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Diffractive Optics and Nanophotonics

2015-10-29

in this book the authors present several examples of techniques used to overcome the abby diffraction limit using flat and 3d diffractive optical elements photonic crystal lenses photonic jets and surface plasmon diffractive optics the structures discussed can be used in the microwave and thz range and also as scaled models for optical frequencies such nano optical microlenses can be integrated for example into existing semiconductor heterostructure platforms for next generation optoelectronic applications chapter 1 considers flat diffractive lenses and innovative 3d radiating structures including a conical millimeter wave fresnel zone plate fzp lens proposed for subwavelength focusing in chapter 2 the subwavelength focusing properties of diffractive photonic crystal lenses are considered and it is shown that at least three different types of photonic crystal lens are possible with the aim of achieving subwavelength focusing in chapter 3 an alternative mechanism to produce photonic jets at terahertz frequencies terajets using 3d dielectric particles of arbitrary size cuboids is considered a scheme to create a 2d teraknife using dielectric rods is also discussed in the final chapter the successful adaptation of free space 3d binary phase reversal conical fzps for operation on surface plasmon polariton spp waves demonstrates that analogues of fourier diffractive components can be developed for in plane spp 3d optics review ing theory modelling and experiment this book will be a valuable resource for students and researchers working on nanophotonics and sub wavelength focusing and imaging

Nonlinear Super-resolution Nano-optics and Applications

2014

this book presents the recent progress in the field of nanophotonics it contains review like chapters focusing on various but mutually related topics in nanophotonics written by the world s leading scientists following the elaboration of the idea of nanophotonics much theoretical and experimental work has been carried out and several novel photonic devices high resolution fabrication highly efficient energy conversion and novel information processing have been developed in these years novel theoretical models describing the nanometric light matter interaction nonequilibrium statistical mechanical models for photon breeding processes and near field assisted chemical reactions as well as light matter interaction are also explained in this book it describes dressed photon technology and its applications including implementation of nanophotonic devices and systems fabrication methods and performance characteristics of ultrathin ultraflexible organic light emitting diodes organic solar cells and organic transistors

Progress in Nanophotonics 4

2017-02-18

presents recent developments in theoretical and experimental research of nanophotonics discusses properties and features of nanophotonic devices e g scanning near field optical microscopy nanofiber nanowire based photonic devices illustrates the most promising nanophotonic devices and instruments and their application suits well for researchers and graduates in nanophotonics field contents scanning near field optical microscopy nanofibers nanowires and their applications in photonic components and devices micro nano optoelectronic devices based on photonic crystal

Advances in Nanophotonics

2017-12-18

nano optics is the study of optical phenomena and techniques on the nanometer scale that is near or beyond the diffraction limit of light it is an emerging field of study motivated by the rapid advance of nanoscience and nanotechnology which require adequate tools and strategies for fabrication manipulation and characterization at this scale in this 2006 text the authors provide a comprehensive overview of the theoretical and experimental concepts necessary to understand and work in nano optics with a very broad perspective they cover optical phenomena relevant to the nanoscale across diverse areas ranging from quantum optics to biophysics introducing and extensively describing all of the significant methods written for graduate students who want to enter the field the text includes problem sets to reinforce and extend the discussion it is also a valuable reference for researchers and course teachers

Principles of Nano-Optics

2006-06-01

current developments in optical technologies are being directed toward nanoscale devices with subwavelength dimensions in which photons are manipulated on the nanoscale although light is clearly the fastest means to send information to and from the nanoscale there is a fundamental incompatibility between light at the microscale and devices and processes at the nanoscale nanostructured metals which support surface plasmon modes can concentrate electromagnetic em fields to a small fraction of a wavelength while enhancing local field strengths by several orders of magnitude for this reason plasmonic nanostructures can serve as optical couplers across the nano micro

interface metal dielectric and metal semiconductor nanostructures can act as optical nanoantennae and enhance light matter coupling in nanoscale devices this book describes how one can fully integrate plasmonic nanostructures into dielectric semiconductor and molecular photonic devices for guiding photons across the nano micro interface and for detecting molecules with unsurpassed sensitivity nanophotonics and nanoplasmonics metamaterials and negative index materials plasmon enhanced sensing and spectroscopy imaging and sensing on the nanoscale metal optics

