

# Surface Plasmon Polaritons Spps Introduction And Basic

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2D Materials for Surface Plasmon Resonance-based Sensors - Sanjeev Kumar Raghuvanshi  
2021-12-13

2D Materials for Surface Plasmon Resonance-based Sensors offers comprehensive coverage of recent design and development (including processing and fabrication) of 2D materials in the context of plasmonic-based devices. It provides a thorough overview of the basic principles and techniques used in the analysis and design of 2D material-based optical sensor systems. Beginning with the basic concepts of plasmon/plasmonic sensors and mathematical modelling, the authors explain the fundamental properties of 2D materials, including Black Phosphorus (BP), Phosphorene, Graphene, Transition metal dichalcogenides (TMDCs), MXene's and SW-CNT. It also details the applications of these emerging materials in clinical diagnosis and their future trends. This text will be useful for practising engineers, undergraduate and postgraduate students. Key

Features Presents the fundamental concepts of 2D material assisted fibre optic and prism based SPR sensor in a student-friendly manner.

Includes the recent synthesis and characterization techniques of 2D materials. Provides computational results of recently discovered electronic and optical properties of the 2D materials along with their effectiveness in the field of plasmonic sensors. Presents emerging applications of novel 2D material-based plasmonic sensors in the field of chemical, bio-chemical and biosensing.

*3D Imaging—Multidimensional Signal Processing and Deep Learning* - Lakhmi C. Jain  
2022-08-23

This book gathers selected papers presented at the conference “Advances in 3D Image and Graphics Representation, Analysis, Computing and Information Technology,” one of the first initiatives devoted to the problems of 3D imaging in all contemporary scientific and application areas. The two volumes of the book

cover wide area of the aspects of the contemporary multidimensional imaging and outline the related future trends from data acquisition to real-world applications based on new techniques and theoretical approaches. This volume contains papers aimed at the multidimensional systems and signal processing, deep learning, mathematical approaches and the related applications. The related topics are multidimensional multi-component image processing; multidimensional image representation and super-resolution; compression of multidimensional spatio-temporal images; multidimensional image transmission systems; multidimensional signal processing; prediction and filtering of multidimensional process; intelligent multi-spectral and hyper-spectral image processing, intelligent multi-view image processing, 3D deep learning, 3D GIS and graphic database; data-based MD image retrieval and knowledge data mining; watermarking, hiding and encryption of

MD images; intelligent visualization of MD images; forensic analysis systems for M3D graphics algorithm; 3D VR (Virtual Reality)/AR (Augmented Reality); applications of multidimensional signal processing; applications of multidimensional systems; multidimensional filters and filter-banks.

*Evanescent Waves in Optics* - Mario Bertolotti  
2017-11-09

This monograph provides an introductory discussion of evanescent waves and plasmons, describes their properties and uses, and shows how they are fundamental when operating with nanoscale optics. Far field optics is not suitable for the design, description, and operation of devices at this nanometre scale. Instead one must work with models based on near-field optics and surface evanescent waves. The new discipline of plasmonics has grown to encompass the generation and application of plasmons both as a travelling excitation in a nanostructure and as a stationary enhancement of the electrical

field near metal nanosurfaces. The book begins with a brief review of the basic concepts of electromagnetism, then introduces evanescent waves through reflection and refraction, and shows how they appear in diffraction problems, before discussing the role that they play in optical waveguides and sensors. The application of evanescent waves in super-resolution devices is briefly presented, before plasmons are introduced. The surface plasmon polaritons (SPPs) are then treated, highlighting their potential applications also in ultra-compact circuitry. The book concludes with a discussion of the quantization of evanescent waves and quantum information processing. The book is intended for students and researchers who wish to enter the field or to have some insight into the matter. It is not a textbook but simply an introduction to more complete and in-depth discussions. The field of plasmonics has exploded in the last ten years, and most of the material treated in this book is scattered in

original or review papers. A short comprehensive treatment is missing; this book is intended to provide just that.

