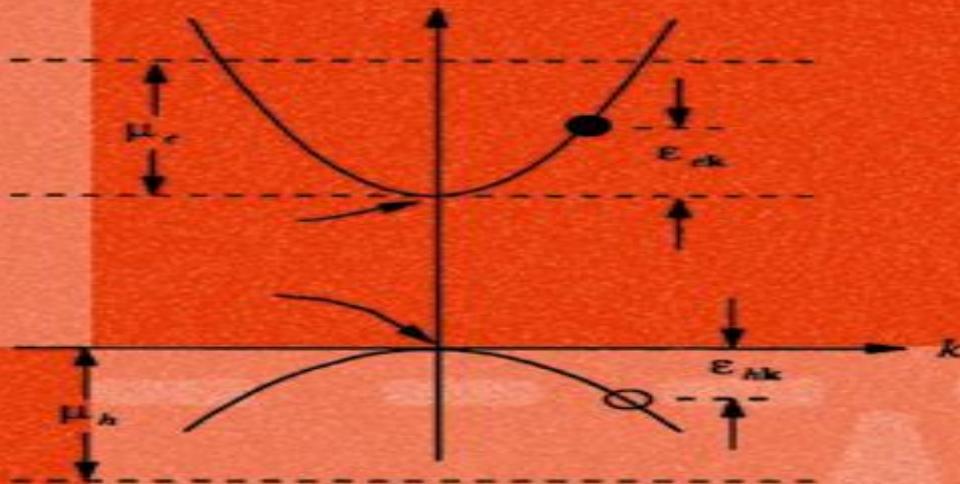


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Semiconductor-Laser Fundamentals Weng W. Chow, Stephan W. Koch, 2013-03-09 Since Fall of 1993 when we completed the manuscript of our book *Semiconductor Laser Physics* W W Chow S W Koch and M Sargent III Springer Berlin Heidelberg 1994 many new and exciting developments have taken place in the world of semiconductor lasers Novel laser and amplifier structures were developed and others for example the VCSEL vertical cavity surface emitting laser and monolithic MOPA master oscillator power amplifier made the transition from research and development to production When investigating some of these systems we discovered instances when device performance and thus design depend critically on details of the gain medium properties e g spectral shape and carrier density dependence of the gain and refractive index New material systems were also introduced with optical emission wave lengths spanning from the mid infrared to the ultraviolet Particularly noteworthy are laser and light emitting diodes based on the wide bandgap group III nitride and II VI compounds These devices emit in the visible to ultra violet wavelength range which is important for the wide variety of optoelectronic applications While these novel semiconductor laser materials show many similarities with the more conventional near infrared systems they also possess rather different material parameter combinations These differences appear as band structure modifications and as increased importance of Coulomb effects such that e g excitonic signatures resulting from the attractive electron hole interaction are generally significantly more prominent in the wide bandgap systems **Springer**

Handbook of Semiconductor Devices Massimo Rudan, Rossella Brunetti, Susanna Reggiani, 2022-11-10 This Springer Handbook comprehensively covers the topic of semiconductor devices embracing all aspects from theoretical background to fabrication modeling and applications Nearly 100 leading scientists from industry and academia were selected to write the handbook's chapters which were conceived for professionals and practitioners material scientists physicists and electrical engineers working at universities industrial R D and manufacturers Starting from the description of the relevant technological aspects and fabrication steps the handbook proceeds with a section fully devoted to the main conventional semiconductor devices like e g bipolar transistors and MOS capacitors and transistors used in the production of the standard integrated circuits and the corresponding physical models In the subsequent chapters the scaling issues of the

semiconductor device technology are addressed followed by the description of novel concept based semiconductor devices The last section illustrates the numerical simulation methods ranging from the fabrication processes to the device performances Each chapter is self contained and refers to related topics treated in other chapters when necessary so that the reader interested in a specific subject can easily identify a personal reading path through the vast contents of the handbook

Physics of Photonic Devices Shun Lien Chuang,2012-11-07 The most up to date book available on the physics of photonic devices This new edition of Physics of Photonic Devices incorporates significant advancements in the field of photonics that have occurred since publication of the first edition Physics of Optoelectronic Devices New topics covered include a brief history of the invention of semiconductor lasers the Lorentz dipole method and metal plasmas matrix optics surface plasma waveguides optical ring resonators integrated electroabsorption modulator lasers and solar cells It also introduces exciting new fields of research such as surface plasmonics and micro ring resonators the theory of optical gain and absorption in quantum dots and quantum wires and their applications in semiconductor lasers and novel microcavity and photonic crystal lasers quantum cascade lasers and GaN blue green lasers within the context of advanced semiconductor lasers Physics of Photonic Devices Second Edition presents novel information that is not yet available in book form elsewhere Many problem sets have been updated the answers to which are available in an all new Solutions Manual for instructors Comprehensive timely and practical Physics of Photonic Devices is an invaluable textbook for advanced undergraduate and graduate courses in photonics and an indispensable tool for researchers working in this rapidly growing field **Handbook of Defence Electronics and Optronics** Anil K. Maini,2018-03-26 Handbook of Defence Electronics and Optronics Anil K Maini Former Director Laser Science and Technology Centre India First complete reference on defence electronics and optronics Fundamentals Technologies and Systems This book provides a complete account of defence electronics and optronics The content is broadly divided into three categories topics specific to defence electronics topics relevant to defence optronics and topics that have both electronics and optronics counterparts The book covers each of the topics in their entirety from fundamentals to advanced concepts military systems in use and related technologies thereby leading the reader logically from the operational basics of military systems to involved technologies and battlefield deployment and applications Key features Covers fundamentals operational aspects involved technologies and application potential of a large cross section of military systems Discusses emerging technology trends and development and deployment status of next generation military systems wherever applicable in each category of military systems Amply illustrated with approximately 1000 diagrams and photographs and around 30 tables Includes salient features technologies and deployment aspects of hundreds of military systems including military radios ground and surveillance radars laser range finder and target designators night visions devices EW and EO jammers laser guided munitions and military communications equipment and satellites Handbook of Defence Electronics and Optronics is an essential guide for graduate students R D scientists engineers engaged in

manufacturing defence equipment and professionals handling the operation and maintenance of these systems in the Armed Forces