Nanophotonics with Surface Plasmons

2006-12-18

the aim of this textbook is to provide an overview of nanophotonics a discipline which was developed around the turn of the millennium this unique and rapidly evolving subject area is the result of a collaboration between various scientific communities working on different aspects of light matter interaction at the nanoscale these include near field optics and super resolution microscopy photonic crystals diffractive optics plasmonics optoelectronics synthesis of metallic and semiconductor nanoparticles two dimensional materials and metamaterials the book is aimed at graduate students with a background in physics electrical engineering material science or chemistry as well as lecturers and researchers working within these fields

Introduction to Nanophotonics

2022-04-12

diffractive optics and nanophotonics is devoted to achievements in diffractive optics focusing on the creation of new nanophotonic components and devices as well as instrumentation and available information technology the author describes methods of calculation of diffractive optical elements to solve actual problems of nanophotonics coverage includes mathematical methods for calculation of diffraction gratings calculation of modes of inhomogeneous waveguides integral methods of calculation of electromagnetic field near the focus and methods of calculation of diffractive optical elements generating vortex laser beams

Diffractive Optics and Nanophotonics

2017-09-01

this groundbreaking book focuses on near field microscopy which has opened up optical processes at the nanoscale for direct inspection further it explores the emerging area of nano optics which promises to make possible optical microscopy with true nanometer resolution this frontline resource helps you achieve high resolution optical imaging of biological species and functional materials you also find guidance in the imaging of optical device operation and new nanophotonics functionalities ebl

Nano-optics and Near-field Optical Microscopy

2009

over the last few decades the quantum aspects of light have been explored and major progress has been made in understanding the specific quantum aspects of the interaction between light and matter the domain of classical optics has recently seen many exciting new developments especially in the areas of nano optics nano antennas metamaterials and optical cloaking approaches based on single molecule detection and plasmonics have provided new avenues for exploring light matter interaction at the nanometre scale all these topics have in common a trend to consider and use smaller and smaller objects down to the micrometre nanometre and even atomic range the summer school held in les houches in july 2013 treated all these subjects lying at the frontier between nanophotonics and quantum optics in a series of lectures given by world experts

Quantum Optics and Nanophotonics

2017

addressing the growing demand for larger capacity in information technology vlsi micro and nanophotonics science technology and applications explores issues of science and technology of micro nano scale photonics and integration for broad scale and chip scale very large scale integration photonics this book is a game changer in the sense that it is quite possibly the first to focus on vlsi photonics very little effort has been made to develop integration technologies for micro nanoscale photonic devices and applications so this reference is an important and necessary early stage perspective on this field new demand for vlsi photonics brings into play various technological and scientific issues as well as evolutionary and revolutionary challenges all of which are discussed in this book these include topics such as miniaturization interconnection and integration of photonic devices at micron submicron and nanometer scales with its disruptive creativity and unparalleled coverage of the photonics revolution in information technology this book should greatly impact the future of micro nano photonics and it as a whole it offers a comprehensive overview of the science and engineering of micro nanophotonics and photonic integration many books on micro nanophotonics focus on understanding the properties of individual devices and their related

characteristics however this book offers a full perspective from the point of view of integration covering all aspects of benefits and advantages of vlsi scale photonic integration the key technical concept in developing a platform to make individual devices and components useful and practical for various applications