**Molecular Sensors and Nanodevices** - John X J Zhang 2013-12-03

With applications ranging from medical diagnostics to environmental monitoring, molecular sensors (also known as biosensors, chemical sensors, or chemosensors), along with emerging nanotechnologies offer not only valuable tools but also unlimited possibilities for engineers and scientists to explore the world. New generation of functional microsystems can be designed to provide a variety of small scale sensing, imaging and manipulation techniques to the fundamental building blocks of materials. This book provides comprehensive coverage of the current and emerging technologies of molecular sensing, explaining the principles of molecular sensor design and assessing the sensor types currently available. Having explained the basic sensor structures and

sensing principles, the authors proceed to explain the role of nano/micro fabrication techniques in molecular sensors, including MEMS, BioMEMS, MicroTAS among others. The miniaturization of versatile molecular sensors opens up a new design paradigm and a range of novel biotechnologies, which is illustrated through case studies of groundbreaking applications in the life sciences and elsewhere. As well as the techniques and devices themselves, the authors also cover the critical issues of implantability, biocompatibility and the regulatory framework. The book is aimed at a broad audience of engineering professionals, life scientists and students working in the multidisciplinary area of biomedical engineering. It explains essential principles of electrical, chemical, optical and mechanical engineering as well as biomedical science, intended for readers with a variety of scientific backgrounds. In addition, it will be valuable for medical professionals and researchers. An online tutorial

developed by the authors provides learning reinforcement for students and professionals alike. Reviews of state-of-the-art molecular sensors and nanotechnologies Explains principles of sensors and fundamental theories with homework problems at the end of each chapter to facilitate learning Demystifies the vertical integration from nanomaterials to devices design Covers practical applications the recent progress in state-of-the-art sensor technologies Includes case studies of important commercial products Covers the critical issues of implantability, biocompatibility and the regulatory framework

**The Photonic Hook** - Oleg V. Minin 2021-05-02 This book describes the recently-discovered artificially curved light beam known as the photonic hook. Self-bending of light, a long-time goal of optical scientists, was realized in 2007 with the Airy beam, followed by the first demonstration of the photonic hook by the authors of this book and their collaborators in

2015 and experimentally in 2019. The photonic hook has curvature less than the wavelength, along with other unique features described in this book that are not shared by Airy-like beams, and so deepens our understanding of light propagation. This book discusses the general principles of artificial near-field structured curved light and the full-wave simulations of the photonic hook along with their experimental confirmation. The book goes on to show how the photonic hook has implications for acoustic and surface plasmon waves and as well as applications in nanoparticle manipulation.

*Plasmonics* - Tatjana Gric 2018-11-21

Plasmonics gives researchers in universities and industries and designers an overview of phenomena enabled by artificially designed metamaterials and their application for plasmonic devices. The purpose of this book is to provide a detailed introduction to the basic modeling approaches and an overview of enabled innovative phenomena. The main

research agenda of this book is aimed at the study of modeling techniques and novel functionalities such as plasmonic enhancement of solar cell efficiency, plasmonics in sensing, etc. The topics addressed in this book cover the major strands: theory, modeling and design, applications in practical devices, fabrication, characterization, and measurement. It is worthwhile mentioning that the strategic objectives of developing new artificial functional materials require close cooperation of the research in each subarea.

Novel Optical Technologies for Nanofabrication - Qian Liu 2013-10-29

Novel Optical Technologies for Nanofabrication describes recent advances made in micro/nanofabrication with super-resolution laser technologies, which are based on the latest research findings in the authors' groups. It focuses on new techniques and methods as well as applications and development trends in laser nanofabrication, including super-resolution laser

direct writing, surface structures composed of laser path-guided wrinkle, three-dimensional laser nanofabrication based on two-photon absorption, and nanofabrication by laser interference and surface plasmon polaritons. This book serves as a reference for academic researchers, engineers, technical professionals and graduate students in the fields of micro/nanotechnology, thin film materials, super-resolution optics and laser techniques. Qian Liu is a Professor at Laboratory for Nanodevice, National Center for Nanoscience and Technology, China. Xuanming Duan is a Professor at the Key Laboratory of Functional Crystals and Laser Technology, Technical Institute of Physics and Chemistry, Chinese Academy of Sciences, China Changsi Peng is a Professor at the Institute of Information Optical Engineering, Soochow University, China.

*Two-Photon Polymerization and application to Surface Plasmon Polaritons* - Sven Passinger 2008

*Surface Plasmon Nanophotonics* - Mark L. Brongersma 2007-09-18

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.