Handbook of Optoelectronic Device Modeling and Simulation Joachim Piprek, 2017-10-10 Optoelectronic devices are now ubiquitous in our daily lives from light emitting diodes LEDs in many household appliances to solar cells for energy This handbook shows how we can probe the underlying and highly complex physical processes using modern mathematical models and numerical simulation for optoelectronic device design analysis and performance optimization It reflects the wide availability of powerful computers and advanced commercial software which have opened the door for non specialists to perform sophisticated modeling and simulation tasks The chapters comprise the know how of more than a hundred experts from all over the world The handbook is an ideal starting point for beginners but also gives experienced researchers the opportunity to renew and broaden their knowledge in this expanding field

Fundamentals of Photonics Bahaa E. A. Saleh, Malvin Carl Teich, 2020-03-04 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

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Lasers Charles Blain, 2002 Developments in lasers continue to enable progress in many areas such as eye surgery the recording industry and dozens of others This book presents citations from the book literature for the last 25 years and groups them for ease of access which is also provided by subject author and titles indexes

Lasers and Electro-optics Christopher C. Davis, 2014-03-20 This book contains comprehensive coverage of topics in optical physics and engineering for undergraduate

students studying laser physics optoelectronics photonics and optical engineering *Lasers and Optoelectronics* Anil K. Maini, 2013-08-05 With emphasis on the physical and engineering principles this book provides a comprehensive and highly accessible treatment of modern lasers and optoelectronics Divided into four parts it explains laser fundamentals types of lasers laser electronics optoelectronics and laser applications covering each of the topics in their entirety from basic fundamentals to advanced concepts Key features include exploration of technological and application related aspects of lasers and optoelectronics detailing both existing and emerging applications in industry medical diagnostics and therapeutics scientific studies and Defence simple explanation of the concepts and essential information on electronics and circuitry related to laser systems illustration of numerous solved and unsolved problems practical examples chapter summaries self evaluation exercises and a comprehensive list of references for further reading This volume is a valuable design guide for R D engineers and scientists engaged in design and development of lasers and optoelectronics systems and technicians in their operation and maintenance The tutorial approach serves as a useful reference for under graduate and graduate students of lasers and optoelectronics also PhD students in electronics optoelectronics and physics *Dilute III-V Nitride Semiconductors and Material Systems* Ayse Erol, 2008-01-12 A major current challenge for semiconductor devices is to develop materials for the next generation of optical communication systems and solar power conversion applications Recently extensive research has revealed that an introduction of only a few percentages of nitrogen into III V semiconductor lattice leads to a dramatic reduction of the band gap This discovery has opened the possibility of using these material systems for applications ranging from lasers to solar cells *Physics and Technology of Dilute III V Nitride Semiconductors and Novel Dilute Nitride Material Systems* reviews the current status of research and development in dilute III V nitrides with 24 chapters from prominent research groups covering recent progress in growth techniques experimental characterization of band structure defects carrier transport transport properties dynamic behavior of N atoms device applications modeling of device design novel optoelectronic integrated circuits and novel nitrogen containing III V materials *Optoelectronic Devices* Xun Li, 2009-06-11 With a clear application focus this book explores optoelectronic device design and modeling through physics models and systematic numerical analysis By obtaining solutions directly from the physics based governing equations through numerical techniques the author shows how to develop new devices and how to enhance the performance of existing devices Semiconductor based optoelectronic devices such as semiconductor laser diodes electroabsorption modulators semiconductor optical amplifiers superluminescent light emitting diodes and their integrations are all covered Including step by step practical design and simulation examples together with detailed numerical algorithms this book provides researchers device designers and graduate students in optoelectronics with the numerical techniques to obtain solutions for their own structures *Light and Matter* Yehuda B. Band, 2006-09-01 *Light and Matter* Electromagnetism Optics Spectroscopy and Lasers provides comprehensive coverage of the interaction of light and matter and resulting

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Physics and Simulation of Optoelectronic Devices, 2001 **Vertical-Cavity Surface-Emitting Laser Devices** Herbert Li, Kenichi Iga, 2013-04-17

Explains in detail the basics theory design fabrication and operation of vertical cavity surface emitting lasers All the chapters are written by pioneers and key experts who have exclusive access to the most up to date innovations in the respective fields

Laser-Based Measurements for Time and Frequency Domain Applications Pasquale Maddaloni, Marco Bellini, Paolo De Natale, 2016-04-19 Foreword by Nobel laureate Professor Theodor W Hch of Ludwig Maximilians Universit tMunchenBased on the authors experimental work over the last 25 years Laser Based Measurements for Time and Frequency Domain Applications A Handbook presents basic concepts state of the art applications and future trends in optical atomic and molecular physic

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to nanophotonics covering basic principles technology and applications in lighting lasers and photovoltaics Providing a wealth of information on materials and devices and over 150 color figures it is the go to guide for students in electrical engineering taking courses in nanophotonics

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