VLSI Micro- and Nanophotonics

2018-09-03

this book gives a readable introduction to the important rapidly developing field of nanophotonics it provides a quick understanding of the basic elements of the field allowing students and newcomers to progress rapidly to the frontiers of their interests topics include the basic mathematical techniques needed for the study of the materials of nanophotonic technology photonic crystals and their applications as laser resonators waveguides and circuits of waveguides the application of photonic crystals technology in the design of optical diodes and transistors the basic properties needed for the design and understanding of new types of engineered materials known as metamaterials and a consideration of how and why these engineered materials have been formulated in the lab as well as their applications as negative refractive index materials as perfect lens as cloaking devices and their effects on cherenkov and other types of radiation additionally the book introduces the new field of plasmonics and reviews its important features the role of plasmon polaritons in the scattering and transmission of light by rough surfaces and the enhanced transmission of light by plasmon polariton supporting surfaces is addressed the important problems of subwavelength resolution are treated with discussions of applications in a number of scientific fields the basic principles of near field optical microscopy are presented with a number of important applications the basics of atomic cavity physics photonic entanglement and its relation to some of the basic properties of quantum computing and the physics associated with the study of optical lattices are presented

Nanophotonics

2019-01-10

this monograph is a detailed introduction to the nascent and ever evolving fields of metamaterials and nanophotonics with key techniques and applications needed for a comprehensive understanding of these fields all detailed these include the standard and high accuracy nonstandard ftdt techniques finite difference frequency domain mode solvers the transfer matrix method analytic calculations for dielectric and plasmonic waveguides dispersion maxwell bloch and density functional theory as well as design methods for constructing metamaterials and nanolasers and quantum plasmonics the book is intended for final year undergraduates as well as postgraduates or

active researchers who wish to understand and enter these fields in a user friendly manner and who have a basic understanding of and familiarity with electromagnetic theory

Metamaterials And Nanophotonics: Principles, Techniques And Applications

2022-08-11

this book aims to collect cutting edge studies in various optical imaging technologies with advanced performances that are enabled or enhanced by plasmonics the basic working principles development details and potential future direction and perspectives are discussed edited by zhaowei liu a prominent researcher in the field of super resolution microscopy this book will be an excellent reference for anyone in the field of nanophotonics plasmonics and optical microscopy

Plasmonics and Super-resolution Imaging

2017

fundamentals and applications of nanophotonics includes a comprehensive discussion of the field of nanophotonics including key enabling technologies that have the potential to drive economic growth and impact numerous application domains such as ict the environment healthcare military transport manufacturing and energy this book gives readers the theoretical underpinnings needed to understand the latest advances in the field after an introduction to the area chapters two and three cover the essential topics of electrodynamics quantum mechanics and computation as they relate to nanophotonics subsequent chapters explore materials for nanophotonics including nanoparticles photonic crystals nanosilicon nanocarbon iii v and ii vi semiconductors in addition fabrication and characterization techniques are addressed along with the importance of plasmonics and the applications of nanophotonics in devices such as lasers leds and photodetectors covers electrodynamics quantum mechanics and computation as these relate to nanophotonics reviews materials fabrication and characterization techniques for nanophotonics describes applications of the technology such as lasers leds and photodetectors

Fundamentals and Applications of Nanophotonics

2016-01-09

nanophotonics is a comprehensive introduction to the emerging area concerned with controlling and shaping optical fields at a subwavelength scale. Photonic crystals and microcavities are extensively described including non-linear optical effects. Local probe techniques are presented and are used to characterize plasmonic devices. The emerging fields of semiconductor nanocrystals and nanobiophotonics are also presented.

Nanophotonics

2010-01-05

presents recent developments in theoretical and experimental research of nanophotonics. Discusses properties and features of nanophotonic devices e.g. scanning near-field optical microscopy, nanofiber, nanowire-based photonic devices. Illustrates the most promising nanophotonic devices and instruments and their application. Suits well for researchers and graduates in the nanophotonics field. Contents: scanning near-field optical microscopy, nanofibers, nanowires and their applications in photonic components and devices, micro-nano optoelectronic devices based on photonic crystal.

Advances in Nanophotonics

2017-12-18

this book summarizes the latest advances in nanophotonics for biomedical applications including biomolecular sensing and imaging, additive fabrications and biophotonics. The engineering of nanophotonics will have significant impacts on the life sciences and medicine alike. Given its scope, the book offers a valuable asset for researchers, scientists, engineers, and graduate students in the fields of biomedical engineering, electrical engineering, materials sciences, optics, biology, and medicine.