**Nano-Optics** - Sabu Thomas 2020-07-06

Nano-Optics: Fundamentals, Experimental Methods, and Applications offers insights into the fundamentals and industrial applications of nanoscale light-emitting materials and their composites. This book serves as a reference, offering an overview of existing research, with a particular focus on industrial applications. Nano-optics is the branch of nanoscience and nanotechnology that deals with interaction of

light with nanoscale objects. This book explores the materials, structure, manufacturing techniques, and industrial applications of nano-optics. The applications discussed include healthcare, communication, astronomy, and satellites. Explains the major manufacturing techniques for light-emitting nanoscale materials  
Discusses how nanoscale optical materials are being used in a range of industrial applications  
Assesses the challenges of using nano-optics in a mass-production context

*Metamaterials and Wave Control* - Eric Lheurette 2013-12-04

Since the concept was first proposed at the end of the 20th Century, metamaterials have been the subject of much research and discussion throughout the wave community. More than 10 years later, the number of related published articles is increasing significantly. On the one hand, this success can be attributed to dreams of new physical objects which are the consequences of the singular properties of

metamaterials. Among them, we can consider the examples of perfect lensing and invisibility cloaking. On other hand, metamaterials also provide new tools for the design of well-known wave functions such as antennas for electromagnetic waves. The goal of this book is to propose an overview of the concept of metamaterials as a perspective on a new practical tool for wave study and engineering. This includes both the electromagnetic spectrum, from microwave to optics, and the field of acoustic waves. Contents 1. Overview of Microwave and Optical Metamaterial Technologies, Didier Lippens. 2. MetaLines: Transmission Line Approach for the Design of Metamaterial Devices, Bruno Sauviac. 3. Metamaterials for Non-Radiative Microwave Functions and Antennas, Divitha Seetharamdo and Bruno Sauviac. 4. Toward New Prospects for Electromagnetic Compatibility, Divitha Seetharamdo. 5. Dissipative Loss in Resonant Metamaterials, Philippe Tassin, Thomas

Koschny, and Costas M. Soukoulis. 6. Transformation Optics and Antennas, André de Lustrac, Shah Nawaz Burokur and Paul-Henri Tichit. 7. Metamaterials for Control of Surface Electromagnetic and Liquid Waves, Sébastien Guenneau, Mohamed Farhat, Muamer Kadic, Stefan Enoch and Romain Quidant. 8. Classical Analog of Electromagnetically Induced Transparency, Philippe Tassin, Thomas Koschny and Costas M. Soukoulis.

**Surface Plasmon Polaritons at Terahertz Frequencies on Metal and Semiconductor Surfaces** - Jörg Saxler 2006-01-06

Diploma Thesis from the year 2003 in the subject Electrotechnology, grade: 1.0, RWTH Aachen University (Institut für Halbleitertechnik), 46 entries in the bibliography, language: English, abstract: This thesis presents the first experimental study of the propagation characteristics and field distribution of surface plasmon polaritons (SPPs) at terahertz (THz) frequencies. A measurement

setup has been designed which allows the generation, demonstration and systematic investigation of SPPs at flat surfaces of various materials. In this chapter a general introduction is given which comprises the different concepts that are involved in the presented experiments. After giving a general introduction to electromagnetic interface excitations in section 1.1, a qualitative account of the SPP is found in 1.2. In section 1.3 we discuss the peculiarity of the THz frequency range in which experiments have been carried out, followed by the conceptual formulation of this thesis, including a short summary of the subsequent chapters (section 1.4).

Plasmonics and Plasmonic Metamaterials - G. Shvets 2012

Manipulation of plasmonics from nano to micro scale. 1. Introduction. 2. Form-Birefringent metal and its plasmonic anisotropy. 3. Plasmonic photonic crystal. 4. Fourier plasmonics. 5. Nanoscale optical field localization. 6.

