
Optically Pumped Semiconductor Disk Lasers For High Power

Applied Nanophotonics
Science and Applications of Laser Cooling of Solids
Tailoring the Emission of Stripe Array Diode Lasers with External Cavities to Enable Nonlinear Frequency Conversion
Packaging of High Power Semiconductor Lasers
Mid-Infrared Coherent Sources and Applications
Semiconductor Lasers
Ultrashort Pulse Laser Technology
Vertical External Cavity Surface Emitting Lasers
Semiconductor Nanolasers
Optical Refrigeration
VECSEL Technology and Applications
Design and Performance of Optically Pumped Semiconductor Disk Lasers with Wide Tuning Ranges
Frontiers in Guided Wave Optics and Optoelectronics
Applied Nanophotonics
Military Laser Technology and Systems
Electrically and Optically Pumped Semiconductor Disk Lasers - Continuous-wave and Modelocked
Laser-based Mid-infrared Sources and Applications
Optically Pumped Semiconductor Disk Lasers for High-power Wide Wavelength Tuning
Advances in Semiconductor Lasers
Organic Solid-State Lasers
The Physics and Engineering of Compact Quantum Dot-based Lasers for Biophotonics
An Introduction
Issues in Optics, Light, Laser, Infrared, and Photonic Technology: 2011 Edition
Physics and Technology
Fundamentals and Applications
Optical Engineering of Diamond
Proceedings of the 13th International Conference, 8-12 July, 2007, Guildford, UK
Advanced Semiconducting Materials and Devices
Narrow Gap Semiconductors 2007
Introduction to Laser Technology
Fundamentals, Technology, Applications
Lasers and Current Optical Techniques in Biology
Semiconductor Lasers
VECSEL Technology and Applications
High-Power Diode Lasers
An Entry-Level Guide
Introduction to Laser Technology
DBR-Free Optically Pumped Semiconductor Disk Lasers

Optically-pumped Semiconductor Disk Lasers with Intracavity Second-harmonic Generation
Semiconductor Lasers and Laser Dynamics

Optically Pumped Semiconductor Disk Lasers For High Power

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Applied Nanophotonics John Wiley & Sons

Narrow gap semiconductors have provided an exciting field of research and show a number of extreme physical and material characteristics. They are the established material systems for infrared detectors and emitters, and with new developments in the technology these materials are emerging as a viable route to high speed, low power electronics. New kinds of narrow gap semiconductor, such as graphene and other composite nanocrystals, are also providing renewed interest in the underlying physics. The Thirteenth International Conference on Narrow Gap Semiconductors (NGS-13) was held at the University of Surrey, Guildford, UK in July 2007. The conference brought together experts and young scientists to discuss the latest findings and developments in the field. This book contains the invited and contributed papers which were presented at this meeting and serves to provide a broad overview of the current worldwide activities in narrow gap semiconductor research. The subjects covered are theoretical and material physics of narrow gap semiconductors and quantum heterostructures, spin related phenomenon including carrier dynamics and magnetotransport, carbon nanotubes and graphene as novel narrow gap material, as well as device physics including transistors, mid and far-infrared lasers and detectors.

Science and Applications of Laser Cooling of Solids John Wiley & Sons

The expanded fourth edition of the book that offers an essential introduction to laser technology and the newest developments in the field The revised and updated fourth edition of *Understanding Lasers* offers an essential guide and introduction that explores how lasers work, what they do, and how they are applied in the real world. The author—a Fellow of The Optical Society—reviews the key concepts of physics and optics that are essential for understanding lasers and explains how lasers operate. The book also contains information on the optical accessories used with lasers. Written in non-technical terms, the book gives an overview of the wide-variety laser types and configurations. *Understanding Lasers* covers fiber, solid-state, excimer, helium-neon, carbon dioxide, free-electron lasers, and more. In addition, the book also explains concepts such as the difference between laser oscillation and amplification, the importance of laser gain, and tunable lasers. The updated fourth edition highlights the most recent research and development in the field. This important resource: Includes a new chapter on fiber lasers and amplifiers Reviews new topics on physics of optical fibers and fiber lasers, disk lasers, and Ytterbium lasers Contains new sections on Laser Geometry and Implications, Diode Laser Structures, Optimal Parametric Sources, and 3D Printing and Additive Manufacturing Puts the focus on research and emerging developments in areas such as spectroscopy, slow light, laser cooling, and extremely precise measurements Contains appendices, glossary, and index that help make this book a useful reference Written for engineering and physics students, engineers, scientists, and technicians, the fourth edition of *Understanding Lasers* contains

the basic concepts of lasers and the most recent advances in the technology.

