

High Power Fiber Lasers Fundamentals To Applications

The State of the Art in High-Power Laser Technology Filled with full-color images, High-Power Laser Handbook offers comprehensive details on the latest advances in high-power laser development and applications. Performance parameters for each major class of lasers are described. The book covers high-power gas, chemical, and free-electron lasers and then discusses semiconductor diode lasers, along with the associated technologies of packaging, reliability, and beam shaping and delivery. Current research and development in solid-state lasers is described as well as scaling approaches for high CW powers, high pulse energies, and high peak powers. This authoritative work also addresses the emergence of fiber lasers and concludes by reviewing various methods for beam combining. Coverage Includes: Carbon dioxide lasers Excimer lasers Chemical lasers High-power free-electron lasers Semiconductor laser diodes High-power diode laser arrays Introduction to high-power solid-state lasers Zig-zag slab lasers ThinZag high-power laser development Thin disk lasers Heat capacity lasers Ultrafast solid-state lasers Ultrafast lasers in the thin disk geometry The National Ignition Facility laser Optical fiber lasers Pulsed fiber lasers High-power ultrafast fiber laser systems High-power fiber lasers for industry and defense Beam combining

An LLNL team of six physicists has developed a new technology that is a stepping stone to enable some of the limitations on high-power fiber lasers to be overcome. Their technology, dubbed "Efficient Mode-Converters for High-Power Fiber Amplifiers," allows the power of fiber lasers to be increased while maintaining high beam quality. Currently, fiber lasers are used in machining, on factory floors and in a number of defense applications and can produce tens of kilowatts of power. The conventional fiber laser design features a circular core and has fundamental limitations that make it impractical to allow higher laser power unless the core area is increased. LLNL researchers have pioneered a design to increase the laser's core area along the axis of the ribbon fiber. Their design makes it difficult to use a conventional laser beam, so the LLNL team converted the beam into a profile that propagates into the ribbon fiber and is converted back once it is amplified. The use of this LLNL technology will permit the construction of higher power lasers for lower costs and increase the power of fiber lasers from tens of kilowatts of power to about 100 kilowatts and potentially even higher.

The laser has become more and more important in scientific research and industrial applications. Now, the laser wavelength can cover the range from ultraviolet to terahertz and output laser performance has significantly progressed in recent years. This book is focused on the advanced diode laser, fiber laser, and their applications in laser ablation, laser-introduced fluorescence, and laser treatment. The advantages of laser technology are shown comprehensively. The development of new highly nonlinear fibers - referred to as microstructured

fibers, holey fibers and photonic crystal fibers - is the next generation technology for all-optical signal processing and biomedical applications. This new edition has been thoroughly updated to incorporate these key technology developments. The book presents sound coverage of the fundamentals of lightwave technology, along with material on pulse compression techniques and rare-earth-doped fiber amplifiers and lasers. The extensively revised chapters include information on fiber-optic communication systems and the ultrafast signal processing techniques that make use of nonlinear phenomena in optical fibers. New material focuses on the applications of highly nonlinear fibers in areas ranging from wavelength laser tuning and nonlinear spectroscopy to biomedical imaging and frequency metrology. Technologies such as quantum cryptography, quantum computing, and quantum communications are also covered in a new chapter. This book will be an ideal reference for: R&D engineers working on developing next generation optical components; scientists involved with research on fiber amplifiers and lasers; graduate students and researchers working in the fields of optical communications and quantum information. The only book on how to develop nonlinear fiber optic applications Two new chapters on the latest developments; Highly Nonlinear Fibers and Quantum Applications Coverage of biomedical applications

Laser beam combining techniques allow increasing the power of lasers far beyond what it is possible to obtain from a single conventional laser. One step further, coherent beam combining (CBC) also helps to maintain the very unique properties of the laser emission with respect to its spectral and spatial properties. Such lasers are of major interest for many applications, including industrial, environmental, defense, and scientific applications. Recently, significant progress has been made in coherent beam combining lasers, with a total output power of 100 kW already achieved. Scaling analysis indicates that further increase of output power with excellent beam quality is feasible by using existing state-of-the-art lasers. Thus, the knowledge of coherent beam combining techniques will become crucial for the design of next-generation highpower lasers. The purpose of this book is to present the more recent concepts of coherent beam combining by world leader teams in the field.

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.

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.