Conclusions and outlook -- 11. Dielectric-loaded plasmonic waveguide components. 1. Introduction. 2. Design of waveguide dimensions. 3. Sample preparation and near-field characterization. 4. Excitation and propagation of guided modes. 5. Waveguide bends and splitters. 6. Coupling between waveguides. 7. Waveguide-ring resonators. 8. Bragg gratings. 9. Discussion-- 12. Manipulating nanoparticles and enhancing spectroscopy with surface plasmons. 1. Introduction. 2. Propulsion of gold nanoparticles with surface plasmon polaritons. 3. Double resonance substrates for surface-enhanced raman spectroscopy. 4. Conclusions and outlook -- 13. Analysis of light scattering by nanoobjects on a plane surface via discrete sources method. 1. Introduction. 2. Light scattering by a nanorod. 3. Light scattering by a nanoshell. 4. Summary -- 14. Computational techniques for plasmonic antennas and waveguides. 1. Introduction. 2. Time domain solvers. 3. Frequency domain

solvers. 4. Plasmonic antennas. 5. Plasmonic waveguides. 6. Advanced structures. 7.

Conclusions

*2021 International Conference on Applications and Techniques in Cyber Intelligence* - Jemal Abawajy 2021-06-23

This book presents innovative ideas, cutting-edge findings, and novel techniques, methods, and applications in a broad range of cybersecurity and cyberthreat intelligence areas. As our society becomes smarter, there is a corresponding need to secure our cyberfuture. The book describes approaches and findings that are of interest to business professionals and governments seeking to secure our data and underpin infrastructures, as well as to individual users.

**Manipulation of Near Field Propagation and Far Field Radiation of Surface Plasmon Polariton** - Lin Li 2017-05-29

This book mainly focuses on the study of steering electromagnetic fields in near-field and

far-field contexts involving plasmonic structures. It also offers a new approach to achieving full control of optical polarizations and potentially boosting the development in photonic information processing. A new in-plane phase modulation method is proposed and described, by means of which a series of optical beams were realized with nanostructures in metal surfaces, such as a plasmonic Airy beam, broad band focusing beam, and demultiplexing, collimated beam, as well as an optical orbital angular momentum (OAM) beam. Further, the book presents a plasmonic polarization generator, which can reconfigure an input polarization to all kinds of states simultaneously.

21st Century Nanoscience - Klaus D. Sattler  
2021-11-05

This 21st Century Nanoscience Handbook will be the most comprehensive, up-to-date large reference work for the field of nanoscience. Handbook of Nanophysics, by the same editor, published in the fall of 2010, was embraced as

the first comprehensive reference to consider both fundamental and applied aspects of nanophysics. This follow-up project has been conceived as a necessary expansion and full update that considers the significant advances made in the field since 2010. It goes well beyond the physics as warranted by recent developments in the field. Key Features: Provides the most comprehensive, up-to-date large reference work for the field. Chapters written by international experts in the field. Emphasises presentation and real results and applications. This handbook distinguishes itself from other works by its breadth of coverage, readability and timely topics. The intended readership is very broad, from students and instructors to engineers, physicists, chemists, biologists, biomedical researchers, industry professionals, governmental scientists, and others whose work is impacted by nanotechnology. It will be an indispensable resource in academic, government, and industry

libraries worldwide. The fields impacted by nanoscience extend from materials science and engineering to biotechnology, biomedical engineering, medicine, electrical engineering, pharmaceutical science, computer technology, aerospace engineering, mechanical engineering, food science, and beyond.

### **Optical Guided-wave Chemical and**

**Biosensors I** - Mohammed Zourob 2010-03-18

For the first time, distinguished scientists from key institutions worldwide provide a comprehensive approach to optical sensing techniques employing the phenomenon of guided wave propagation for chemical and biosensors. This includes both state-of-the-art fundamentals and innovative applications of these techniques. The authors present a deep analysis of their particular subjects in a way to address the needs of novice researchers such as graduate students and post-doctoral scholars as well as of established researchers seeking new avenues. Researchers and practitioners who need a solid

foundation or reference will find this work invaluable. This first of two volumes contains eight chapters covering planar waveguides for sensing, as well as sensing techniques based on plasmonic waveguides.

**Frontiers in Electronics** - Sorin Cristoloveanu 2013

Frontiers in Electronics is divided into four sections: advanced terahertz and photonics devices; silicon and germanium on insulator and advanced CMOS and MOSFETs; nanomaterials and nanodevices; and wide band gap technology for high power and UV photonics. This book will be useful for nano-microelectronics scientists, engineers, and visionary research leaders. It is also recommended to graduate students working at the frontiers of the nanoelectronics and microscience.