Nanophotonics in Biomedical Engineering

2020-10-23

this reference informs readers about nanoscale design and synthesis of different nanomaterials. Chapters of the book account for variable nanoarchitecture while explaining concepts which are central to the field of nanotechnology. It explains how nanodevices and microdevices can be used for nanophotonics, biophotonics, and drug delivery applications. Advanced biochemical techniques ranging from fluorescence

plasmonics enhanced plasmonics ep to metal enhanced fluorescence mef from colloidal dispersion to single luminescent nanoplatfoms and nanospectroscopy microfluidics nanofluidics silica wave guiding lasers nanolasers and photonic circuits for enhanced signal detections are also presented in addition proof of concept ideas of microdevices and nanodevices to real applications within other allied disciplines such as genomics biochemistry drug delivery and clinical chemistry based on advanced optical detection and imaging are highlighted the book is an informative reference for readers studying biochemistry pharmacology biomedical engineering and related subjects at all levels as well as general readers who want to learn about advanced applications in optics and photonics

Frontiers in Nano and Micro-Device Design for Applied Nanophotonics, Biophotonics and Nanomedicine

2021-07-30

this comprehensive text collects the progress made in recent years in the fabrication processing and performance of organic nanophotonic materials and devices the first part of the book addresses photonic nanofabrications in a chapter on multiphoton processes in nanofabrication and microscopy imaging the second part of the book is focused on nanoscale light sources for integrated nanophotonic circuits and is composed of three chapters on organic nano microcavities organic laser materials and polymer light emitting electrochemical cells lecs the third part is focused on the interactions between light and matter and consists in three chapters including the propagation of light in organic nanostructures and photoswitches based on nonlinear optical polymer photonic crystals and photoresponsive molecules respectively the final chapter of this book introduces the integration of miniaturized photonic devices and circuits with various organic nanophotonic elements the practical case studies demonstrate how the latest applications actually work while tables throughout the book summarize key information and diagrams and figures help readers to grasp complex concepts and designs the references at the end of each chapter can be used as the gateway to the relevant literature in the field moreover this book helps researchers to advance their own investigations to develop the next generation of miniaturized devices for information processing efficient energy conversion and highly accurate sensing yong sheng zhao phd is a professor at the institute of chemistry chinese academy of sciences iccas china

Organic Nanophotonics

2014-11-05

this book covers device design fundamentals and system applications in optical mems and nanophotonics expert authors showcase

examples of how fusion of nanoelectromechanical nems with nanophotonic elements is creating powerful new photonic devices and systems including mems micromirrors mems tunable filters mems based adjustable lenses and apertures nems driven variable silicon nanowire waveguide couplers and nems tunable photonic crystal nanocavities the book also addresses system applications in laser scanning displays endoscopic systems space telescopes optical telecommunication systems and biomedical implantable systems presents efforts to scale down mechanical and photonic elements into the nano regime for enhanced performance faster operational speed greater bandwidth and higher level of integration showcases the integration of mems and optical photonic devices into real commercial products addresses applications in optical telecommunication sensing imaging and biomedical systems prof vincent c lee is associate professor in the department of electrical and computer engineering national university of singapore prof guangya zhou is associate professor in the department of mechanical engineering at national university of singapore

Optical MEMS, Nanophotonics, and Their Applications

2017-12-14

this book investigates the behavior of light light pulse within the micro and nano scale device ring resonator which can be integrated to form the device circuits and systems that can be used for atom molecule trapping and transportation optical transistor fast calculation devices optical gate nanoscale communication and networks and energy storage etc the large demand of small scale device especially with light signal processing is needed this book discusses device nano device design and simulation which can be useful for practice in the near future

