

Maksim Skorobogatiy

Nanostructured and Subwavelength Waveguides

Fundamentals and Applications



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Nanostructured And Subwavelength Waveguides Fundamentals And Applications

Rainer Wesche



Nanostructured And Subwavelength Waveguides Fundamentals And Applications:

Nanostructured and Subwavelength Waveguides Maksim Skorobogatiy, 2012-05-23 Optical waveguides take a prominent role in photonics because they are able to trap and to transport light efficiently between a point of excitation and a point of detection. Moreover, waveguides allow the management of many of the fundamental properties of light and allow highly controlled interaction with other optical systems. For this reason, waveguides are ubiquitous in telecommunications, sensing, spectroscopy, light sources, and high power light delivery. Nanostructured and subwavelength waveguides have additional advantages: they are able to confine light at a length scale below the diffraction limit and enhance or suppress light-matter interaction as well as manage fundamental properties of light such as speed and direction of energy and phase propagation. This book presents semi-analytical theory and practical applications of a large number of subwavelength and nanostructured optical waveguides and fibers operating in various regions of the electromagnetic spectrum including visible, near and mid IR, and THz. A large number of approximate while highly precise analytical expressions are derived that describe various modal properties of the planar and circular isotropic, anisotropic, and metamaterial waveguides and fibers as well as surface waves propagating on planar and circular interfaces. A variety of naturally occurring and artificial materials are also considered, such as dielectrics, metals, polar materials, anisotropic all-dielectric and metal-dielectric metamaterials. Contents are organized around four major themes: Guidance properties of subwavelength waveguides and fibers made of homogeneous generally anisotropic materials; Guidance properties of nanostructured waveguides and fibers using both exact geometry modelling and effective medium approximation; Development of the effective medium approximations for various 1D and 2D nanostructured materials and extension of these approximations to shorter wavelengths; Practical applications of subwavelength and nanostructured waveguides and fibers. *Nanostructured Subwavelengths and Waveguides* is unique in that it collects in a single place an extensive range of analytical solutions which are derived in various limits for many practically important and popular waveguide and fiber geometries and materials.

Electromagnetic Wave Absorbing Materials Hongjing Wu, Jun Luo, Meiyin Yang, 2024-08-26 *Electromagnetic Wave Absorbing Materials* presents information on the most promising electromagnetic wave absorbing materials with timely coverage of both conventional and novel materials including 1D, 2D, and 3D materials. This book enables readers to address the growing specification needs in the field through optimizing electromagnetic parameters and promoting interface polarization, two key properties for wireless technology in electronic applications. Edited by three highly qualified academics with significant relevant research experience, *Electromagnetic Wave Absorbing Materials* includes discussions on materials including ferrites, graphene, carbon-based composite absorbers, SiC ceramics, MOFs, and meta-material based absorbers. Recent advances in the field surrounding composite absorbers, conductive polymers, and ceramics and other materials. Potential improvements in the Internet of Things, 5G mobile applications, and intelligent transport systems through electromagnetic wave absorbing

materials Potential improvements in the Internet of Things 5G mobile applications and intelligent transport systems through electromagnetic wave absorbing materials Applications including terrestrial and satellite communication software radio GPS and satellite TV environmental monitoring via satellite and EMI shielding as well as stealth applications Electromagnetic Wave Absorbing Materials is an essential reference on the subject for researchers and advanced students in the chemical electronics and communications industries as well as R D scientists at companies such as Apple HUAWEI and China Aerospace Science and Technology Corp CASC