Plasmonics: Fundamentals and Applications -

Stefan Alexander Maier 2007-05-16

Considered a major field of photonics, plasmonics offers the potential to confine and

guide light below the diffraction limit and promises a new generation of highly miniaturized photonic devices. This book combines a comprehensive introduction with an extensive overview of the current state of the art. Coverage includes plasmon waveguides, cavities for field-enhancement, nonlinear processes and the emerging field of active plasmonics studying interactions of surface plasmons with active media.

*Semiconductor Nanophotonics* - Prasanta Kumar Basu 2022

Nanometre sized structures made of semiconductors, insulators, and metals and grown by modern growth technologies or by chemical synthesis exhibit novel electronic and optical phenomena due to the confinement of electrons and photons. Strong interactions between electrons and photons in narrow regions lead to inhibited spontaneous emission, thresholdless laser operation, and Bose-Einstein condensation of exciton-polaritons in

microcavities. Generation of sub-wavelength radiation by surface plasmon-polaritons at metal-semiconductor interfaces, creation of photonic band gaps in dielectrics, and realization of nanometer sized semiconductor or insulator structures with negative permittivity and permeability, known as metamaterials, are further examples in the area of Nanophotonics. The studies help develop spasers and plasmonic nanolasers of subwavelength dimensions, paving the way to use plasmonics in future data centres and high-speed computers working at THz bandwidth with less than a few fJ/bit dissipation. The present book is aimed at graduate students and researchers providing them with an introductory textbook on Semiconductor Nanophotonics. It gives an introduction to electron-photon interactions in Quantum Wells, Wires, and Dots and then discusses the processes in microcavities, photonic band gap materials, metamaterials, and related applications. The phenomena and device

applications under strong light-matter interactions are discussed, mostly by using classical and semi-classical theories. Numerous examples and problems accompany each chapter.

*Near-Field Optics and Surface Plasmon Polaritons* - Satoshi Kawata 2003-07-01

Covers not only near-field optical microscopy but also wider fields such as local spectroscopy, nano-scale optical processing, quantum near-field optics, and atom manipulation.

*Acoustic Metamaterials* - Richard V. Craster 2012-12-06

About the book: This book is the first comprehensive review on acoustic metamaterials; novel materials which can manipulate sound waves in surprising ways, which include collimation, focusing, cloaking, sonic screening and extraordinary transmission. It covers both experimental and theoretical aspects of acoustic and elastic waves propagating in structured composites, with a

focus on effective properties associated with negative refraction, lensing and cloaking. Most related books in the field address electromagnetic metamaterials and focus on numerical methods, and little (or no) experimental section. Each chapter will be authored by an acknowledged expert, amongst the topics covered will be experimental results on non-destructive imaging, cloaking by surface water waves, flexural waves in thin plates. Applications in medical ultrasound imaging and modeling of metamaterials will be emphasized too. The book can serve as a reference for researchers who wish to build a solid foundation of wave propagation in this class of novel materials.

**21st Century Nanoscience - A Handbook** - Klaus D. Sattler 2020-11-26

21st Century Nanoscience - A Handbook: Nanophotonics, Nanoelectronics, and Nanoplasmonics (Volume 6) will be the most comprehensive, up-to-date large reference work

for the field of nanoscience. Handbook of Nanophysics by the same editor published in the fall of 2010 and was embraced as the first comprehensive reference to consider both fundamental and applied aspects of nanophysics. This follow-up project has been conceived as a necessary expansion and full update that considers the significant advances made in the field since 2010. It goes well beyond the physics as warranted by recent developments in the field. This sixth volume in a ten-volume set covers nanophotonics, nanoelectronics, and nanoplasmonics. Key Features: Provides the most comprehensive, up-to-date large reference work for the field. Chapters written by international experts in the field. Emphasises presentation and real results and applications. This handbook distinguishes itself from other works by its breadth of coverage, readability and timely topics. The intended readership is very broad, from students and instructors to engineers, physicists, chemists, biologists,

biomedical researchers, industry professionals, governmental scientists, and others whose work is impacted by nanotechnology. It will be an indispensable resource in academic, government, and industry libraries worldwide. The fields impacted by nanophysics extend from materials science and engineering to biotechnology, biomedical engineering, medicine, electrical engineering, pharmaceutical science, computer technology, aerospace engineering, mechanical engineering, food science, and beyond.