Nanophotonics

2013-05-07

ever since the beginning of mankind s efforts to pursue scientific inquiry into the laws of nature visualization of the very distant and the very small has been paramount the examples are numerous a century ago the atom appeared mysterious a raisin or plum pie of no structure until it was visualized on the appropriate length and time scales similarly with telescopic observations a central dogma of the cosmos was changed and complexity yielded to simplicity of the heliocentric structure and motion in our solar system for matter in over a century of developments major advances have been made to explore the inner microscopic structures and dynamics these advances have benefited many fields of endeavor but visualization was incomplete it was limited either to the 3d spatial structure or to the 1d temporal evolution however in systems with myriads of atoms 4d spatiotemporal visualization is essential for dissecting their complexity the

biological world is rich with examples and many molecular diseases cannot be fully understood without such direct visualization as for example in the case of alzheimer s and parkinson s the same is true for phenomena in materials science chemistry and nanoscience this anthology is an account of the collected works that have emerged over the past decade from caltech through recent publications the volume provides overviews of the principles the electron based techniques and the applications made thanks to advances in imaging principles and technology it is now possible with 4d electron microscopy to reach ten orders of magnitude improvement in time resolution while simultaneously conserving the atomic spatial resolution in visualization this is certainly a long way from robert hooke s microscopy which was recorded in his 1665 masterpiece micrographia

4D Visualization of Matter

2014-09-12

this volume brings together several recent research articles in the field of nanophotonics the editors have arranged the chapters in three main parts quantum devices photonic devices and semiconductor devices the chapters cover a wide variety of scopes in those areas including principles of plasmonic spr lspr and their applications graphene based nanophotonic devices generation of entangled photon and quantum dots perovskite solar cells photo detachment and photoionization of two electrons systems diffusion and intermixing of atoms in semiconductor crystals lattice and molecular elastic and inelastic scattering including surface enhanced raman scattering and their applications it is our sincerest hope that science and engineering students and researchers could benefit from the new ideas and recent advances in the field that are covered in this book

Recent Advances in Nanophotonics

2020-11-26

this book offers a unified presentation of metamaterials building from fundamental nanophotonic principles

An Introduction to Metamaterials and Nanophotonics

2020-11-26

this book focuses on the recent progress in nanophotonics technology to be used to develop novel nano optical devices fabrication

technology and security systems it begins with a review of the concept of dressed photons and applications to devices fabrication and systems principles and applications further topics include dna process for quantum dot chain photon enhanced emission microscopy near field spectroscopy of metallic nanostructure self organized fabrication of composite semiconductor quantum dots formation of metallic nanostructure and nanophotonic information systems with security these topics are reviewed by seven leading scientists this overview is a variable resource for engineers and scientists working in the field of nanophotonics

Progress in Nanophotonics 1

2011-07-29

this book focuses the recent progress in nanophotonics technology to be used to develop novel nano optical devices fabrication technology and advanced systems it begins with a review of near field excitation dynamics in molecules further topics include wavelength up converting a phonon assisted excitation process with degenerate beams and non degenerate beams in dye grains a fabrication method of semiconductor quantum dots including self assembly of inas quantum dots based on the stranski krastanov growth mode single nanotube spectroscopy and time resolved spectroscopy for studying novel excitonic properties of single walled carbon nanotubes the striking features of excitons in the carbon nanotube multiple exciton states and microfluidic and extended nano fluidic techniques these topics are reviewed by nine leading scientists this overview is a variable resource for engineers and scientists working in the field of nanophotonics

Progress in Nanophotonics 2

2013-02-26

the only comprehensive treatment of nanophotonics currently available photonics is an all encompassing optical science and technology which has impacted a diverse range of fields from information technology to health care nanophotonics is photonic science and technology that utilizes light matter interactions on the nanoscale where researchers are discovering new phenomena and developing technologies that go well beyond what is possible with conventional photonics and electronics these new technologies could include efficient solar power generation high bandwidth and high speed communications high capacity data storage and flexible and high contrast displays in addition nanophotonics will continue to impact biomedical technologies by providing new and powerful diagnostic techniques as well as light guided and activated therapies nanophotonics provides the only available comprehensive treatment of this exciting multidisciplinary field offering a wide range of topics covering foundations materials applications theory fabrication nanophotonics introduces students to important and timely concepts and provides scientists and engineers with a cutting edge reference the book is intended for anyone who

wishes to learn about light matter interactions on the nanoscale as well as applications of photonics for nanotechnology and nanobiotechnology written by an acknowledged leader in the field this text provides an essential resource for those interested in the future of materials science and engineering nanotechnology and photonics