Tailoring the Emission of Stripe Array Diode Lasers with External Cavities to Enable Nonlinear Frequency Conversion Springer

An important guide to the major techniques for generating coherent light in the mid-infrared region of the spectrum *Laser-based Mid-infrared Sources and Applications* gives a comprehensive overview of the existing methods for generating coherent light in the important yet difficult-to-reach mid-infrared region of the spectrum (2–20 μm) and their applications. The book describes major approaches for mid-infrared light generation including ion-doped solid-state lasers, fiber lasers, semiconductor lasers, and laser sources based on nonlinear optical frequency conversion, and reviews a range of applications: spectral recognition of molecules and trace gas sensing, biomedical and military applications, high-field physics and attoscience, and others. Every chapter starts with the fundamentals for a given technique that enables self-directed study, while extensive references help conduct deeper research. *Laser-based Mid-infrared Sources and Applications* provides up-to-date information on the state-of-the-art mid-infrared sources, discusses in detail the advancements made over the last two decades such as microresonators and interband cascade lasers, and explores novel approaches that are currently subjects of intense research such as supercontinuum and frequency combs generation. This important book: • Explains the fundamental principles and major techniques for coherent mid-infrared light generation • Discusses recent advancements and current cutting-edge research in the field • Highlights important biomedical, environmental, and military applications Written for researchers, academics, students, and engineers from different disciplines, the book helps navigate the rapidly expanding field of mid-infrared laser-based technologies.

Packaging of High Power Semiconductor Lasers Cambridge University Press

With full color throughout, this unique text provides an accessible yet rigorous introduction to the basic principles, technology, and applications of nanophotonics. It explains key physical concepts such as quantum confinement in semiconductors, light confinement in metal and dielectric nanostructures, and wave coupling in nanostructures, and describes how they can be applied in lighting sources, lasers, photonic circuitry, and photovoltaic systems. Readers will gain an intuitive insight into the commercial implementation of nanophotonic components, in both current and potential future devices, as well as challenges facing the field. The fundamentals of semiconductor optics, optical material properties, and light propagation are included, and new and emerging fields such as colloidal photonics, Si-based photonics, nanoplasmonics, and bioinspired photonics are all discussed. This is the 'go-to' guide for graduate students and researchers in electrical engineering who are interested in nanophotonics, and students taking nanophotonics courses.

Mid-Infrared Coherent Sources and Applications Springer

Semiconductors and Semimetals has distinguished itself through the careful selection of well-known authors, editors, and contributors. Originally widely known as the "Willardson and Beer" Series, it has succeeded in publishing numerous landmark volumes and chapters. The series publishes timely,

highly relevant volumes intended for long-term impact and reflecting the truly interdisciplinary nature of the field. 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 academia, scientific laboratories and modern industry. The series publishes timely, highly relevant volumes intended for long-term impact and reflecting the truly interdisciplinary nature of the field
Semiconductor Lasers Artech House