This book is a compilation of works presenting recent advances and progress in optical fiber technology related to the next generation optical communication, system and network, sensor, laser, measurement, characterization and devices. It contains five sections including optical fiber communication systems and networks, plastic optical fibers technologies, fiber optic sensors, fiber lasers and fiber measurement techniques and fiber optic devices on silicon chip. Each chapter in this book is a contribution from a group of academicians and scientists from a prominent university or research center, involved in cutting edge research in the field of photonics. This compendium is an invaluable reference for researchers and practitioners working in academic institutions as well as industries.

This book serves as a comprehensive, up-to-date reference about this cutting-edge laser technology and its many new and interesting developments. Various aspects and trends of Raman fiber lasers are described in detail by experts in their fields. Raman fiber lasers have progressed quickly in the past decade, and have emerged as a versatile laser technology for generating high power light sources covering a spectral range from visible to mid-infrared. The technology is already being applied in the fields of telecommunication, astronomy, cold atom physics, laser spectroscopy, environmental sensing, and laser medicine. This book covers various topics relating to Raman fiber laser research, including power scaling, cladding and diode pumping, cascade Raman shifting, single frequency operation and power amplification, mid-infrared laser generation, specialty optical fibers, and random distributed feedback Raman fiber lasers. The book will appeal to scientists, students, and technicians seeking to understand the recent developments and future trends of this promising and multifaceted technology.

Ultrafast Fiber Lasers is intended to be a self-contained treatment of short-pulse fiber lasers. It will include a review of initial short-pulse fiber lasers from the 1990s, along with a treatment of lasers based on new pulse evolutions discovered since 2002. The book will systematically explain pulse evolutions and review their performance features. The author will discuss the requirements of common applications of the technology and compare them to competing technologies.

Lasers can alter the surface composition and properties of materials in a highly controllable way, which makes them efficient and cost-effective tools for surface engineering. This book provides an overview of the different techniques, the laser-material interactions and the advantages and disadvantages for different applications. Part one looks at laser heat treatment, part two covers laser additive manufacturing such as laser-enhanced electroplating, and part three discusses laser micromachining, structuring and surface modification. Chemical and biological applications of laser surface engineering are explored in part four, including ways to improve the surface corrosion properties of metals. Provides an overview of thermal surface treatments using lasers, including the treatment of steels, light metal alloys, polycrystalline silicon and technical ceramics Addresses the development of new metallic materials,

innovations in laser cladding and direct metal deposition, and the fabrication of tuneable micro- and nano-scale surface structures. Chapters also cover laser structuring, surface modification, and the chemical and biological applications of laser surface engineering. *Advances in High-Power Fiber and Diode Laser Engineering* provides an overview of recent research trends in fiber and diode lasers and laser systems engineering. In recent years, many new fiber designs and fiber laser system strategies have emerged, targeting the mitigation of different problems which occur when standard optical fibers are used for making high-power lasers. Simultaneously, a lot of attention has been put to increasing the brightness and the output power of laser diodes. Both of these major laser development directions continue to advance at a rapid pace with the sole purpose of achieving higher power while having excellent beam quality. The book begins by introducing the principles of diode lasers and methods for improving their brightness. Later chapters cover quantum cascade lasers, diode pumped high power lasers, high average power LMA fiber amplifiers, high-power fiber lasers, beam combinable kilowatt all-fiber amplifiers, and applications of 2 μm thulium fiber lasers and high-power GHz linewidth diode lasers. Written by a team of authors with experience in academia and industrial research and development, and brought together by an expert editor, this book will be of use to anyone interested in laser systems development at the laboratory or commercial scale.

The book is an introduction to the fundamentals of fiber lasers. It provides clear explanations of physical concepts supporting the field of fiber lasers. Fiber lasers characteristics are analyzed theoretically through simulations derived from numerical models.

This is the first detailed description in English of radiation and polymeric material interaction and the influences of thermal and optical material properties. As such, it provides comprehensive information on material and process characteristics as well as applications regarding plastic laser welding. The first part of this practical book introduces the structure and physical properties of plastics, before discussing the interaction of material and radiation in the NIR and IR spectral range. This is followed by an overview of the physical foundations of laser radiation and laser sources used for plastic welding. The third part describes the main processes of laser welding thermoplastics, as well as possibilities of process control, design of joint geometry, material compatibilities and adaptation of absorption of plastics to NIR radiation. Finally, the author explains applications of laser welding plastics using several industrial case studies from the automotive industry, household goods, and medical devices. Tailored to the needs of everyone dealing with laser welding of plastics, especially engineers in packaging, component manufacturing, and the medical industry.

