G. Guekos (Ed.)

Photonic Devices

for Telecommunications

Springer

Photonic Devices For Telecommunications How To Model And Measure

Giancarlo C. Righini,Nicoletta Righini

Photonic Devices For Telecommunications How To Model And Measure:

Photonic Devices for Telecommunications George Guekos,2012-12-06 This book is subdivided into three main Parts The common spirit in these parts is to provide at the beginning of each a comprehensive introduction into the subject treated followed by specific aspects pertaining to the modelling and or measuring particularities arlsmg from the investigation of photonic devices for telecommunications Some of the devices treated here can be considered as widely known and well established Others are rather new and their potential for applications is not yet fully exploited The methods to model and measure photonic in this book and the comparison of results obtained devices and structures outlined by applying such methods are likely to interest both the engineer investigating the of a device in a system and the engineer looking for new ways to explore behaviour the possibilities offered by emerging devices Many authors have contributed to this book There are two main reasons for this in photonic device research modelling First the book addresses two broad fields and measurements for which a vast knowledge exists in many research groups that was not integrated in a book before Second a significant number of laboratories decided to closely co operate in order to gain additional information on merits and drawbacks of their own methods for simulation and experimentation of devices as compared to the methods used by their colleagues in other laboratories The outcome are new aspects and approaches that would not have been investigated in the absence of a framework for a co operative programme **Photonic Devices for Telecommunications** George Guekos,1998-11-19 *Frontiers in Planar Lightwave Circuit Technology* Siegfried Janz,Jiri Ctyroky,Stoyan Tanev,2006-01-12 The contributions to this book constitute an excellent record of many key issues and scientific problems in planar lightwave circuit research There are detailed overviews of experimental and theoretical work in high index contrast waveguide systems micro optical resonators nonlinear optics and advanced optical simulation methods as well as articles describing emerging applications of integrated optics for medical and biological applications *Photonica2015* Suzana Petrović,Goran Gligorić,Milutin Stepić,2016-03-24 **Measurement and Modeling of Silicon Heterostructure Devices** John D. Cressler,2018-10-03 When you see a nicely presented set of data the natural response is How did they do that what tricks did they use and how can I do that for myself Alas usually you must simply keep wondering since such tricks of the trade are usually held close to the vest and rarely divulged Shamefully ignored in the technical literature measurement and modeling of high speed semiconductor devices is a fine art Robust measuring and modeling at the levels of performance found in modern SiGe devices requires extreme dexterity in the laboratory to obtain reliable data and then a valid model to fit that data Drawn from the comprehensive and well reviewed Silicon Heterostructure Handbook this volume focuses on measurement and modeling of high speed silicon heterostructure devices The chapter authors provide experience based tricks of the trade and the subtle nuances of measuring and modeling advanced devices making this an important reference for the semiconductor industry It includes easy to reference appendices covering topics such as the properties of silicon and

germanium the generalized Moll Ross relations the integral charge control model and sample SiGe HBT compact model parameters *Fundamentals of Photonics* Bahaa E. A. Saleh,Malvin Carl Teich,2007-03-09 Fundamentals of Photonics A complete thoroughly updated full color second edition Now in a new full color edition Fundamentals of Photonics Second 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 logical 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 photons and atoms and semiconductor optics Presented at increasing levels of complexity preliminary sections build toward more advanced topics such as Fourier optics and holography guided wave and fiber optics semiconductor sources and detectors electro optic and acousto optic devices nonlinear optical devices optical interconnects and switches and optical fiber communications Each of the twenty two chapters of the first edition has been thoroughly updated The Second Edition also features entirely new chapters on photonic crystal optics including multilayer and periodic media waveguides holey fibers and resonators and ultrafast optics including femtosecond optical pulses ultrafast nonlinear optics and optical solitons The chapters on optical interconnects and switches and optical fiber communications have been completely rewritten to accommodate current technology Each chapter contains summaries highlighted equations exercises problems and selected reading lists Examples of real systems are included to emphasize the concepts governing applications of current interest **Fiber-Optic Measurement Techniques** Rongqing Hui,Maurice O'Sullivan,2022-11-11 Fiber Optic Measurement Techniques is an indispensable collection of key optical measurement techniques essential for developing and characterizing today s photonic devices and fiber optic systems The book gives comprehensive and systematic descriptions of various fiber optic measurement methods with the emphasis on the understanding of optoelectronic signal processing methodologies helping the reader to weigh up the pros and cons of each technique and establish their suitability for the task at hand Carefully balancing descriptions of principle operations and optoelectronic circuit implementation this indispensable resource will enable the engineer to Understand the implications of various measurement results and system performance qualifications Characterize modern optical systems and devices Select optical devices and subsystems in optical network design and implementation Design innovative instrumentations for fiber optic systems The 2nd edition of this successful reference has been extensively updated with 150 new pages to reflect the advances in the field since publication in 2008 and includes A new chapter on fiber based optical sensors and spectroscopy techniques A new chapter on measurement uncertainty and error analysis Fiber Optic Measurement Techniques brings together in one volume the fundamental principles with the latest techniques making it a complete resource for the optical and communications engineer developing future optical devices and fiber optic systems The only book to combine explanations of the basic principles with latest techniques to enable the engineer to develop photonic systems of the future Careful and systematic presentation of