Photoconductivity and Photoconductive Materials, 2 Volume Set
Safa O. Kasap, 2022-06-27 Dieses wichtige Referenzwerk behandelt die grundlegenden Konzepte der Photoleitfähigkeit und der photoleitenden Materialien Mit Photoconductivity and Photoconductive Materials präsentiert Professor Kasap eine maßgebliche Zusammenstellung der wesentlichen Grundsätze der Photoleitfähigkeit und stellt eine Auswahl aktueller photoleitfähiger Materialien vor Der erste Band des zweibändigen Werks beginnt mit einer Darstellung der grundlegenden Konzepte und Definitionen Es folgt eine Charakterisierung der verschiedenen Techniken auf Grundlage von stationärer transienter und modulierter Photoleitfähigkeit und der neuen Methode der Ladungsextraktion durch linear steigende Spannung CELIV Auch die Physik der Terahertz Photoleitfähigkeit sowie die Grundlagen der organischen Halbleiter LSOI werden behandelt Der zweite Band beginnt mit einem umfassenden Überblick über eine Vielzahl unterschiedlicher photoleitfähiger Materialien wobei der Schwerpunkt auf einige der wichtigsten Photoleiter gelegt wird darunter hydriertes amorphes Silizium Cadmium Quecksilber Tellurid verschiedene Röntgenphotoleiter Diamantfilme Metallhalogenidperowskite Nanodotter und Quantenpunkte Auch die Anwendungen der photoleitenden Antenne werden erörtert Das Werk das zahlreiche Beiträge führender Autoren auf diesem Fachgebiet enthält bietet den Leserinnen und Lesern außerdem eine gründliche Einführung in die Charakterisierung von Halbleitern mit Hilfe von Techniken der Photoleitfähigkeit insbesondere gleichmäßiger Beleuchtung und Phototransistor Gittertechniken Eine umfassende Darstellung organischer Photoleiter mitsamt Informationen zu Photoerzeugung Transport und Anwendungen im Druckbereich Praktische Erörterungen der transienten Lichtleitfähigkeit im Flugzeitverfahren inklusive Experimentiertechniken und Interpretationshinweisen Eine eingehende Betrachtung der transienten Photoleitfähigkeit organischer Halbleiterschichten und neuartiger Techniken der transienten Photoleitfähigkeit

Photoconductivity and Photoconductive Materials ist nicht nur ein wichtiges Referenzwerk für Physiker in der Forschung Materialwissenschaftler und Elektroingenieure sondern auch ein unverzichtbares Nachschlagewerk für Doktoranden und Studierende höherer Semester die sich mit dem Bereich der optoelektronischen Materialien beschäftigen sowie für Forschende in der Industrie Ein umfassendes zweibändiges Werk mit Beiträgen führender Fachautoren herausgegeben von einem angesehenen Forscher auf dem Gebiet der Photoleitfähigkeit

Optical Properties of Materials and Their Applications
Jai Singh, 2020-01-07 Provides a semi quantitative approach to recent developments in the study of optical properties of condensed matter systems Featuring contributions by noted experts in the field of electronic and optoelectronic materials

and photonics this book looks at the optical properties of materials as well as their physical processes and various classes. Taking a semi quantitative approach to the subject it presents a summary of the basic concepts reviews recent developments in the study of optical properties of materials and offers many examples and applications. Optical Properties of Materials and Their Applications 2nd Edition starts by identifying the processes that should be described in detail and follows with the relevant classes of materials. In addition to featuring four new chapters on optoelectronic properties of organic semiconductors recent advances in electroluminescence perovskites and ellipsometry the book covers optical properties of disordered condensed matter and glasses concept of excitons photoluminescence photoinduced changes and electroluminescence in noncrystalline semiconductors and photoinduced bond breaking and volume change in chalcogenide glasses. Also included are chapters on nonlinear optical properties of photonic glasses kinetics of the persistent photoconductivity in crystalline III V semiconductors and transparent white OLEDs. In addition readers will learn about excitonic processes in quantum wells optoelectronic properties and applications of quantum dots and more. Covers all of the fundamentals and applications of optical properties of materials. Includes theory experimental techniques and current and developing applications. Includes four new chapters on optoelectronic properties of organic semiconductors recent advances in electroluminescence perovskites and ellipsometry. Appropriate for materials scientists chemists physicists and electrical engineers involved in development of electronic materials. Written by internationally respected professionals working in physics and electrical engineering departments and government laboratories. Optical Properties of Materials and Their Applications 2nd Edition is an ideal book for senior undergraduate and postgraduate students and teaching and research professionals in the fields of physics chemistry chemical engineering materials science and materials engineering.

Spintronics Kaiyou Wang, Meiyin Yang, Jun Luo, 2022-07-14 Discover the latest advances in spintronic materials devices and applications. In Spintronics Materials Devices and Applications a team of distinguished researchers delivers a holistic introduction to spintronic effects within cutting edge materials and applications. Containing the perfect balance of academic research and practical application the book discusses the potential and the key limitations and challenges of spintronic devices. The latest title in the Wiley Series in Materials for Electronic and Optoelectronic Applications Spintronics Materials Devices and Applications explores giant magneto resistance GMR and tunneling magnetic resistance TMR materials spin transfer torque and spin orbit torque materials spin oscillators and spin materials for use in artificial neural networks. Applications in multi ferroelectric and antiferromagnetic materials are presented as well. This book also includes A thorough introduction to recent research developments in the fields of spintronic materials devices and applications. Comprehensive explorations of skyrmions magnetic semiconductors and antiferromagnetic materials. Practical discussions of spin transfer torque materials and devices for magnetic random access memory. In depth examinations of giant magneto resistance materials and devices for magnetic sensors. Perfect for advanced students and researchers in materials science physics.