This book describes the fascinating recent advances made concerning the chaos, stability and instability of semiconductor lasers, and discusses their applications and future prospects in detail. It emphasizes the dynamics in semiconductor lasers by optical and electronic feedback, optical injection, and injection current modulation. Applications of semiconductor laser chaos, control and noise, and semiconductor lasers are also demonstrated. Semiconductor lasers with new structures, such as vertical-cavity surface-emitting lasers and broad-area semiconductor lasers, are intriguing and promising devices. Current topics include fast physical number generation using chaotic semiconductor lasers for secure communication, development of chaos, quantum-dot semiconductor lasers and quantum-cascade semiconductor lasers, and vertical-cavity surface-emitting lasers. This fourth edition has been significantly expanded to reflect the latest developments. The fundamental theory of laser chaos and the chaotic dynamics in semiconductor lasers are discussed, but also for example the method of self-mixing interferometry in quantum-cascade lasers, which is indispensable in practical applications. Further, this edition covers chaos synchronization between two lasers and the application to secure optical communications. Another new topic is the consistency and synchronization property of many coupled semiconductor lasers in connection with the analogy of the dynamics between synaptic neurons and chaotic semiconductor lasers, which are compatible nonlinear dynamic elements. In particular, zero-lag synchronization between distant neurons plays a crucial role for information processing in the brain. Lastly, the book presents an application of the consistency and synchronization property in chaotic semiconductor lasers, namely a type of neuro-inspired information processing referred to as reservoir computing.

Ultrashort Pulse Laser Technology John Wiley & Sons

Starting from the basics of semiconductor lasers with emphasis on the generation of high optical output power the reader is introduced in a tutorial way to all key technologies required to fabricate high-power diode-laser sources. Various applications are exemplified.

Vertical External Cavity Surface Emitting Lasers Springer

"a very valuable book for graduate students and researchers in the field of Laser Spectroscopy, which I can fully recommend" —Wolfgang Demtröder, Kaiserslautern University of Technology How would it be possible to provide a coherent picture of this field given all the techniques available today? The authors have taken on this daunting task in this impressive, groundbreaking text. Readers will benefit from the broad overview of basic concepts, focusing on practical scientific and real-life applications of laser spectroscopic analysis and imaging. Chapters follow a consistent structure, beginning with a succinct summary of key principles and concepts, followed by an overview of applications, advantages and pitfalls, and finally a brief discussion of seminal advances and current developments. The examples used in this text span physics and chemistry to environmental science, biology, and medicine. Focuses on practical use in the laboratory and real-

world applications Covers the basic concepts, common experimental setups Highlights advantages and caveats of the techniques Concludes each chapter with a snapshot of cutting-edge advances This book is appropriate for anyone in the physical sciences, biology, or medicine looking for an introduction to laser spectroscopic and imaging methodologies. Helmut H. Telle is a full professor at the Instituto Pluridisciplinar, Universidad Complutense de Madrid, Spain. Ángel González Ureña is head of the Department of Molecular Beams and Lasers, Instituto Pluridisciplinar, Universidad Complutense de Madrid, Spain.

Semiconductor Nanolasers Academic Press

This is the first comprehensive book on the engineering of diamond optical devices. Written by 39 experts in the field, it gives readers an up-to-date review of the properties of optical quality synthetic diamond (single crystal and nanodiamond) and the nascent field of diamond optical device engineering. Application areas covered in detail in this book include quantum information processing, high performance lasers and light sources, and bioimaging. It provides scientists, engineers and physicists with a valuable and practical resource for the design and development of diamond-based optical devices.

Optical Refrigeration Royal Society of Chemistry

Ultrashort laser pulses with durations in the femtosecond range up to a few picoseconds provide a unique method for precise materials processing or medical applications. Paired with the recent developments in ultrashort pulse lasers, this technology is finding its way into various application fields. The book gives a comprehensive overview of the principles and applications of ultrashort pulse lasers, especially applied to medicine and production technology. Recent advances in laser technology are discussed in detail. This covers the development of reliable and cheap low power laser sources as well as high average power ultrashort pulse lasers for large scale manufacturing. The fundamentals of laser-matter-interaction as well as processing strategies and the required system technology are discussed for these laser sources with respect to precise materials processing. Finally, different applications within medicine, measurement technology or materials processing are highlighted.