measurement methods to help engineers to choose the most appropriate for their application The latest methods covered such as real time optical monitoring and phase coded systems and subsystems making this the most up to date guide to fiber optic measurement **WDM Systems and Networks** Neophytos (Neo) Antoniades,Georgios Ellinas,Ioannis Roudas,2011-12-08 Modeling Simulation Design and Engineering of WDM Systems and Networks provides readers with the basic skills concepts and design techniques used to begin design and engineering of optical communication systems and networks at various layers The latest semi analytical system simulation techniques are applied to optical WDM systems and networks and a review of the various current areas of optical communications is presented Simulation is mixed with experimental verification and engineering to present the industry as well as state of the art research This contributed volume is divided into three parts accommodating different readers interested in various types of networks and applications The first part of the book presents modeling approaches and simulation tools mainly for the physical layer including transmission effects devices subsystems and systems whereas the second part features more engineering design issues for various types of optical systems including ULH access and in building systems The third part of the book covers networking issues related to the design of provisioning and survivability algorithms for impairment aware and multi domain networks Intended for professional scientists company engineers and university researchers the text demonstrates the effectiveness of computer aided design when it comes to network engineering and prototyping **Polarization Measurement and Control in Optical Fiber Communication and Sensor Systems** X. Steve Yao,Xiaojun (James) Chen,2022-11-22 Polarization Measurement and Control in Optical Fiber Communication and Sensor Systems A practical handbook covering polarization measurement and control in optical communication and sensor systems In Polarization Measurement and Control in Optical Fiber Communication and Sensor Systems the authors deliver a comprehensive exploration of polarization related phenomena as well as the methodologies techniques and devices used to eliminate mitigate or compensate for polarization related problems and impairments The book also discusses polarization related parameter measurement and characterization technologies in optical fibers and fiber optic devices and the utilization of polarization to solve problems or enable new capabilities in communications sensing and measurement systems The authors provide a practical and hands on treatment of the information that engineers scientists and graduate students must grasp to be successful in their everyday work In addition to coverage of topics ranging from the use of polarization analysis to obtain instantaneous spectral information on light sources to the design of novel fiber optic gyroscopes for rotation sensing Polarization Measurement and Control in Optical Fiber Communication and Sensor Systems offers A thorough introduction to polarization in optical fiber studies including a history of polarization in optical fiber communication and sensor systems Comprehensive discussions of the fundamentals of polarization including the effects unique to optical fiber systems as well as extensive coverage Jones and Mueller matrix calculus for polarization analysis In depth treatments of active polarization controlling devices for optical