electronics and computer science Spintronics Materials Devices and Applications will also earn a place in the libraries of professionals working in the manufacture of optics photonics and nanometrology equipment Microwave Materials and Applications Mailadil T. Sebastian, Rick Uvic, Heli Jantunen, 2017-03-02 Die jüngsten Fortschritte im Bereich der drahtlosen Telekommunikation und dem Internet der Dinge sorgen bei drahtlosen Systemen beim Satellitenfernsehen und bei intelligenten Transportsystemen der 5. Generation für eine hohe Nachfrage nach dielektrischen Materialien und modernen Fertigungstechniken. Diese Materialien bieten ausgezeichnete elektrische, dielektrische und thermische Eigenschaften und verfügen über enormes Potenzial vor allem bei der drahtlosen Kommunikation, bei flexibler Elektronik und gedruckter Elektronik. Microwave Materials and Applications erläutert die herkömmlichen Methoden zur Messung der dielektrischen Eigenschaften im Mikrowellenbereich, die verschiedenen Ansätze zur Lösung von Problemen der Materialchemie und von Kristallstrukturen in den Bereichen Doping, Substitution und Aufbau von Verbundwerkstoffen. Besonderer Schwerpunkt liegt auf Verarbeitungstechniken, Einflüssen der Morphologie und der Anwendung von Materialien in der Mikrowellentechnik. Gleichzeitig werden viele der jüngsten Forschungserkenntnisse bei Mikrowellen, Dielektrika und Anwendungen zusammengefasst. Die verschiedenen Kapitel untersuchen Oxidkeramiken für dielektrische Resonatoren und Substrate, HTCC, LTCC und ULTCC, Binder für Substrate, Polymer-Keramik-Verbundstoffe für Leiterplatten, Elastomer-Keramik-Verbundstoffe für flexible Elektronik, dielektrische Tinten, Materialien für die EMV-Abschirmung, Mikrowellen-Ferrite. Ein umfassender Anhang präsentiert die grundlegenden Eigenschaften von mehr als 4000 verlustarmen dielektrischen Keramiken, deren Zusammensetzung, kristalline Struktur und dielektrischen Eigenschaften für Mikrowellenanwendungen. Microwave Materials and Applications wirft einen Blick auf sämtliche Aspekte von Mikrowellenmaterialien und -anwendungen. Ein nützliches Handbuch für Wissenschaftler, Unternehmen, Ingenieure und Studenten, die sich mit heutigen und neuen Anwendungen in den Bereichen drahtlose Kommunikation und Unterhaltungselektronik beschäftigen. Inorganic Glasses for Photonics Animesh Jha, 2016-08-04 Advanced textbook on inorganic glasses suitable for both undergraduates and researchers. Engaging style to facilitate understanding. Suitable for senior undergraduates, postgraduates and researchers entering material science, engineering, physics, chemistry, optics and photonics fields. Discusses new techniques in optics and photonics, including updates on diagnostic techniques. Comprehensive and logically structured. Organic Semiconductors for Optoelectronics Hiroyoshi Naito, 2021-08-02 Comprehensive coverage of organic electronics, including fundamental theory, basic properties, characterization methods, device physics and future trends. Organic semiconductor materials have vast commercial potential for a wide range of applications, from self-emitting OLED displays and solid-state lighting to plastic electronics and organic solar cells. As research in organic optoelectronic devices continues to expand at an unprecedented rate, organic semiconductors are being applied to flexible displays, biosensors and other cost-effective green devices in ways not possible with conventional inorganic semiconductors. Organic Semiconductors for Optoelectronics is an up-to-date review of the both

the fundamental theory and latest research and development advances in organic semiconductors. Featuring contributions from an international team of experts, this comprehensive volume covers basic properties of organic semiconductors, characterization techniques, device physics, and future trends in organic device development. Detailed chapters provide key information on the device physics of organic field effect transistors, organic light emitting diodes, organic solar cells, organic photosensors, and more. This authoritative resource provides a clear understanding of the optoelectronic properties of organic semiconductors and their influence to overall device performance. Explains the theories behind relevant mechanisms in organic semiconducting materials and in organic devices. Discusses current and future trends and challenges in the development of organic optoelectronic devices. Reviews electronic properties, device mechanisms, and characterization techniques of organic semiconducting materials. Covers theoretical concepts of optical properties of organic semiconductors, including fluorescent, phosphorescent, and thermally assisted delayed fluorescent emitters. An important new addition to the Wiley Series in Materials for Electronic Optoelectronic Applications. Organic Semiconductors for Optoelectronics bridges the gap between advanced books and undergraduate textbooks on semiconductor physics and solid state physics. It is essential reading for academic researchers, graduate students, and industry professionals involved in organic electronics materials science, thin film devices, and optoelectronics research and development.

