

A Dfb Diode Laser For Monitoring And Repumping A Barium

Study of Phase Locked Diode Laser Array and DFB/DBR Surface Emitting Laser Diode
 Semiconductor Diode Lasers
 Unlocking Dynamical Diversity
 Development of micro-integrated diode lasers for precision quantum optics experiments in space
 Tunable External Cavity Diode Lasers
 Monolithic Diode-Laser Arrays
 Handbook of Distributed Feedback Laser Diodes, Second Edition
 Semiconductor Lasers
 Distributed Feedback Semiconductor Lasers
 Low Threshold Organic Thin Film Laser Devices
 Tunable External Cavity Diode Lasers
 Technology and Applications
 An Applied Approach
 Tailoring the Emission of Stripe Array Diode Lasers with External Cavities to Enable Nonlinear Frequency Conversion
 2nd-order, Surface-emitting Distributed Feedback Diode Lasers
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 Encyclopedia of Modern Optics
 Laser Diode Modulation and Noise
 Laser and Fiber Optic Gas Absorption Spectroscopy
 Phase-Modulated Optical Communication Systems
 Diode Laser Materials and Devices - A Worldwide Market and Technology Overview to 2005
 DFB Laser Diode with Variable Diffraction Grating Period
 Laser Diodes and Their Applications to Communications and Information Processing
 The Principles of Semiconductor Laser Diodes and Amplifiers
 Fundamentals of Fiber Lasers and Fiber Amplifiers
 Laser Techniques Applied to Fluid Mechanics
 Fundamentals and Applications
 Incorporating a 1550 Nm DFB Laser Diode Into a Fiber Optic Electronic Speckle Pattern Interferometer
 Photoacoustic IR Spectroscopy
 Technological Development of Laser Diodes in the United States and Japan
 General Purpose Technology, Spin-Out, and Innovation
 Introduction to Semiconductor Lasers for Optical Communications
 Semiconductor Laser Diode
 Laser Spectroscopy and Laser Imaging
 Distributed Feedback Laser Diodes and Optical Tunable Filters
 Fundamentals, Technology, Applications
 Laser Diode Microsystems

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Study of Phase Locked Diode Laser Array and DFB/DBR Surface Emitting Laser Diode Springer

This invaluable and up-to-date source on instruments and applications covers everything needed to employ a technique for investigating various gases and materials, including biomaterials. It includes the latest developments in light sources, signal recovery and numerical methods. There is no other single publication that reviews the entire subject of photoacoustic infrared spectroscopy in such detail. Physicists, chemists, and spectroscopists in both academic and industrial laboratories, polymer and organic chemists, analysts in industry, forensic and government laboratories, and materials scientists will find this book to be a vital resource.

Semiconductor Diode Lasers BoD - Books on Demand
 Semiconductor lasers have important applications in numerous

fields, including engineering, biology, chemistry and medicine. They form the backbone of the optical telecommunications infrastructure supporting the internet, and are used in information storage devices, bar-code scanners, laser printers and many other everyday products. Semiconductor lasers: Fundamentals and applications is a comprehensive review of this vital technology. Part one introduces the fundamentals of semiconductor lasers, beginning with key principles before going on to discuss photonic crystal lasers, high power semiconductor lasers and laser beams, and the use of semiconductor lasers in ultrafast pulse generation. Part two then reviews applications of visible and near-infrared emitting lasers. Nonpolar and semipolar GaN-based lasers, advanced self-assembled InAs quantum dot lasers and vertical cavity surface emitting lasers are all considered, in addition to semiconductor disk and hybrid silicon lasers. Finally, applications of mid- and far-infrared emitting lasers are the focus of part three. Topics covered include GaSb-based type I quantum well diode lasers, interband cascade and

terahertz quantum cascade lasers, whispering gallery mode lasers and tunable mid-infrared laser absorption spectroscopy. With its distinguished editors and international team of expert contributors, *Semiconductor lasers* is a valuable guide for all those involved in the design, operation and application of these important lasers, including laser and telecommunications engineers, scientists working in biology and chemistry, medical practitioners, and academics working in this field. Provides a comprehensive review of semiconductor lasers and their applications in engineering, biology, chemistry and medicine. Discusses photonic crystal lasers, high power semiconductor lasers and laser beams, and the use of semiconductor lasers in ultrafast pulse generation. Reviews applications of visible and near-infrared emitting lasers and mid- and far-infrared emitting lasers.