In the second chapter, I present a novel design of microstructured large pitch, LMA asymmetric rod-type fiber to achieve higher MI threshold. By eliminating mirror symmetries in the cladding of the LPF through six high refractive index germanium-doped silica inclusions, we reduce the overlap of the LP_{1m}-like modes with the core region, which leads to strong HOM delocalization and enhanced preferential gain for the fundamental mode in active fibers.

This book covers the basics, realization and materials for high power laser systems and high power radiation interaction with matter. The physical and technical fundamentals of high intensity laser optics and adaptive optics and the related physical processes in

high intensity laser systems are explained. A main question discussed is: What is power optics? In what way is it different from ordinary optics widely used in cameras, motion-picture projectors, i.e., for everyday use? An undesirable consequence of the thermal deformation of optical elements and surfaces was discovered during studies of the interaction with powerful incident laser radiation. The requirements to the fabrication, performance and quality of optical elements employed within systems for most practical applications are also covered. The high-power laser performance is generally governed by the following: (i) the absorption of incident optical radiation (governed primarily by various absorption mechanisms), (ii) followed by a temperature increase and response governed primarily by thermal properties and (iii) the thermo-optical and thermo-mechanical response of distortion, stress, fracture, etc. All this needs to be understood to design efficient, compact, reliable and useful high power systems for many applications under a variety of operating conditions, pulsed, continuous wave and burst mode of varying duty cycles. The book gives an overview of an important spectrum of related topics like laser resonator configurations, intermetallic optical coatings, heat carriers for high power optics, cellular materials, high-repetition-rate lasers and mono-module disk lasers for high power optics.

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.

This highly illustrated book presents the essential information and major constituents of laser welding, including laser brazing and laser-arc hybrid welding. Students, engineers, researchers, scientists, specialists, professors, consultants, designers, and executives worldwide will fully grasp the fundamentals, the present state, and the applications of laser welding. Welding phenomena, formation mechanisms and preventive procedures of welding defects, and process monitoring and adaptive control are especially emphasized, because understanding these aspects of laser welding greatly improves the performance of work and research and solves many problems in the field. Finally, the book shows how increasingly widespread use of a variety of materials is bringing major advances to laser welding.

The fiber laser, with its humble beginning in the late 1980s, has undergone

tremendous development in the past decade or so, transforming itself from a research curiosity to a major force in modern manufacturing. Today, it is revolutionizing our economy by fundamentally changing the way we mark, machine, and process materials on an industrial scale. The recent development of high-power fiber lasers is also fundamentally shaping a wide range of other areas from physical sciences and medicine to geology and space exploration. In the past few years, the tactical deployment of direct energy weapons based on fiber lasers has become a reality. The development of fiber lasers is rooted in a number of technical areas including optical materials, optical waveguide design, nonlinear optics, optical fiber fabrication, and optical characterization, in addition to optical fiber components, and fiber laser design and architecture. No comprehensive in-depth coverage of such diverse topical areas has appeared in a single book. Many important developments have taken place in the past decade in both academia and industry. This book comprehensively covers the basics, technology and applications of fiber lasers including up-to-date developments in both academia and industry and is aimed to serve as both an introduction and research aid for graduate students, engineers, and scientists who are new to this field and also for veterans in the field

This book gives a contemporary overview of the technologies of single-frequency fiber lasers. The development of single-frequency fiber lasers is one of the most significant achievements in the field of laser photonics over the past two decades. Owing to the crucial demands of a laser sources with highly stable single-frequency operation, narrow linewidth, low noise, scalable to high output power, compact and robustness structure, fiber lasers have been intensively studied since its introduction to the single-frequency laser community and they still continuously proceed to trigger the emergence of new technologies and applications. This book systematically demonstrates the single-frequency fiber laser technologies from fundamental principles to state-of-the-art progress. Details of selected typical applications of single-frequency fiber lasers are also given and discussed. The reader will acquire a good knowledge of the current situation within this important field.