fiber systems including polarization controllers scramblers emulators switches and binary polarization state generators Fulsome explorations of passive polarization management devices including polarizers polarization beam splitters displacers wave plates Faraday rotators and depolarizers Extensive review of polarization measurement techniques and devices including time division amplitude division and wave front division Stokes polarimeters as well as various Mueller matrix polarimeters for PMD PDL and birefringence measurements Premiere of binary polarization state analyzers and binary Mueller matrix polarimeters pioneered by the authors including their applications for highly sensitive PMD PDL and birefringence measurements Comprehensive discussion on distributed polarization analysis techniques developed by the authors including their applications in solving real world problems Detailed descriptions of high accuracy polarimetric fiber optic electric current and magnetic field sensors Perfect for professional engineers scientists and graduate students studying fiber optics Polarization Measurement and Control in Optical Fiber Communication and Sensor Systems enables one to quickly grasp extensive knowledge and latest development of polarization in optical fibers and will earn a place in the libraries of professors and teachers of photonics and related disciplines *Optical Fiber Telecommunications VII* Alan Willner,2019-10-18 With optical fiber telecommunications firmly entrenched in the global information infrastructure a key question for the future is how deeply will optical communications penetrate and complement other forms of communication e g wireless access on premises networks interconnects and satellites Optical Fiber Telecommunications the seventh edition of the classic series that has chronicled the progress in the research and development of lightwave communications since 1979 examines present and future opportunities by presenting the latest advances on key topics such as Fiber and 5G wireless access networks Inter and intra data center communications Free space and quantum communication links Another key issue is the use of advanced photonics manufacturing and electronic signal processing to lower the cost of services and increase the system performance To address this the book covers Foundry and software capabilities for widespread user access to photonic integrated circuits Nano and microphotonic components Advanced and nonconventional data modulation formats The traditional emphasis of achieving higher data rates and longer transmission distances are also addressed through chapters on space division multiplexing undersea cable systems and efficient reconfigurable networking This book is intended as an ideal reference suitable for university and industry researchers graduate students optical systems implementers network operators managers and investors Quotes This book series which owes much of its distinguished history to the late Drs Kaminow and Li describes hot and growing applied topics which include long distance and wideband systems data centers 5G wireless networks foundry production of photonic integrated circuits quantum communications and AI deep learning These subjects will be highly beneficial for industrial R D engineers university teachers and students and funding agents in the business sector Prof Kenichi Iga President Retired Tokyo Institute of Technology With the passing of two luminaries Ivan Kaminow and Tingye Li I feared the loss of one of the premier reference books in the field Happily this

new version comes to chronicle the current state of the art and is written by the next generation of leaders This is a must have reference book for anyone working in or trying to understand the field of optical fiber communications technology Dr Donald B Keck Vice President Corning Inc Retired This book is the seventh edition in the definitive series that was previously marshaled by the extraordinary Ivan Kaminow and Tingye Li both sadly no longer with us The series has charted the remarkable progress made in the field and over a billion kilometers of optical fiber currently snake across the globe carrying ever increasing Internet traffic Anyone wondering about how we will cope with this incredible growth must read this book Prof Sir David Payne Director Optoelectronics Research Centre University of Southampton **Terahertz Channel Measurement, Modeling, and Security Properties** Jianjun Ma,Peian Li,Wenbo Liu,2025-08-20 This book presents essential topics in terahertz communications including channel measurement modeling and security properties Its chapters explore propagation mechanisms multipath effects and atmospheric impacts and delve into advanced measurement techniques such as time domain and frequency domain methods The book also provides insights into environment specific channel modeling for indoor outdoor and aerial scenarios as well as discussions of security challenges encryption and physical layer safeguards Real world case studies highlight applications in 6G integration wireless sensor networks and the use of deep learning for performance evaluation The book will appeal to researchers engineers and students interested in terahertz communication technologies **Advances in Photonic Crystals and Devices** Narendra Kumar,Bhuvneshwer Suthar,2019-09-06 In recent decades there has been a phenomenal growth in the field of photonic crystal research and has emerged as an interdisciplinary area Photonic crystals are usually nanostructured electromagnetic media consisting of periodic variation of dielectric constant which prohibit certain electromagnetic wave frequency ranges called photonic bandgaps to propagate through them Photonic crystals elicited numerous interesting features by unprecedented control of light and their exploitation is a promising tool in nanophotonics and designing optical components The book Advances in Photonic Crystals and Devices is designed with 15 chapters with introductory as well as research and application based contents It covers the following highlighted features Basics of photonic crystals and photonic crystal fibers Different theoretical as well as experimental approaches Current research advances from around the globe Nonlinear optics and super continuum generation in photonic crystal fibers Magnetized cold plasma photonic crystals Liquid crystal defect embedded with graphene layers Biophysics and biomedical applications as optical sensors Two dimensional photonic crystal demultiplexer Optical logic gates using photonic crystals A large number of references The goal of this book is to draw the background in understanding fabrication and characterization of photonic crystals using a variety of materials and their applications in design of several optical devices Though the book is useful as a reference for the researchers working in the area of photonics optical computing and fabrication of nanophotonic devices it is intended for the beginners like students pursuing their masters degree in photonics **Glassy Materials Based Microdevices** Giancarlo C. Righini,Nicoletta