Surface Plasmon Enhanced, Coupled and Controlled Fluorescence - Chris D. Geddes

2017-03-14

Explains the principles and current thinking behind plasmon enhanced Fluorescence  
Describes the current developments in Surface Plasmon Enhanced, Coupled and Controlled Fluorescence  
Details methods used to understand solar energy conversion, detect and quantify DNA more quickly and accurately, and

enhance the timeliness and accuracy of digital immunoassays Contains contributions by the world's leading scientists in the area of fluorescence and plasmonics Describes detailed experimental procedures for developing both surfaces and nanoparticles for applications in metal-enhanced fluorescence

**Spoof Surface Plasmon Polaritons Antenna** - Junping Geng 2021-09-30

This book investigates in detail some new spoof surface plasmon polaritons (SSPPs) structures and their applications to antenna. It introduces the working principle and radiation characteristics of directional antenna, omnidirectional antenna, reconfigurable antenna and phase-mode antenna based on SSPPs structure. Especially, the irregular SSPPs structure, such as T-shaped and m-shaped SSPPs structures, is introduced to low-profile end-fire antenna with vertical polarization; the rotated SSPPs structure is applied to CP end-fire antenna and omnidirectional antenna; PIN

circuit combining with SSPPs structure is used to pattern reconfigurable antenna; the novel phase-mode SSPPs antennas with multi-modes are performed too. This book proposes a continuous method to develop the potentialities of the SSPPs antenna. And the readers can study the method or ideas of the SSPPs antenna, even graft the methods to other SSPPs antenna. The book is intended for undergraduate and graduate students who are interested in SSPPs antenna technology, researchers investigating high-performance antenna, and antenna design engineers working on multi-function antenna applications.

**Data Storage at the Nanoscale** - Gan Fuxi 2015-02-09

In the big data era, data storage is one of the cores in the whole information chain, which includes production, transfer, sharing, and finally processing. Over the years, the growth of data volume has been explosive. Today, various storage services need memories with higher

density and capacity. Moreover, information storage in the big data applic

**Sensors** - Francesco Baldini 2013-07-30

This book contains a selection of papers presented at the First National Conference on Sensors held in Rome 15-17 February 2011. The conference highlighted state-of-the-art results from both theoretical and applied research in the field of sensors and related technologies.

This book presents material in an interdisciplinary approach, covering many aspects of the disciplines related to sensors, including physics, chemistry, materials science, biology and applications. · Provides a selection of the best papers from the First Italian National Conference on Sensors; · Covers a broad range of topics relating to sensors and microsystems, including physics, chemistry, materials science, biology and applications; · Offers interdisciplinary coverage, aimed at defining a common ground for sensors beyond the specific differences among the different particular

implementation of sensors.

*Artificial Intelligence and Soft Computing* -

Leszek Rutkowski 2014-05-22

The two-volume set LNAI 8467 and LNAI 8468 constitutes the refereed proceedings of the 13th International Conference on Artificial Intelligence and Soft Computing, ICAISC 2014, held in Zakopane, Poland in June 2014. The 139 revised full papers presented in the volumes, were carefully reviewed and selected from 331 submissions. The 69 papers included in the first volume are focused on the following topical sections: Neural Networks and Their Applications, Fuzzy Systems and Their Applications, Evolutionary Algorithms and Their Applications, Classification and Estimation, Computer Vision, Image and Speech Analysis and Special Session 3: Intelligent Methods in Databases. The 71 papers in the second volume are organized in the following subjects: Data Mining, Bioinformatics, Biometrics and Medical Applications, Agent Systems, Robotics and

Control, Artificial Intelligence in Modeling and Simulation, Various Problems of Artificial Intelligence, Special Session 2: Machine Learning for Visual Information Analysis and Security, Special Session 1: Applications and Properties of Fuzzy Reasoning and Calculus and Clustering.