VECSEL Technology and Applications John Wiley & Sons

The only introductory text on the market today that explains the underlying physics and engineering applicable to all lasers Although lasers are becoming increasingly important in our high-tech environment, many of the technicians and engineers who install, operate, and maintain them have had little, if any, formal training in the field of electro-optics. This can result in less efficient usage of these important tools. Introduction to Laser Technology, Fourth Edition provides readers with a good understanding of what a laser is and what it can and cannot do. The book explains what types of laser to use for different purposes and how a laser can be modified to improve its performance in a given application. With a unique combination of clarity and technical depth, the book explains the characteristics and important applications of commercial lasers worldwide and discusses light and optics, the fundamental elements of lasers, and laser modification.? In addition to new chapter-end problems, the Fourth Edition includes new and expanded chapter material on: Material and wavelength Diode Laser Arrays Quantum-cascade lasers Fiber lasers Thin-disk and slab lasers Ultrafast fiber lasers Raman lasers Quasi-phase matching Optically pumped semiconductor lasers

Introduction to Laser Technology, Fourth Edition is an excellent book for students, technicians, engineers, and other professionals seeking a fuller, more formal introduction to the field of laser technology.

Design and Performance of Optically Pumped Semiconductor Disk Lasers with Wide Tuning Ranges Springer

Provides comprehensive coverage of the advancement of vertical-external-cavity surface-emitting lasers. Vertical-external-cavity surface-emitting lasers (VECSELs) emit coherent light from the infrared to the visible spectral range with high power output. Recent years have seen new device developments - such as the mode-locked integrated (MIXSEL) and the micro external-cavity surface emitting laser (MECSEL) - expand the application of VECSELs to include laser cooling, spectroscopy, telecommunications, biophotonics, and laser-based displays and projectors. In *Vertical External Cavity Surface Emitting Lasers: VECSEL Technology and Applications*, leading international research groups provide a comprehensive, fully up-to-date account of all fundamental and technological aspects of vertical external cavity surface emitting lasers. This unique book reviews the physics and technology of optically- and electrically- pumped disk lasers and discusses the latest developments of VECSEL devices in different wavelength ranges. Topics include optically pumped VECSEL physics, continuous wave (CW) lasers, frequency doubling, carrier dynamics in SESAMs, and characterisation of nonlinear lensing in VECSEL gain samples. This authoritative volume: * Summarises new concepts of DBR-free VECSEL and MECSEL lasers for the first time * Covers the mode-locking concept and its application * Provides an overview of the emerging concept of self-mode locking * Describes the development of next-generation OPS laser products * Summarises new concepts of DBR-free VECSEL and MECSEL lasers for the first time * Covers the mode-locking concept and its application * Provides an overview of the emerging concept of self-mode locking * Describes the development of next-generation OPS laser products. *Vertical External Cavity Surface Emitting Lasers: VECSEL Technology and Applications* is an invaluable resource for laser specialists, semiconductor physicists, optical industry professionals, spectroscopists, telecommunications engineers and industrial physicists.

Frontiers in Guided Wave Optics and Optoelectronics Springer Science & Business Media

This timely publication presents a review of the most recent developments in the field of Semiconductor Disk Lasers. Covering a wide range of key topics, such as operating principles, thermal management, nonlinear frequency conversion, semiconductor materials, short pulse generation, electrical pumping, and laser applications, the book provides readers with a comprehensive account of the fundamentals and latest advances in this rich and diverse field. In so doing, it brings together contributions from world experts at major collaborative research centers in Europe and the USA. Each chapter includes a tutorial style introduction to the selected topic suitable for postgraduate students and scientists with a basic background in optics - making it of interest to a wide range of scientists, researchers, engineers and physicists working and interested in this rapidly developing field. It will also serve as additional reading for students in the field.

Applied Nanophotonics Springer

Written by a team of European experts in the field, this book addresses the physics, the principles, the engineering methods, and the latest developments of efficient and compact ultrafast lasers

based on novel quantum-dot structures and devices, as well as their applications in biophotonics. Recommended reading for physicists, engineers, students and lecturers in the fields of photonics, optics, laser physics, optoelectronics, and biophotonics.

Military Laser Technology and Systems Optically Pumped Semiconductor Disk Lasers for High-power Wide Wavelength Tuning Optically-pumped Semiconductor Disk Lasers with Intracavity Second-harmonic Generation Electrically and Optically Pumped Semiconductor Disk Lasers - Continuous-wave and Mode-locked DBR-Free Optically Pumped Semiconductor Disk Lasers Semiconductor Disk Lasers Physics and Technology

An accessible yet rigorous introduction 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.

