linear, time-integrated optical experiments for measuring basic material properties, such as Fourier transform infrared spectroscopy, photoluminescence, and Raman scattering. The next section begins with a description of ultrashort pulse generation and carrier dynamics in semiconductors and metals. The book then discusses time-resolved optical techniques, such as pump – probe spectroscopy, terahertz spectroscopy, and magneto-optical spectroscopy. The subsequent section describes spatially resolved optical spectroscopy, including conventional optical microscopy and micro-optical and near-field scanning techniques. The book concludes with an overview of more advanced, emerging optical techniques, such as ultrafast x-ray and electron diffraction, ultrafast photoemission spectroscopy, and time-resolved optical microscopy. As optical techniques are among the first applied when studying new systems with novel properties, the information presented in this comprehensive reference will only grow in importance. By supplying clear, detailed explanations of these techniques, the book enables researchers to readily implement them and acquire new insights into the materials they study. CRC Press Authors Speak Rohit P. Prasankumar speaks about

his book. Watch the Video

The fundamental concept of quantum coherence plays a central role in quantum physics, cutting across disciplines of quantum optics, atomic and condensed matter physics. Quantum coherence represents a universal property of the quantum s- tems that applies both to light and matter thereby tying together materials and p- nomena. Moreover, the optical coherence can be transferred to the medium through the light-matter interactions. Since the early days of quantum mechanics there has been a desire to control dynamics of quantum systems. The generation and c- trol of quantum coherence in matter by optical means, in particular, represents a viable way to achieve this longstanding goal and semiconductor nanostructures are the most promising candidates for controllable quantum systems. Optical generation and control of coherent light-matter states in semiconductor quantum nanostructures is precisely the scope of the present book. Recently, there has been a great deal of interest in the subject of quantum coh- ence. We are currently witnessing parallel growth of activities in different physical systems that are all built around the central concept of manipulation of quantum coherence. The burgeoning activities in solid-state systems, and semiconductors in particular, have been strongly driven by the unprecedented control of coherence that previously has been demonstrated in quantum optics of atoms and molecules, and is now taking advantage of the remarkable advances in semiconductor fabrication technologies. A recent impetus to exploit the coherent quantum phenomena comes from the emergence of the quantum information paradigm.

Proceedings of SPIE present the original research papers presented at SPIE conferences and other high-quality conferences in the broad-ranging fields of optics and photonics. These books provide prompt access to the latest innovations in research and technology in their respective fields. Proceedings of SPIE are among the most cited references in patent literature.

Quantum Coherence in Solid State Systems

Semiconductor Quantum Optoelectronics

Coherent Optical Communications Systems

From Basic Concepts to Nanostructure Applications

Coherence and Quantum Optics VII

This book presents a systematic account of optical coherence theory within the framework of classical optics, as applied to such topics as radiation from sources of different states of coherence, foundations of radiometry, effects of source coherence on the spectra of radiated fields, coherence theory of laser modes, and scattering of partially coherent light by random media.

The Encyclopedia of Modern Optics, Second Edition, provides a wide-ranging overview of the field, comprising authoritative reference articles for undergraduate and postgraduate students and those researching outside their area of expertise. Topics covered include classical and quantum optics, lasers, optical fibers and optical fiber systems, optical materials and light-emitting diodes (LEDs). Articles cover all subfields of optical physics and engineering, such as electro-optical design of modulators and detectors. This update contains contributions from international experts who discuss topics such as nano-photonics and

plasmonics, optical interconnects, photonic crystals and 2D materials, such as graphene or holy fibers. Other topics of note include solar energy, high efficiency LED ' s and their use in illumination, orbital angular momentum, quantum optics and information, metamaterials and transformation optics, high power fiber and UV fiber lasers, random lasers and bio-imaging. Addresses recent developments in the field and integrates concepts from fundamental physics with applications for manufacturing and engineering/design Provides a broad and interdisciplinary coverage of specialist areas Ensures that the material is appropriate for new researchers and those working in a new sub-field, as well as those in industry Thematically arranged and alphabetically indexed, with cross-references added to facilitate ease-of-use
Well-balanced and up-to-date introduction to the field of semiconductor optics, including transport phenomena in semiconductors. Starting with the theoretical fundamentals of this field the book develops, assuming a basic knowledge of solid-state physics. The application areas of the theory covered include semiconductor lasers, detectors, electro-optic modulators, single-electron transistors, microcavities and double-barrier resonant tunneling diodes. One hundred problems with hints for solution help the readers to deepen their knowledge.
Nonlinear Optical Materials
Coherent Semiconductor Optics
Coherence, Amplification, and Quantum Effects in Semiconductor Lasers
Semiconductor Lasers I
Terahertz and Mid Infrared Radiation