*Recent Progress in Surface Electromagnetic Modes* - Lin Chen 2021-07-08

**Modern Plasmonics** - Alexei A. Maradudin  
2014-09-10

Plasmonics is entering the curriculum of many universities, either as a stand alone subject, or as part of some course or courses.

Nanotechnology institutes have been, and are being, established in universities, in which plasmonics is a significant topic of research. Modern Plasmonics book offers a comprehensive presentation of the properties of surface plasmon polaritons, in systems of different structures and various natures, e.g. active,

nonlinear, graded, theoretical/computational and experimental techniques for studying them, and their use in a variety of applications. Contains material not found in existing books on plasmonics, including basic properties of these surface waves, theoretical/computational and experimental approaches, and new applications of them. Each chapter is written by an expert in the subject to which it is devoted. Emphasis on applications of plasmonics that have been realized, not just predicted or proposed.

*Active and Passive Plasmonic Devices for Optical Communications* - Melikyan, Argishti 2018-02-14

**Plasmonic Nanoguides and Circuits** - Sergey Bozhevolnyi 2019-05-08

In this book, the authors concentrate on the surface Plasmon (SP) waveguide configurations ensuring nanoscale confinement and review the current status of this rapidly emerging field, considering different configurations being developed for nanoscale plasmonic guides and

circuits. Both fundamental physics and application aspects of plasmonics are reviewed in detail by the world's leading experts. A unique feature of this book is its strong focus on a particular subfield of plasmonics dealing with subwavelength (nanoscale) waveguiding, an area which is especially important in view of the explosively growing interest in plasmonic interconnects and nanocircuits.

**Handbook of Terahertz Technology for Imaging, Sensing and Communications** - D Saeedkia 2013-01-16

The recent development of easy-to-use sources and detectors of terahertz radiation has enabled growth in applications of terahertz (THz) imaging and sensing. This vastly adaptable technology offers great potential across a wide range of areas, and the Handbook of terahertz technology for imaging, sensing and communications explores the fundamental principles, important developments and key applications emerging in this exciting field. Part one provides an

authoritative introduction to the fundamentals of terahertz technology for imaging, sensing and communications. The generation, detection and emission of waves are discussed alongside fundamental aspects of surface plasmon polaritons, terahertz near-field imaging and sensing, room temperature terahertz detectors and terahertz wireless communications. Part two goes on to discuss recent progress and such novel techniques in terahertz technology as terahertz bio-sensing, array imagers, and resonant field enhancement of terahertz waves. Fiber-coupled time-domain spectroscopy systems (THz-TDS), terahertz photomixer systems, terahertz nanotechnology, frequency metrology and semiconductor material development for terahertz applications are all reviewed. Finally, applications of terahertz technology are explored in part three, including applications in tomographic imaging and material spectroscopy, art conservation, and the aerospace, wood products, semiconductor and

pharmaceutical industries. With its distinguished editor and international team of expert contributors, the Handbook of terahertz technology for imaging, sensing and communications is an authoritative guide to the field for laser engineers, manufacturers of sensing devices and imaging equipment, security companies, the military, professionals working in process monitoring, and academics interested in this field. Examines techniques for the generation and detection of terahertz waves  
Discusses material development for terahertz applications  
Explores applications in tomographic imaging, art conservation and the pharmaceutical and aerospace industries  
*Integrated Nanophotonic Devices* - Zeev Zalevsky 2014-06-18  
Nanophotonics is a newly developing and exciting field, with two main areas of interest: imaging/computer vision and data transport. The technologies developed in the field of nanophotonics have far reaching implications

with a wide range of potential applications from faster computing power to medical applications, and "smart" eyeglasses to national security. *Integrated Nanophotonic Devices* explores one of the key technologies emerging within nanophotonics: that of nano-integrated photonic modulation devices and sensors. The authors introduce the scientific principles of these devices and provide a practical, applications-based approach to recent developments in the design, fabrication and experimentation of integrated photonic modulation circuits. For this second edition, all chapters have been expanded and updated to reflect this rapidly advancing field, and an entirely new chapter has been added to cover liquid crystals integrated with nanostructures. Unlocks the technologies that will turn the rapidly growing research area of nanophotonics into a major area of commercial development, with applications in telecommunications, computing, security, and sensing  
Nano-integrated photonic modulation

devices and sensors are the components that will see nanophotonics moving out of the lab into a new generation of products and services. By covering the scientific fundamentals alongside technological applications, the authors open up this important multidisciplinary subject to readers from a range of scientific backgrounds.