Righini,2019-02-28 Microtechnology has changed our world since the last century when silicon microelectronics revolutionized sensor control and communication areas with applications extending from domotics to automotive and from security to biomedicine The present century however is also seeing an accelerating pace of innovation in glassy materials as an example glass ceramics which successfully combine the properties of an amorphous matrix with those of micro or nano crystals offer a very high flexibility of design to chemists physicists and engineers who can conceive and implement advanced microdevices In a very similar way the synthesis of glassy polymers in a very wide range of chemical structures offers unprecedented potential of applications The contemporary availability of microfabrication technologies such as direct laser writing or 3D printing which add to the most common processes deposition lithography and etching facilitates the development of novel or advanced microdevices based on glassy materials Biochemical and biomedical sensors especially with the lab on a chip target are one of the most evident proofs of the success of this material platform Other applications have also emerged in environment food and chemical industries The present Special Issue of Micromachines aims at reviewing the current state of the art and presenting perspectives of further development Contributions related to the technologies glassy materials design and fabrication processes characterization and eventually applications are welcome

Laser and Photonic Systems Shimon Y. Nof,Andrew M. Weiner,Gary J. Cheng,2014-05-12 New significant scientific discoveries in laser and photonic technologies systems perspectives and integrated design approaches can improve even further the impact in critical areas of challenge Yet this knowledge is dispersed across several disciplines and research arenas Laser and Photonic Systems Design and Integration brings together a multidisciplinary group of experts to increase understanding of the ways in which systems perspectives may influence laser and photonic innovations and application integration By bringing together chapters from leading scientists and technologists industrial and systems engineers and managers the book stimulates new thinking that would bring a systems network and system of systems perspective to bear on laser and photonic systems applications The chapters challenge you to explore opportunities for revolutionary and broader advancements The authors emphasize the identification of emerging research and application frontiers where there are promising contributions to lasers optics and photonics applications in fields such as manufacturing healthcare security and communications The book contains insights from leading researchers inventors implementers and innovators It explains a variety of techniques models and technologies proven to work with laser and photonic systems their development design and integration Such systems are of growing interest to many organizations given their promise and potential solutions of grand societal challenges Lastly the book helps you leverage the knowledge into exciting new frontiers of successful solutions

Modeling and Simulation for Microelectronic Packaging Assembly Shen Liu,Yong Liu,2011-05-17 Although there is increasing need for modeling and simulation in the IC package design phase most assembly processes and various reliability tests are still based on the time consuming test and try out method to obtain the best solution Modeling and simulation can

easily ensure virtual Design of Experiments DoE to achieve the optimal solution This has greatly reduced the cost and production time especially for new product development Using modeling and simulation will become increasingly necessary for future advances in 3D package development In this book Liu and Liu allow people in the area to learn the basic and advanced modeling and simulation skills to help solve problems they encounter Models and simulates numerous processes in manufacturing reliability and testing for the first time Provides the skills necessary for virtual prototyping and virtual reliability qualification and testing Demonstrates concurrent engineering and co design approaches for advanced engineering design of microelectronic products Covers packaging and assembly for typical ICs optoelectronics MEMS 2D 3D SiP and nano interconnects Appendix and color images available for download from the book s companion website Liu and Liu have optimized the book for practicing engineers researchers and post graduates in microelectronic packaging and interconnection design assembly manufacturing electronic reliability quality and semiconductor materials Product managers application engineers sales and marketing staff who need to explain to customers how the assembly manufacturing reliability and testing will impact their products will also find this book a critical resource Appendix and color version of selected figures can be found at www wiley com go liu packaging **An Assessment of the National Institute of Standards and Technology Physical Measurement Laboratory** National Academies of Sciences, Engineering, and Medicine,Division on Engineering and Physical Sciences,Laboratory Assessments Board,Committee on NIST Technical Programs,Panel on Review of the Physical Measurement Laboratory at the National Institute of Standards and Technology,2016-03-31 The Physical Measurement Laboratory PML at the National Institute of Standards and Technology NIST is dedicated to three fundamental and complementary tasks 1 increase the accuracy of our knowledge of the physical parameters that are the foundation of our technology driven society 2 disseminate technologies by which these physical parameters can be accessed in a standardized way by the stakeholders and 3 conduct research at both fundamental and applied levels to provide knowledge that may eventually lead to advances in measurement approaches and standards This report assesses the scientific and technical work performed by the PML and identifies salient examples of accomplishments challenges and opportunities for improvement for each of its nine divisions Optics and Photonics National Research Council,Division on Engineering and Physical Sciences,National Materials and Manufacturing Board,Committee on Harnessing Light: Capitalizing on Optical Science Trends and Challenges for Future Research,2013-03-19 Optics and photonics technologies are ubiquitous they are responsible for the displays on smart phones and computing devices optical fiber that carries the information in the internet advanced precision manufacturing enhanced defense capabilities and a plethora of medical diagnostics tools The opportunities arising from optics and photonics offer the potential for even greater societal impact in the next few decades including solar power generation and new efficient lighting that could transform the nation s energy landscape and new optical capabilities that will be essential to support the continued exponential growth of the Internet As described in the