Metalorganic Vapor Phase Epitaxy (MOVPE)
Stuart Irvine, Peter Capper, 2019-08-27. Systematically discusses the growth method, material properties, and applications for key semiconductor materials. MOVPE is a chemical vapor deposition technique that produces single or polycrystalline thin films. As one of the key epitaxial growth technologies, it produces layers that form the basis of many optoelectronic components, including mobile phone components, GaAs semiconductor lasers, and LEDs. III-Vs, nitrides, optical communications, oxides, infrared detectors, photovoltaics, II-IV materials, etc. Featuring contributions by an international group of academics and industrialists, this book looks at the fundamentals of MOVPE and the key areas of equipment, safety, precursor chemicals, and growth monitoring. It covers the most important materials from III-V and II-VI compounds to quantum dots and nanowires, including sulfides and selenides and oxides, ceramics. Sections in every chapter of Metalorganic Vapor Phase Epitaxy: MOVPE Growth Materials, Properties, and Applications cover the growth of the particular material system, the properties of the resultant material, and its applications. The book offers information on arsenides, phosphides, and antimonides, nitrides, lattice mismatched growth, CdTe, MCT, mercury, cadmium, telluride, ZnO, and related materials, equipment, and safety, and more. It also offers a chapter that looks at the future of the technique. Covers, in order, the growth method, material properties, and applications for each material. Includes chapters on the fundamentals of MOVPE and the key areas of equipment, safety, precursor chemicals, and growth monitoring. Looks at important materials such as III-V and II-VI compounds, quantum dots, and nanowires. Provides topical and wide-ranging coverage from well-known authors in the field. Part of the Materials for Electronic and Optoelectronic Applications series. Metalorganic Vapor Phase Epitaxy: MOVPE Growth Materials, Properties

and Applications is an excellent book for graduate students researchers in academia and industry as well as specialist courses at undergraduate postgraduate level in the area of epitaxial growth MOVPE MOCVD MBE

Oxide Electronics Asim K. Ray, 2021-04-22 Oxide Electronics Multiple disciplines converge in this insightful exploration of complex metal oxides and their functions and properties Oxide Electronics delivers a broad and comprehensive exploration of complex metal oxides designed to meet the multidisciplinary needs of electrical and electronic engineers physicists and material scientists The distinguished author eschews complex mathematics whenever possible and focuses on the physical and functional properties of metal oxides in each chapter Each of the sixteen chapters featured within the book begins with an abstract and an introduction to the topic clear explanations are presented with graphical illustrations and relevant equations throughout the book Numerous supporting references are included and each chapter is self contained making them perfect for use both as a reference and as study material Readers will learn how and why the field of oxide electronics is a key area of research and exploitation in materials science electrical engineering and semiconductor physics The book encompasses every application area where the functional and electronic properties of various genres of oxides are exploited Readers will also learn from topics like Thorough discussions of High k gate oxide for silicon heterostructure MOSFET devices and semiconductor dielectric interfaces An exploration of printable high mobility transparent amorphous oxide semiconductors Treatments of graphene oxide electronics magnetic oxides ferroelectric oxides and materials for spin electronics Examinations of the calcium aluminate binary compound perovskites for photovoltaics and oxide 2D Degs Analyses of various applications for oxide electronics including data storage microprocessors biomedical devices LCDs photovoltaic cells TFTs and sensors Suitable for researchers in semiconductor technology or working in materials science electrical engineering and physics Oxide Electronics will also earn a place in the libraries of private industry researchers like device engineers working on electronic applications of oxide electronics Engineers working on photovoltaics sensors or consumer electronics will also benefit from this book