**Proceedings of the 8th International Multidisciplinary Conference on Optofluidics (IMCO 2018)** - Lei Xu 2021-02-08

This book is a compilation of selected papers from the 8th International Multidisciplinary Conference on Optofluidics (IMCO 2018) held in Shanghai on August 5-8, 2018, as well as papers from the IMCO 2019 held in Hong Kong on June 14-17, 2019. The work focuses on the current development in the fields of optofluidics, microfluidics, silicon photonics, optical metamaterials and other related areas. Readers from both academia and industry will benefit from the experts' opinion and the latest development in the multidisciplinary field of

optofluidics.

Principles of Surface-Enhanced Raman Spectroscopy - Eric Le Ru 2008-11-17

SERS was discovered in the 1970s and has since grown enormously in breadth, depth, and understanding. One of the major characteristics of SERS is its interdisciplinary nature: it lies at the boundary between physics, chemistry, colloid science, plasmonics, nanotechnology, and biology. By their very nature, it is impossible to find a textbook that will summarize the principles needed for SERS of these rather dissimilar and disconnected topics. Although a basic understanding of these topics is necessary for research projects in SERS with all its many aspects and applications, they are seldom touched upon as a coherent unit during most undergraduate studies in physics or chemistry. This book intends to fill this existing gap in the literature. It provides an overview of the underlying principles of SERS, from the fundamental understanding of the effect to its

potential applications. It is aimed primarily at newcomers to the field, graduate students, researchers or scientists, attracted by the many applications of SERS and plasmonics or its basic science. The emphasis is on concepts and background material for SERS, such as Raman spectroscopy, the physics of plasmons, or colloid science, all of them introduced within the context of SERS, and from where the more specialized literature can be followed.

Represents one of very few books fully dedicated to the topic of surface-enhanced Raman spectroscopy (SERS) Gives a comprehensive summary of the underlying physical concepts around SERS Provides a detailed analysis of plasmons and plasmonics

*Introduction to Plasmonics* - Sabine Szunerits  
2015-03-24

Plasmonics is a highly dynamic field, and a number of researchers and scientists from other disciplines have become involved in it. This book presents the most widely employed approaches

to plasmonics and the numerous applications associated with it. There are several underlying elements in plasmonics research. Advances in nanoscience and nanotechnology have made possible the fabrication of plasmonic nanostructures, deposition of thin films, and development of highly sensitive optical characterization techniques. The different approaches to nanostructuring metals have led to a wealth of interesting optical properties and functionality via manipulation of the plasmon modes that such structures support. The sensitivity of plasmonic structures to the changes in their local dielectric environment has led to the development of new sensing strategies and systems for chemical analysis and identification. The book discusses all of these aspects.

**Reviews in Plasmonics 2015** - Chris D. Geddes  
2016-01-22

Reviews in Plasmonics 2015, the second volume of the new book series from Springer, serves as

a comprehensive collection of current trends and emerging hot topics in the field of Plasmonics and closely related disciplines. It summarizes the year's progress in surface plasmon phenomena and its applications, with authoritative analytical reviews in sufficient detail to be attractive to professional researchers, yet also appealing to the wider audience of scientists in related disciplines of Plasmonics. Reviews in Plasmonics offers an essential source of reference material for any lab working in the Plasmonics field and related areas. All academics, bench scientists, and industry professionals wishing to take advantage of the latest and greatest in the continuously emerging field of Plasmonics will find it an invaluable resource.

**Nanophotonics with Surface Plasmons -**  
2006-12-18

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

Active Plasmonics and Tuneable Plasmonic Metamaterials - Anatoly V. Zayats 2013-05-22

This book, edited by two of the most respected researchers in plasmonics, gives an overview of

the current state in plasmonics and plasmonic-based metamaterials, with an emphasis on active functionalities and an eye to future developments. This book is multifunctional, useful for newcomers and scientists interested in applications of plasmonics and metamaterials as well as for established researchers in this multidisciplinary area.