National Research Council report Optics and Photonics Essential Technologies for our Nation it is critical for the United States to take advantage of these emerging optical technologies for creating new industries and generating job growth The report assesses the current state of optical science and engineering in the United States and abroad including market trends workforce needs and the impact of photonics on the national economy It identifies the technological opportunities that have arisen from recent advances in and applications of optical science and engineering The report also calls for improved management of U S public and private research and development resources emphasizing the need for public policy that encourages adoption of a portfolio approach to investing in the wide and diverse opportunities now available within photonics Optics and Photonics Essential Technologies for our Nation is a useful overview not only for policymakers such as decision makers at relevant Federal agencies on the current state of optics and photonics research and applications but also for individuals seeking a broad understanding of the fields of optics and photonics in many arenas *Optical Fiber Telecommunications VA* Ivan Kaminow,Tingye Li,Alan E. Willner,2010-07-28 Optical Fiber Telecommunications V A B is the fifth in a series that has chronicled the progress in the research and development of lightwave communications since the early 1970s Written by active authorities from academia and industry this edition not only brings a fresh look to many essential topics but also focuses on network management and services Using high bandwidth in a cost effective manner for the development of customer applications is a central theme This book is ideal for R D engineers and managers optical systems implementers university researchers and students network operators and the investment community Volume A is devoted to components and subsystems including semiconductor lasers modulators photodetectors integrated photonic circuits photonic crystals specialty fibers polarization mode dispersion electronic signal processing MEMS nonlinear optical signal processing and quantum information technologies Volume B is devoted to systems and networks including advanced modulation formats coherent systems time multiplexed systems performance monitoring reconfigurable add drop multiplexers Ethernet technologies broadband access and services metro networks long haul transmission optical switching microwave photonics computer interconnections and simulation tools Biographical Sketches Ivan Kaminow retired from Bell Labs in 1996 after a 42 year career He conducted seminal studies on electrooptic modulators and materials Raman scattering in ferroelectrics integrated optics semiconductor lasers DBR ridge waveguide InGaAsP and multi frequency birefringent optical fibers and WDM networks Later he led research on WDM components EDFAs AWGs and fiber Fabry Perot Filters and on WDM local and wide area networks He is a member of the National Academy of Engineering and a recipient of the IEEE OSA John Tyndall OSA Charles Townes and IEEE LEOS Quantum Electronics Awards Since 2004 he has been Adjunct Professor of Electrical Engineering at the University of California Berkeley Tingye Li retired from AT T in 1998 after a 41 year career at Bell Labs and AT T Labs His seminal work on laser resonator modes is considered a classic Since the late 1960s He and his groups have conducted pioneering studies on lightwave technologies and systems He led the work on