Molecular Beam Epitaxy Hajime Asahi, Yoshiji Horikoshi, 2019-04-15 Covers both the fundamentals and the state of the art technology used for MBE Written by expert researchers working on the frontlines of the field this book covers fundamentals of Molecular Beam Epitaxy MBE technology and science as well as state of the art MBE technology for electronic and optoelectronic device applications MBE applications to magnetic semiconductor materials are also included for future magnetic and spintronic device applications Molecular Beam Epitaxy Materials and Applications for Electronics and Optoelectronics is presented in five parts Fundamentals of MBE MBE technology for electronic devices application MBE for optoelectronic devices Magnetic semiconductors and spintronics devices and Challenge of MBE to new materials and new researches The book offers chapters covering the history of MBE principles of MBE and fundamental mechanism of MBE growth migration enhanced epitaxy and its application quantum dot formation and selective area growth by MBE MBE of III nitride semiconductors for electronic devices MBE for Tunnel FETs applications of III V semiconductor

quantum dots in optoelectronic devices MBE of III V and III nitride heterostructures for optoelectronic devices with emission wavelengths from THz to ultraviolet MBE of III V semiconductors for mid infrared photodetectors and solar cells dilute magnetic semiconductor materials and ferromagnet semiconductor heterostructures and their application to spintronic devices applications of bismuth containing III V semiconductors in devices MBE growth and device applications of Ga₂O₃ Heterovalent semiconductor structures and their device applications and more Includes chapters on the fundamentals of MBE Covers new challenging researches in MBE and new technologies Edited by two pioneers in the field of MBE with contributions from well known MBE authors including three Al Cho MBE Award winners Part of the Materials for Electronic and Optoelectronic Applications series Molecular Beam Epitaxy Materials and Applications for Electronics and Optoelectronics will appeal to graduate students researchers in academia and industry and others interested in the area of epitaxial growth

Amorphous Semiconductors Kazuo Morigaki, Sandor Kugler, Koichi Shimakawa, 2016-12-29

Amorphous semiconductors are substances in the amorphous solid state that have the properties of a semiconductor and which are either covalent or tetrahedrally bonded amorphous semiconductors or chalcogenide glasses Developed from both a theoretical and experimental viewpoint Deals with amongst others preparation techniques structural optical and electronic properties and light induced phenomena Explores different types of amorphous semiconductors including amorphous silicon amorphous semiconducting oxides and chalcogenide glasses Applications include solar cells thin film transistors sensors optical memory devices and flat screen devices including televisions

Phosphors for Radiation Detectors Takayuki Yanagida, Masanori Koshimizu, 2022-02-02

Phosphors for Radiation Detector Phosphors for Radiation Detectors Discover a comprehensive overview of luminescence phosphors for radiation detection In Phosphors for Radiation Detection accomplished researchers Takayuki Yanagida and Masanori Koshimizu deliver a state of the art exploration of the use of phosphors in radiation detection The internationally recognized contributors discuss the fundamental physics and detector functions associated with the technology with a focus on real world applications The book discusses all forms of luminescence phosphors for radiation detection used in a variety of fields including medicine security resource exploration environmental monitoring and high energy physics Readers will discover discussions of dosimeter materials including thermally stimulated luminescent materials optically stimulated luminescent materials and radiophotoluminescence materials The book also covers transparent ceramics and glasses and a broad range of devices used in this area Phosphors for Radiation Detection also includes Thorough introductions to ionizing radiation induced luminescence organic scintillators and inorganic oxide scintillators Comprehensive explorations of luminescent materials including discussions of materials synthesis and their use in gamma ray neutron and charged particle detection Practical discussions of semiconductor scintillators including treatments of organic inorganic layered perovskite materials for scintillation detectors In depth examinations of thermally stimulated luminescent materials including discussions of the dosimetric properties for photons

charged particles and neutrons Relevant for research physicists materials scientists and electrical engineers Phosphors for Radiation Detection is an also an indispensable resource for postgraduate and senior undergraduate students working in detection physics

Handbook of Mechanical Nanostructuring Mahmood Aliofkhazraei, 2016-05-02 Providing in depth information on how to obtain high performance materials by controlling their nanostructures this ready reference covers both the bottom up and the top down approaches to the synthesis and processing of nanostructured materials The focus is on advanced methods of mechanical nanostructuring such as severe plastic deformation including high pressure torsion equal channel angular processing cyclic extrusion compression accumulative roll bonding and surface mechanical attrition treatment As such the contents are inherently application oriented with the methods presented able to be easily integrated into existing production processes In addition the structure property relationships and ways of influencing the nanostructure in order to exhibit a desired functionality are reviewed in detail The whole is rounded off by a look at future directions followed by an overview of applications in various fields of structural and mechanical engineering With its solutions for successful processing of complex shaped workpieces and large scale specimens with desired properties this is an indispensable tool for purposeful materials design