Nanophotonics

2004-09-21

this book provides an overview of research achievements by industry experts and academic scientists in the subject area of optoelectronics technology and industry it covers a broad field ranging from laser technology and applications optical communications optoelectronic devices and integration energy harvesting to medical and biological applications authored by highly regarded researchers contributing a wealth of knowledge on photonics and optoelectronics this comprehensive collection of papers offers insight into innovative technologies recent advances and future trends needed to develop effective research and manage projects researchers will benefit considerably when applying the technical information covered in this book

Frontier Research and Innovation in Optoelectronics Technology and Industry

2018-11-15

this book discusses a new class of photonic devices known as surface plasmon nanophotonic structures the book highlights several exciting new discoveries while providing a clear discussion of the underlying physics the nanofabrication issues and the materials considerations involved in designing plasmonic devices with new functionality chapters written by the leaders in the field of plasmonics provide a solid background to each topic

Surface Plasmon Nanophotonics

2007-09-18

off shell science deals with the quantum field in which the dispersion relation between energy and momentum is invalid a typical example of such the quantum field is the dressed photon dp that creates by the interaction among photons electrons and phonons in a nano particle this field is complementary to the on shell quantum field photons in a macroscopic space off shell applications in nanophotonics

dressed photon science and technology reviews the experimental theoretical studies and shows the route that should be taken to establish off shell science in the future a variety of phenomena originate from the dp and phenomena analogous to them have been found among physical chemical and biological phenomena this indicates that off shell quantum fields are universal and essential constituent elements of nature by noting this readers will be able to use off shell science to develop new technologies this book presents i the reasons why the off shell scientific theory is required ii the nature of the dressed photon by presenting experimental results iii tentative theoretical description of the dressed photon iv disruptive innovations nano optical devices nano fabrication technology energy conversion technology and silicon light emitting diodes lasers and v genuine theoretical approaches based on spatio temporal vortex hydrodynamics quantum probability quantum measurement and micro macro duality it will appeal to materials scientists engineers and physicists working in the areas of optics and photonics explains the fundamental concepts behind off shell science and how it differs from traditional nanophotonics presents a range of simulation models demonstrating major off shell models assesses the major challenges for researchers wanting to employ off shell based experimental techniques

Off-Shell Applications in Nanophotonics

2021-07-24

this book shows how dispersion engineering in two dimensional dielectric photonic crystals can provide new effects for the precise control of light propagation for integrated nanophotonics dispersion engineering in regular and graded photonic crystals to promote anomalous refraction effects is studied from the concepts to experimental demonstration via nanofabrication considerations self collimation ultra and negative refraction second harmonic generation mirage and invisibility effects which lead to an unprecedented control of light propagation at the sub wavelength scale for the field of integrated nanophotonics are detailed and commented upon

Dispersion Engineering for Integrated Nanophotonics

2014-03-06

this book highlights recent advances in thin film photonics particularly as building blocks of metamaterials and metasurfaces recent advances in nanophotonics has demonstrated remarkable control over the electromagnetic field by tailoring the optical properties of materials at the subwavelength scale which results in the emergence of metamaterials and metasurfaces however most of the proposed platforms require intense lithography which makes them of minor practical relevance stacked ultrathin films of dielectrics semi conductors and metals are introduced as an alternative platform that perform unique or similar functionalities this book discusses the new era of thin

film photonics and its potential applications in perfect and selective light absorption structural coloring biosensing enhanced spontaneous emission reconfigurable photonic devices and super lensing

New Directions in Thin Film Nanophotonics

2019-06-27

diffractive nanophotonics demonstrates the utility of the well established methods of diffractive computer optics in solving nanophotonics tasks it is concerned with peculiar properties of laser light diffraction by microoptics elements with nanoscale features and light confinement in subwavelength space regions written by recognized experts in t