Rare-Earth-Doped Fiber Lasers and Amplifiers, Second Edition discusses the essential principles, operating characteristics, and current technology of the main fiber laser and amplifier devices based on rare-earth-doped silica and fluorozirconate fibers. Covering all aspects of this revolutionary technology, the book reviews fiber fabrication methods and the basic spectroscopic properties of rare-earth ions in glasses, concentrates on the most important fiber laser sources, examines several advances in fiber amplifiers, and analyzes new findings and improvements in single-frequency operation, frequency tenability, broadband fiber sources, and blue-green and far-infrared fiber lasers. The resonator can be considered the real heart of any laser system, the key element that determines the properties of laser radiation, including mode structure or temporal and spatial characteristics. The theory of different laser

types has been well-developed in the last few decades of the 20th century, starting with the pioneering papers of Fox, Li, Body and Gordon. But today, due to the development of new types of lasers (fibre, diode), new optical elements (adaptive mirrors, phase conjugation techniques, graded phase correctors), the development of optical technology, and new needs for industrial lasers, novel types of resonators are under investigation. Unlike some monographs on laser resonators, this work does not present classical theory and the derivation of the basic equations of laser mode generation and so on. Instead, based on the well-known earlier literature, new results in the field of laser resonators are presented. Although it is not a textbook, it outlines the novel trends in the development of laser resonators science, shows what has already been achieved in this field, and indicates directions for research and applications.

This book introduces the fundamental mechanism of photonic glasses — the linear and nonlinear optical effects in glass under intense light irradiation: photo-induced absorption, refraction, polarization, frequency, coherence and monochromaticity changes. Emphasis is placed on new developments in the structure, spectroscopy and physics of new glassy materials for photonics applications, such as optical communication, optical data storage, new lasers and new photonic components and devices. The book presents the research results of the authors in new glasses for photonics over the last decade.

This book is a compilation of works presenting recent developments and practical applications in optical fiber technology. It contains 13 chapters from various institutions that represent global research in various topics such as scattering, dispersion, polarization interference, fuse phenomena and optical manipulation, optical fiber laser and sensor applications, passive optical network (PON) and plastic optical fiber (POF) technology. It provides the reader with a broad overview and sampling of the innovative research on optical fiber technologies.

This book is a printed edition of the Special Issue "Solid State Lasers Materials, Technologies and Applications" that was published in Applied Sciences

Fiber Optic Essentials starts with a basic discussion on lightwaves and the phenomenon of refraction and reflection. It then goes on to introduce the reader to the field of fiber optics and covers some of the recent developments, such as fiber amplifiers, dispersion compensation and nonlinear effects. A number of other applications are also presented. Examples and comparison with everyday experience are provided wherever possible to help the reader's comprehension. Diagrams are also included to aid in the visualization of certain concepts.

This comprehensive handbook gives a fully updated guide to lasers and laser systems, including the complete range of their technical applications. The first volume outlines the fundamental components of lasers, their properties and working principles. The second volume gives exhaustive coverage of all major categories of lasers, from solid-state and semiconductor diode to fiber, waveguide, gas, chemical, and dye lasers. The third volume covers modern applications in engineering and technology, including all new and updated case

studies spanning telecommunications and data storage to medicine, optical measurement, defense and security, nanomaterials processing and characterization.

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.

Due to their flexible and efficient capabilities, lasers are often used over more traditional machining technologies, such as mechanical drilling and chemical etching, in manufacturing a wide variety of products, from medical implants, gyroscopes, and drug delivery catheters to aircraft engines, printed circuit boards, and fuel cells. Fundamentals of Laser Micromachining explains how laser technology is applied to precision micromachining. The book combines background on physics, lasers, optics, and hardware with analysis of markets, materials, and applications. It gives sufficient theoretical background for readers to understand basic concepts while including a further reading appendix for those interested in more detailed theoretical discussions. After reviewing laser history and technology, the author compares available laser sources, including CO₂, excimer, Nd:YAG, fiber, and short pulse. He also addresses topics crucial to obtaining good processing results, such as IR and UV material–photon interaction, basic optical components, and system integration. The text goes on to cover real-world applications in the medical, microelectronics, aerospace, and other fields. It concludes with details on processing many common materials, such as metals, silicon, ceramics, and glasses. For engineers and project managers, this book provides the foundation to achieve cost-effectiveness, the best edge quality, and the highest resolution in small-scale industrial laser machining. It will help you select the correct kind of laser for your application and identify real opportunities for growth in the marketplace.

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.