Unlocking Dynamical Diversity Springer Nature

This book focuses on exploring the relationship between spin-outs from incumbents and the patterns of innovation in general purpose technology. Do spin-outs really promote innovation? What happens if star scientists leave the incumbents and establish a startup to target untapped markets? Entrepreneurial spin-outs have been recognized as an engine of innovation. General purpose technology, such as the steam engine in the Industrial Revolution, has been considered an engine of growth. This book provides new perspectives on how entrepreneurial spin-outs shape the patterns of innovation in general purpose technology by integrating theoretical findings in industrial organizations and includes innovation studies and detailed evidence from a longitudinal case study. Concretely, by longitudinally exploring the technological development of laser diodes in the USA and Japan, this study examines how the existence or absence of an entrepreneurial strategic choice for spin-outs influences the patterns of subsequent technological development. The longitudinal analysis in this book shows that spin-outs could hinder the subsequent development of existing technology when that technology is still at a nascent level, because the cumulative effects of technological development could disappear if research and development personnel leave their parent firms in order to target different sub-markets. The findings of this book show that institutional settings designed to promote spin-outs do not necessarily promote innovation. The book offers novel theoretical insights into the relationship between institutions promoting spin-outs and the developments of general purpose technology.

Development of micro-integrated diode lasers for precision quantum optics experiments in space Springer Science & Business Media

This book is composed of seven invited papers which present the current status of high speed diode lasers. Fast carrier and photon dynamics in directly modulated MQW lasers is analyzed and novel design approaches are considered which were critical for the demonstration and record of 40 GHz modulation bandwidth. Attention is centered on the challenges in creation of high speed and low chirp single mode DFB lasers. Recent progress in mode-locked diode lasers is covered, specifically by the examples of 160 fs pulse generation and appearance of microwave pulse repetition rates. Future trends in increasing of high speed laser performance are also examined.

Tunable External Cavity Diode Lasers Elsevier

This updated, second edition textbook provides a thorough and accessible treatment of semiconductor lasers from a design and engineering perspective. It includes both the physics of devices as well as the engineering, designing and testing of practical lasers. The material is presented clearly with many examples provided. Readers of the book will come to understand the finer

aspects of the theory, design, fabrication and test of these devices and have an excellent background for further study of optoelectronics.

Monolithic Diode-Laser Arrays World Scientific

This book represents a unique collection of the latest developments in the rapidly developing world of semiconductor laser diode technology and applications. An international group of distinguished contributors have covered particular aspects and the book includes optimization of semiconductor laser diode parameters for fascinating applications. This collection of chapters will be of considerable interest to engineers, scientists, technologists and physicists working in research and development in the field of semiconductor laser diode, as well as to young researchers who are at the beginning of their career.

Handbook of Distributed Feedback Laser Diodes, Second Edition IET

Laser Diode Microsystems provides the reader with the basic knowledge and understanding required for using semiconductor laser diodes in optical microsystems and micro-optical electromechanic systems. This tutorial addresses the fundamentals of semiconductor laser operation and design, coupled with an overview of the types of laser diodes suitable for use in Microsystems, along with their distinguishing characteristics. Emphasis is placed on laser diode characterization and measurement as well as the assembly techniques and optical accessories required for incorporation of semiconductor lasers into complex microsystems. Equipped with typical results and calculation examples, this hand-on text helps readers to develop a feel for how to choose a laser diode, characterize it and incorporate it into a microsystem.

Semiconductor 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.

Distributed Feedback Semiconductor Lasers Springer Science & Business Media

A rigorous account of the physics and engineering of diode and fibre laser gas sensor design, with key applications.

Low Threshold Organic Thin Film Laser Devices Springer Science & Business Media

Optical communications technology is growing increasingly in importance, with a rapid pace of development. Innovative optical

devices have emerged from the integration of semiconductor laser diodes, amplifiers and filters with optical waveguide technology. This well-researched volume traces the evolution of semiconductor laser amplifiers (SLAs) from these technologies. Focusing on the principle applications of SLAs, the author illustrates the growing importance of these functional components in the future of optical communications systems. This book will provide engineering and science students with a basic understanding of laser diode and optical amplification through the analysis of the performance characteristics of these devices both in theory and application. Practising device engineers wishing to consolidate their knowledge in lightwave technology will also find this book an invaluable reference.

Tunable External Cavity Diode Lasers Springer Science & Business Media

Distributed Feedback Semiconductor Lasers IET

Technology and Applications Cambridge University Press

Concentrating on presenting a thorough analysis of DFB lasers from a level suitable for research students, this book emphasises and gives extensive coverage of computer aided modeling techniques.