Nanophotonics

2005-02

this book gives a readable introduction to the important rapidly developing field of nanophotonics it provides a quick understanding of the basic elements of the field allowing students and newcomers to progress rapidly to the frontiers of their interests topics include the basic mathematical techniques needed for the study of the materials of nanophotonic technology photonic crystals and their applications as laser resonators waveguides and circuits of waveguides the application of photonic crystals technology in the design of optical diodes and transistors the basic properties needed for the design and understanding of new types of engineered materials known as metamaterials and a consideration of how and why these engineered materials have been formulated in the lab as well as their applications as negative refractive index materials as perfect lens as cloaking devices and their effects on cherenkov and other types of radiation additionally the book introduces the new field of plasmonics and reviews its important features the role of plasmon polaritons in the scattering and transmission of light by rough surfaces and the enhanced transmission of light by plasmon polariton supporting surfaces is addressed the important problems of subwavelength resolution are treated with discussions of applications in a number of scientific fields the basic principles of near field optical microscopy are presented with a number of important applications the basics of atomic cavity physics photonic entanglement and its relation to some of the basic properties of quantum computing and the physics associated with the study of optical lattices are presented

Diffraction Nanophotonics

2016-04-19

nanophotonics integrating photochemistry optics and nano bio materials studies is an interdisciplinary research text on the application of nanophotonic physical chemical research and effects in devices for applications bridging a gap between conventional photophysics photochemistry and nanoscience nanophotonics is a new wide research field related to photochemistry photobiology and photophysics in nanodimension under the keywords of photo and nano advanced scientific topics such as spectroscopic analysis of from single molecules to nanomaterials nanofabrication by photons detection of single bio molecules near field optics and so forth are described here the book is written by experts in the field of photochemistry optics material science bioscience and so on for providing advanced knowledge of nanophotonics nanophotonics is a new research field that is not included in any conventional discipline but widely cover evolving and promising research subjects under the keywords of light and nanoscale topics included in the book are concerned with photodynamics from single molecules to nanoparticles spectroscopy and imaging in nanodimensions nanofabrication synthesis analysis and control of nano bio systems and so on the book is finalized by topics of toward molecular nanophotonics this is written primarily for graduate students researchers and engineers

Nanophotonics

2018-04-27

this book represents the first comprehensive overview over amorphous nano optical and nano photonic systems nanophotonics is a burgeoning branch of optics that enables many applications by steering the mould of light on length scales smaller than the wavelength with devoted nanostructures amorphous nanophotonics exploits self organization mechanisms based on bottom up approaches to fabricate nanooptical systems the resulting structures presented in the book are characterized by a deterministic unit cell with tailored geometries but their spatial arrangement is not controlled instead of periodic the structures appear either amorphous or random the aim of this book is to discuss all aspects related to observable effects in amorphous nanophotonic material and aspects related to their design fabrication characterization and integration into applications the book has an interdisciplinary nature with contributions from scientists in physics chemistry and materials sciences and sheds light on the topic from many directions

Nanophotonics: Integrating Photochemistry, Optics and Nano/Bio Materials Studies

2004-10-09

nanoscale materials are showing great promise in various optoelectronics applications especially the fast developing fields of optical communication and optical computers with silicon as the leading material for microelectronics the integration of optical functions into silicon technology is a very important challenge this book concentrates on

Amorphous Nanophotonics

2013-02-15

photonics concerns the generation transport processing and detection of light it underlies a large amount of industrial activity mainly devoted to information technology telecommunications environmental monitoring biomedical science and instrumentation the field has received a powerful impetus recently with the introduction of nanoscale concepts moreover organic materials now appear as key components in photonic devices such as light emitting diodes integrated lasers or photovoltaic cells organic molecular systems offer unique opportunities in nanophotonics since both top down and bottom up strategies can be pursued towards the nanoscale this book gathers the proceedings of the nato advanced research workshop on organic nanophotonics held in aix en provence france august 25 29 2002 it constitutes a snapshot of the state of the art in the novel emerging research area of nanophotonics based on organic molecules and materials

Silicon Nanophotonics

2016-04-19

Organic Nanophotonics

2013-06-29

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