amplified WDM transmission systems and championed their deployment for upgrading network capacity He is a member of the National Academy of Engineering and a foreign member of the Chinese Academy of Engineering He is a recipient of the IEEE David Sarnoff Award IEEE OSA John Tyndall Award OSA Ives Medal Quinn Endowment AT T Science and Technology Medal and IEEE Photonics Award Alan Willner has worked at AT T Bell Labs and Bellcore and he is Professor of Electrical Engineering at the University of Southern California He received the NSF Presidential Faculty Fellows Award from the White House Packard Foundation Fellowship NSF National Young Investigator Award Fulbright Foundation Senior Scholar IEEE LEOS Distinguished Lecturer and USC University Wide Award for Excellence in Teaching He is a Fellow of IEEE and OSA and he has been President of the IEEE LEOS Editor in Chief of the IEEE OSA J of Lightwave Technology Editor in Chief of Optics Letters Co Chair of the OSA Science Engineering Council and General Co Chair of the Conference on Lasers and Electro Optics For nearly three decades the OFT series has served as the comprehensive primary resource covering progress in the science and technology of optical fiber telecom It has been essential for the bookshelves of scientists and engineers active in the field OFT V provides updates on considerable progress in established disciplines as well as introductions to new topics OFT V generates a value that is even higher than that of the sum of its chapters **Optical Fiber Telecommunications VA** Tingye Li,Alan E. Willner,Ivan Kaminow,2010-07-28 Optical Fiber Telecommunications V A B is the fifth in a series that has chronicled the progress in the research and development of lightwave communications since the early 1970s Written by active authorities from academia and industry this edition not only brings a fresh look to many essential topics but also focuses on network management and services Using high bandwidth in a cost effective manner for the development of customer applications is a central theme This book is ideal for R D engineers and managers optical systems implementers university researchers and students network operators and the investment community Volume A is devoted to components and subsystems including semiconductor lasers modulators photodetectors integrated photonic circuits photonic crystals specialty fibers polarization mode dispersion electronic signal processing MEMS nonlinear optical signal processing and quantum information technologies Volume B is devoted to systems and networks including advanced modulation formats coherent systems time multiplexed systems performance monitoring reconfigurable add drop multiplexers Ethernet technologies broadband access and services metro networks long haul transmission optical switching microwave photonics computer interconnections and simulation tools Biographical Sketches Ivan Kaminow retired from Bell Labs in 1996 after a 42 year career He conducted seminal studies on electrooptic modulators and materials Raman scattering in ferroelectrics integrated optics semiconductor lasers DBR ridge waveguide InGaAsP and multi frequency birefringent optical fibers and WDM networks Later he led research on WDM components EDFAs AWGs and fiber Fabry Perot Filters and on WDM local and wide area networks He is a member of the National Academy of Engineering and a recipient of the IEEE OSA John Tyndall OSA Charles Townes and IEEE LEOS Quantum Electronics Awards Since 2004 he has

been Adjunct Professor of Electrical Engineering at the University of California Berkeley Tingye Li retired from AT T in 1998 after a 41 year career at Bell Labs and AT T Labs His seminal work on laser resonator modes is considered a classic Since the late 1960s He and his groups have conducted pioneering studies on lightwave technologies and systems He led the work on amplified WDM transmission systems and championed their deployment for upgrading network capacity He is a member of the National Academy of Engineering and a foreign member of the Chinese Academy of Engineering He is a recipient of the IEEE David Sarnoff Award IEEE OSA John Tyndall Award OSA Ives Medal Quinn Endowment AT T Science and Technology Medal and IEEE Photonics Award Alan Willner has worked at AT T Bell Labs and Bellcore and he is Professor of Electrical Engineering at the University of Southern California He received the NSF Presidential Faculty Fellows Award from the White House Packard Foundation Fellowship NSF National Young Investigator Award Fulbright Foundation Senior Scholar IEEE LEOS Distinguished Lecturer and USC University Wide Award for Excellence in Teaching He is a Fellow of IEEE and OSA and he has been President of the IEEE LEOS Editor in Chief of the IEEE OSA J of Lightwave Technology Editor in Chief of Optics Letters Co Chair of the OSA Science Engineering Council and General Co Chair of the Conference on Lasers and Electro Optics **Optical Waveguides** María L. Calvo,Vasudevan Lakshminarayanan,2018-10-03 Although the theory and principles of optical waveguides have been established for more than a century the technologies have only been realized in recent decades Optical Waveguides From Theory to Applied Technologies combines the most relevant aspects of waveguide theory with the study of current detailed waveguiding technologies in particular photonic devices telecommunication applications and biomedical optics With self contained chapters written by well known specialists the book features both fundamentals and applications The first three chapters examine the theoretical foundations and bases of planar optical waveguides as well as critical optical properties such as birefringence and nonlinear optical phenomena The next several chapters focus on contemporary waveguiding technologies that include photonic devices and telecommunications The book concludes with discussions on additional technological applications including biomedical optical waveguides and the potential of neutron waveguides As optical waveguides play an increasing part in modern technology photonics will become to the 21st century what electronics were to the 20th century Offering both novel insights for experienced professionals and introductory material for novices this book facilitates a better understanding of the new information era the photonics century

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