Materials for Solid State Lighting and Displays Adrian Kitai, 2017-03-06 LEDs are in the midst of revolutionizing the lighting industry Up to date and comprehensive coverage of light emitting materials and devices used in solid state lighting and displays Presents the fundamental principles underlying luminescence Includes inorganic and organic materials and devices LEDs offer high efficiency long life and mercury free lighting solutions

Solar Cell Materials Arthur Willoughby, 2014-03-03 This book presents a comparison of solar cell materials including both new materials based on organics nanostructures and novel inorganics and developments in more traditional photovoltaic materials It surveys the materials and materials trends in the field including third generation solar cells multiple energy level cells thermal approaches and the modification of the solar spectrum with an eye firmly on low costs energy efficiency and the use of abundant non toxic materials

Spintronics for Next Generation Innovative Devices Katsunaki Sato, Eiji Saitoh, 2015-07-22 Spintronics short for spin electronics or spin transport electronics exploits both the intrinsic spin of the electron and its associated magnetic moment in addition to its fundamental electronic charge in solid state devices Controlling the spin of electrons within a device can produce surprising and substantial changes in its properties Drawing from many cutting edge fields including physics materials science and electronics device technology spintronics has provided the key concepts for many next generation information processing and transmitting technologies This book discusses all aspects of spintronics from basic science to applications and covers magnetic semiconductors topological insulators spin current science spin caloritronics ultrafast magnetization reversal magneto resistance effects and devices spin transistors quantum information devices This book provides a comprehensive introduction to Spintronics for researchers and students in academia and industry

Glancing Angle Deposition of Thin Films Matthew M. Hawkeye, Michael T.

Taschuk, Michael J. Brett, 2014-07-03 This book provides a highly practical treatment of Glancing Angle Deposition GLAD a thin film fabrication technology optimized to produce precise nanostructures from a wide range of materials GLAD provides an elegant method for fabricating arrays of nanoscale helices chevrons columns and other porous thin film architectures using physical vapour deposition processes such as sputtering or evaporation The book gathers existing procedures methodologies and experimental designs into a single cohesive volume which will be useful both as a ready reference for those in the field and as a definitive guide for those entering it It covers Development and description of GLAD techniques for nanostructuring thin films Properties and characterization of nanohelices nanoposts and other porous films Design and engineering of optical GLAD films including fabrication and testing and chiral films Post deposition processing and integration to optimize film behaviour and structure Deposition systems and requirements for GLAD fabrication A patent survey extensive relevant literature and a survey of GLAD s wide range of material properties and diverse applications

Physical Properties of High-Temperature Superconductors Rainer Wesche, 2015-05-13 A much needed update on complex high temperaturesuperconductors focusing on materials aspects this timely bookcoincides with a recent major breakthrough of the discovery of iron based superconductors It provides an overview of materials aspects of high temperaturesuperconductors combining introductory aspects description of newphysics material aspects and a description of the materialproperties This title is suitable for researchers inmaterials science physics and engineering Also for techniciansinterested in the applications of superconductors e g asbiomagnets

Fano Resonances in Optics and Microwaves Eugene Kamenetskii, Almas Sadreev, Andrey Miroshnichenko, 2018-11-20 This book discusses the development of Fano based techniques and reveals the characteristic properties of various wave processes by studying interference phenomena It explains that the interaction of discrete localized states with a continuum of propagation modes leads to Fano interference effects in transmission and explores novel coherent effects such as bound states in the continuum accompanied by collapse of Fano resonance Originating in atomic physics Fano resonances have become one of the most appealing phenomena of wave scattering in optics microwaves and terahertz techniques The generation of extremely strong and confined fields at a deep subwavelength scale far beyond the diffraction limit plays a central role in modern plasmonics magnonics and in photonic and metamaterial structures Fano resonance effects take advantage of the coupling of these bound states with a continuum of radiative electromagnetic waves With their unique physical properties and unusual combination of classical and quantum structures Fano resonances have an application potential in a wide range of fields from telecommunication to ultrasensitive biosensing medical instrumentation and data storage Including contributions by international experts and covering the essential aspects of Fano resonance effects including theory modeling and design proven and potential applications in practical devices fabrication characterization and measurement this book enables readers to acquire the multifaceted understanding required for these multidisciplinary challenges

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Nanostructured And Subwavelength Waveguides Fundamentals And Applications Introduction

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