Ultrashort pulses in mode-locked lasers are receiving focused attention from researchers looking to apply them in a variety of fields, from optical clock technology to measurements of the fundamental constants of nature and ultrahigh-speed optical communications. Ultrashort pulses are especially important for the next generation of ultrahigh-speed optical systems and networks operating at 100 Gbps per carrier. Ultra Fast Fiber Lasers: Principles and Applications with MATLAB® Models is a self-contained reference for engineers and others in the fields of applied photonics and optical communications. Covering both fundamentals and advanced research, this book includes both theoretical and experimental results. MATLAB files are included to provide a basic grounding in the simulation of the generation of short pulses and the propagation or circulation around nonlinear fiber rings. With its unique and extensive content, this volume—

- Covers fundamental principles involved in the generation of ultrashort pulses employing fiber ring lasers, particularly those that incorporate active optical modulators of amplitude or phase types
- Presents experimental techniques for the generation, detection, and characterization of ultrashort pulse sequences derived from several current schemes
- Describes the multiplication of ultrashort pulse sequences using the Talbot diffraction effects in the time domain via the use of highly dispersive media
- Discusses developments of multiple short pulses in the form of solitons binding together by phase states
- Elucidates the generation of short pulse sequences and multiple wavelength channels from a single fiber laser

The most practical short pulse sources are

always found in the form of guided wave photonic structures. This minimizes problems with alignment and eases coupling into fiber transmission systems. In meeting these requirements, fiber ring lasers operating in active mode serve well as suitable ultrashort pulse sources. It is only a matter of time before scientists building on this research develop the practical and easy-to-use applications that will make ultrahigh-speed optical systems universally available.

Solid-state lasers which offer multiple desirable qualities, including enhanced reliability, robustness, efficiency and wavelength diversity, are absolutely indispensable for many applications. The Handbook of solid-state lasers reviews the key materials, processes and applications of solid-state lasers across a wide range of fields. Part one begins by reviewing solid-state laser materials. Fluoride laser crystals, oxide laser ceramics, crystals and fluoride laser ceramics doped by rare earth and transition metal ions are discussed alongside neodymium, erbium and ytterbium laser glasses, and nonlinear crystals for solid-state lasers. Part two then goes on to explore solid-state laser systems and their applications, beginning with a discussion of the principles, powering and operation regimes for solid-state lasers. The use of neodymium-doped materials is considered, followed by system sizing issues with diode-pumped quasi-three level materials, erbium glass lasers, and microchip, fiber, Raman and cryogenic lasers. Laser mid-infrared systems, laser induced breakdown spectroscopy and the clinical applications of surgical solid-state lasers are also explored. The use of solid-state lasers in defense programs is then reviewed, before the book concludes by presenting some environmental applications of solid-state lasers. With its distinguished editors and international team of expert contributors, the Handbook of solid-state lasers is an authoritative guide for all those involved in the design and application of this technology, including laser and materials scientists and engineers, medical and military professionals, environmental researchers, and academics working in this field. Reviews the materials used in solid-state lasers Explores the principles of solid-state laser systems and their applications Considers defence and environmental applications

Fundamentals of Fiber Lasers and Fiber Amplifiers Springer Nature

Ever since their invention in 1960, lasers have assumed tremendous importance in the fields of science, engineering and technology because of their use both in basic research and in various technological applications. Lasers: Theory and Applications 2nd Edition will provide a coherent presentation of the basic physics behind the working of the laser along with some of their most important applications. Numerical examples are scattered throughout the book for helping the student gain a better appreciation of the concepts and problems at the end of each chapter and provides the student a better understanding of the basics and help in applying the concepts to practical situations. This book serves as a text in a course on lasers and their applications for students majoring in various disciplines such as Physics, Chemistry and Electrical Engineering.

A comprehensive account of the latest developments and applications in this rapidly developing field, covering a wide range of topics, such as power scaling and short pulse generation, dispersion management and modeling, broadband supercontinuum generation and wavelength tailoring. The book brings together contributions from the world's leading experts at

major collaborative research centers throughout Europe, Australia, Russia and the USA. Each chapter presents a tutorial style introduction to the selected topic suitable for scientists, researchers and experts, as well as graduate and postgraduate students with a basic background in optics.

This book describes the latest development in optical fiber devices, and their applications to sensor technology. Optical fiber sensors, an important application of the optical fiber, have experienced fast development, and attracted wide attentions in basic science as well as in practical applications. Sensing is often likened to human sense organs. Optical fiber can not only transport information acquired by sensors at high speed and large volume, but also can play the roles of sensing element itself. Compared with electric and other types of sensors, fiber sensor technology has unique merits. It has advantages over conventional bulky optic sensors, such as combination of sensing and signal transportation, smaller size, and possibility of building distributed systems. Fiber sensor technology has been used in various areas of industry, transportation, communication, security and defense, as well as daily life. Its importance has been growing with the advancement of the technology and the expansion of the scope of its application, a growth this book fully describes.

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