An Applied Approach Springer Science & Business Media

This book covers the fundamental aspects of fiber lasers and fiber amplifiers, and includes a wide range of material from laser physics fundamentals to state-of-the-art topics in this rapidly growing field of quantum electronics. This expanded and updated new edition includes substantial new material on nonlinear frequency conversion and Raman fiber lasers and amplifiers, as well as an expanded list of references inclusive of the recent literature in the field. Emphasis is placed on the nonlinear processes taking place in fiber lasers and amplifiers, their similarities, differences to, and their advantages over other solid-state lasers. The reader will learn the basic principles of solid-state physics and optical spectroscopy of laser active centers in fibers, the main operational laser regimes, and will receive practical recommendations and suggestions on fiber laser research, laser applications, and laser product development. The book will be useful for students, researchers, and professional physicists and engineers who work with lasers in the optical and telecommunications field, as well as those in the chemical and biological industries.

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

Fiber-optic communication systems have revolutionized our telecommunication infrastructures – currently, almost all telephone land-line, cellular, and internet communications must travel via some form of optical fibers. In these transmission systems, neither the phase nor frequency of the optical signal carries information – only the intensity of the signal is used. To transmit more information in a single optical carrier, the phase of the optical carrier must be explored. As a result, there is renewed interest in phase-modulated optical communications, mainly in direct-detection DPSK signals for long-haul optical communication systems. When optical amplifiers are used to maintain certain signal level among the fiber link, the system is limited by amplifier noises and fiber nonlinearities. Phase-Modulated Optical Communication Systems surveys this newly popular area, covering the following topics: - The transmitter and receiver for phase-modulated coherent lightwave systems - Method for performance analysis of phase-modulated optical signals - Direct-detection DPSK signal with fiber nonlinearities, degraded by nonlinear phase noise and intrachannel effects - Wavelength-division-multiplexed direct-detection DPSK signals - Multi-level phase-modulated optical signals, such as the four-phase DQPSK signal. Graduate students, professional engineers, and

researchers will all benefit from this updated treatment of an important topic in the optical communications field.

2nd-order, Surface-emitting Distributed Feedback Diode Lasers Universitätsverlag Potsdam

Since its invention in 1962, the semiconductor laser has come a long way. Advances in material purity and epitaxial growth techniques have led to a variety of semiconductor lasers covering a wide wavelength range of 0.3-100 μm . The development during the 1970s of GaAs semiconductor lasers, emitting in the near-infrared region of 0.8-0.9 μm , resulted in their use for the first generation of optical fiber communication systems. However, to take advantage of flow losses in silica fibers occurring around 1.3 and 1.55 μm , the emphasis soon shifted toward long-wavelength semiconductor lasers. The material system of choice in this wavelength range has been the quaternary alloy InGaAsP. During the last five years or so, the intense development effort devoted to InGaAsP lasers has resulted in a technology mature enough that lightwave transmission systems using InGaAsP lasers are currently being deployed throughout the world. This book is intended to provide a comprehensive account of long-wavelength semiconductor lasers. Particular attention is paid to InGaAsP lasers, although we also consider semiconductor lasers operating at longer wave lengths. The objective is to provide an up-to-date understanding of semiconductor lasers while incorporating recent research results that are not yet available in the book form. Although InGaAsP lasers are often used as an example, the basic concepts discussed in this text apply to all semiconductor lasers, irrespective of their wavelengths.

Instrumentation, Applications and Data Analysis World Scientific

The German Space Agency DLR is supporting a sounding rocket mission that aims to generate a Bose-Einstein-Condensate (BEC) onboard a sounding rocket in 2017. At the time when the research and technical developments described in this thesis were initiated, there were no laser technologies available meeting the requirements regarding compactness and reliability. This work is therefore devoted to developing the required laser technologies that will provide a demonstration of BEC and atomic interferometry in space for the first time ever. This research was carried out as part of the project "LASUS" which provided the technology development for the sounding rocket mission "MAIUS". In the framework of this thesis, concepts were developed to realize micro-integrated extended cavity diode lasers (ECDLs) for rubidium (Rb) and potassium (K) spectroscopy. The ECDL modules contain only non-moveable components that are integrated on a micro-optical bench with footprints of 50 x 10 mm² and 80 x 25 mm². They are based on a Littrow configuration with an external cavity length of ~ 30 mm. The micro-integrated ECDLs provide an output power ≥ 35 mW behind a micro-optical isolator with 30 dB isolation and a short-term (170 μs) FWHM linewidth of significantly less than 100 kHz. The intrinsic linewidth corresponds to only 260 Hz. To qualify the micro-integrated ECDLs for future quantum optics precision experiments in space, vibration tests (8.1 gRMS and 21.4 gRMS) and mechanical shock tests (1500 g) were carried out. No degradation of the electro-optical performance was observed. Moreover, the electro-optical properties of the macroscopic ECDLs were optimized for micro-integrated ECDL modules. Further, distributed feedback diode (DFB) lasers were electro-optically characterized and optimized, again for Rb and K spectroscopy. Rb-DFB lasers provide single mode emission with an output power of more than 180 mW. The K-DFB lasers feature an excellent spectral stability with a short term (10 μs) FWHM linewidth of 320 kHz, and their intrinsic linewidth corresponds to 5 kHz.