Electrically and Optically Pumped Semiconductor Disk Lasers - Continuous-wave and Mode-locked BoD - Books on Demand

Issues in Optics, Light, Laser, Infrared, and Photonic Technology: 2011 Edition is a ScholarlyEditions™ eBook that delivers timely, authoritative, and comprehensive information about Optics, Light, Laser, Infrared, and Photonic Technology. The editors have built *Issues in Optics, Light, Laser, Infrared, and Photonic Technology: 2011 Edition* on the vast information databases of ScholarlyNews.™ You can expect the information about Optics, Light, Laser, Infrared, and Photonic Technology in this eBook to be deeper than what you can access anywhere else, as well as consistently reliable, authoritative, informed, and relevant. The content of *Issues in Optics, Light, Laser, Infrared, and Photonic Technology: 2011 Edition* has been produced by the world's leading scientists, engineers, analysts, research institutions, and companies. All of the content is from peer-reviewed sources, and all of it is written, assembled, and edited by the editors at ScholarlyEditions™ and available exclusively from us. You now have a source you can cite with authority, confidence, and credibility. More information is available at <http://www.ScholarlyEditions.com/>.

Laser-based Mid-infrared Sources and Applications John Wiley & Sons

This new resource provides an insight into the physical principles of the device technology that underpins many laser-based military systems in one form or another. From this knowledge a deeper understanding of the fundamental requirements and the potential performance, as well as limitations of such systems may be assessed, given the appropriate operational parameters.

Engineers and students are provided with practical advice on how to evaluate laser devices and systems, operate them safely, and train with them.

Optically Pumped Semiconductor Disk Lasers for High-power Wide Wavelength Tuning John Wiley & Sons

As the editor, I feel extremely happy to present to the readers such a rich collection of chapters authored/co-authored by a large number of experts from around the world covering the broad field of guided wave optics and optoelectronics. Most of the chapters are state-of-the-art on respective topics or areas that are emerging. Several authors narrated technological challenges in a lucid manner, which was possible because of individual expertise of the authors in their own subject specialties. I have no doubt that this book will be useful to graduate students, teachers, researchers,

and practicing engineers and technologists and that they would love to have it on their book shelves for ready reference at any time.

Advances in Semiconductor Lasers Cambridge University Press

This unique resource explains the fundamental physics of semiconductor nanolasers, and provides detailed insights into their design, fabrication, characterization, and applications. Topics covered range from the theoretical treatment of the underlying physics of nanoscale phenomena, such as temperature dependent quantum effects and active medium selection, to practical design aspects, including the multi-physics cavity design that extends beyond pure electromagnetic consideration, thermal management and performance optimization, and nanoscale device fabrication and characterization techniques. The authors also discuss technological applications of semiconductor nanolasers in areas such as photonic integrated circuits and sensing. Providing a comprehensive overview of the field, detailed design and analysis procedures, a thorough investigation of important applications, and insights into future trends, this is essential reading for graduate students, researchers, and professionals in optoelectronics, applied photonics, physics, nanotechnology, and

materials science.

Organic Solid-State Lasers Springer

This book presents the latest developments in semiconducting materials and devices, providing up-to-date information on the science, processes, and applications in the field. A wide range of topics are covered, including optoelectronic devices, metal-semiconductor junctions, heterojunctions, MISFETs, LEDs, semiconductor lasers, photodiodes, switching diodes, tunnel diodes, Gunn diodes, solar cells, varactor diodes, IMPATT diodes, and advanced semiconductors. Detailed attention is paid to advanced and futuristic materials. In addition, clear explanations are provided of, for example, electron theories, high-field effects, the Hall effect, transit-time effects, drift and diffusion, breakdown mechanisms, equilibrium and transient conditions, switching, and biasing. The book is designed to meet the needs of undergraduate engineering students and will also be very useful for postgraduate students; it will assist in preparation for examinations at colleges and universities and for other examinations in engineering. Practice questions are therefore presented in both essay and multiple choice format, and many solved examples and unsolved problems are included.

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