Chirp Compensation in Active Mode-locked Semiconductor Diode Laser Using a DFB CRC Press

This report examines the development of the diode laser industry over a six-year period, 2000 to 2005, incorporating analysis of trends in markets, technologies and industry structure. It is designed to provide key information to users and manufacturers of substrates, epitaxial wafers (epiwafers) and devices. The coverage includes components, laser diodes, and the semiconducting (SC) wafers and epiwafers on which most of these devices are made. The geographical coverage of the report includes North America, Japan and Europe, which together will account for over 90% of the production and consumption of diode laser materials and devices over the next five years. However, many other countries have activities in this field including South-East Asia (Taiwan, South Korea, Singapore, Malaysia etc), China, India, Australia and Eastern Europe (Russia, Poland, Hungary, the Czech Republic) amongst others. Activities in these countries are commented on in the text where relevant, but are not quantified in the market data. Chapter 1 is an introduction to the market study. Chapter 2 contains an executive summary. Chapter 3 overviews materials markets. The size, quality, and particularly the price, of substrates and wafers are key factors in determining the ability of companies to produce competitive laser products. Chapter 3 also examines trends in materials technologies for laser diodes, the impact of the device markets on wafer demand, and the main suppliers. This chapter introduces the semiconductor materials that are presently or will likely become important to the fabrication of diode laser devices. The principal distinguishing properties of these materials are explained with reference to their application. Chapter 4 chapter examines the basic application sectors for laser diode devices as well as the basic commercial opportunities, changes and forces acting within each sector. The chapter also examines the market for the basic types of device as well as the promising newer types. For each type of device, market data and forecasts are provided and future prospects described. The application data are presented for the following industrial groups: • Automotive • Computers • Consumer • Industrial • Military and Aerospace • Telecommunications • Others A full 5-year forecast and analysis is provided by application and region. Chapter 5 is a technology overview. In this chapter a background and overview of developments in the principal technological R&D and production processes for devices is provided. The main focus is on the most important enabling technology for the production of the present and future generations of laser diodes and related devices. This process is crystal growth and involves the following sequence: • Bulk growth of single crystals • Epitaxial growth of semiconductor single crystal layers • Ion implantation • Device fabrication, ie gate and contact formation, etc • Packaging & test Chapter 6 profiles substrate suppliers, epiwafers suppliers and merchant and captive producers of GaAs devices. Chapter 7 lists universities and selected industrial labs involved in the areas of diode laser research. Chapter 8 is a directory of suppliers. Chapter 9 provides acronyms and exchange rates. For a PDF version of the report please call Tina Enright on +44 (0) 1865 843008 for price details.

Selected Papers from the 9th International Symposium Lisbon, Portugal, July 13-16, 1998 Academic Press

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

Analysis and Transmission Line Laser Modeling IEEE

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.

Encyclopedia of Modern Optics World Scientific

Applications of semiconductor lasers with optical feedback systems are driving rapid developments in theoretical and experimental research. The very broad wavelength-gain-bandwidth of semiconductor lasers combined with frequency-filtered, strong optical feedback create the tunable, single frequency laser systems utilised in telecommunications, environmental sensing, measurement and control. Those with weak to moderate optical feedback lead to the chaotic semiconductor lasers of private communication. This resource illustrates the diversity of dynamic laser states and the technological applications thereof, presenting a timely synthesis of current findings, and providing the roadmap for exploiting their future potential. * Provides theory-based explanations underpinned by a vast range of experimental studies on optical feedback, including conventional, phase conjugate and frequency- filtered feedback in standard, commercial and single-stripe semiconductor lasers * Includes the classic Lang-Kobayashi equation model, through to more recent theory, with new developments in techniques for solving delay differential equations and bifurcation analysis * Explores developments in self-mixing interferometry to produce sub-nanometre sensitivity in path-length measurements * Reviews tunable single frequency semiconductor lasers and systems and their diverse range of applications in sensing and optical communications * Emphasises the importance of synchronised chaotic semiconductor lasers using optical feedback and private communications systems Unlocking Dynamical Diversity illustrates all theory using real world examples gleaned from international cutting-edge research. Such an approach appeals to industry professionals working in semiconductor lasers, laser physics and laser applications and is essential reading for researchers and postgraduates in these fields.