Optical Waves In Crystals Propagation And Control Of Laser Radiation Wiley Series In Pure And Appl

#optical waves #crystal optics #laser radiation #light propagation #applied physics

This resource provides an in-depth exploration of optical waves within crystalline structures, focusing on their propagation characteristics and advanced methods for controlling laser radiation. It's an essential reference for researchers and students in pure and applied physics, offering critical insights into the manipulation of light for cutting-edge technologies.

Each file is designed to support effective teaching and structured learning.

Optical Waves in Crystals

Describes how laser radiation propagates in natural and artificial materials and how the state of radiation can be controlled and manipulated (phase intensity, polarization) by various means. New concepts and useful techniques are described in the problems. Includes many figures, tables, and examples.

Optical Waves in Crystals

As most crystals are generated by crystals, the interaction between light and crystals is vital to the success of any optics-related endevour. This paperback reprint provides a new generation of engineers and physicists with the fundamental knowledge needed to study this complex interaction.

Progress in Optics

In the forty-eight years that have gone by since the first volume of Progress in Optics was published, optics has become one of the most dynamic fields of science. The volumes in this series which have appeared up to now contain more than 300 review articles by distinguished research workers, which have become permanent records for many important developments. 3D optical microscopy Transformation optics and geometry of light Photorefractive solitons Stimulated scattering effects Optical vortices and polarization singularities Quantum feedforward control of light

Development of an AOTF-based Hyperspectral Imager for Atmospheric Remote Sensing

This work addresses important aspects in the development of a new spaceborne instrument called ALTIUS. The imaging capability is first applied to the inversion of atmospheric pressure profiles from the analysis of the apparent flattening of a setting...

Progress in Computational Physics (PiCP)

Progress in Computational Physics is a new e-book series devoted to recent research trends in computational physics. It contains chapters contributed by outstanding experts of modeling of physical problems. The series focuses on interdisciplinary computat

Handbook of Nanoscience, Engineering, and Technology

In his 1959 address, "There is Plenty of Room at the Bottom," Richard P. Feynman speculated about manipulating materials atom by atom and challenged the technical community "to find ways of manipulating and controlling things on a small scale." This visionary challenge has now become a reality, with recent advances enabling atomistic-level tailoring and control of materials. Exemplifying Feynman’s vision, Handbook of Nanoscience, Engineering, and Technology, Third Edition continues to explore innovative nanoscience, engineering, and technology areas. Along with updating all chapters, this third edition extends the coverage of emerging nano areas even further. Two entirely new sections on energy and biology cover nanomaterials for energy storage devices, photovoltaics, DNA devices and assembly, digital microfluidic lab-on-a-chip, and much more. This edition also includes new chapters on nanomagnet logic, quantum transport at the nanoscale, terahertz emission from Bloch oscillator systems, molecular logic, electronic optics in graphene, and electromagnetic metamaterials. With contributions from top scientists and researchers from around the globe, this color handbook presents a unified, up-to-date account of the most promising technologies and developments in the nano field. It sets the stage for the next revolution of nanoscale manufacturing—where scalable technologies are used to manufacture large numbers of devices with complex functionalities.

Laser Systems for Applications

This book addresses topics related to various laser systems intended for the applications in science and various industries. Some of them are very recent achievements in laser physics (e.g. laser pulse cleaning), while others face their renaissance in industrial applications (e.g. CO2 lasers). This book has been divided into four different sections: (1) Laser and terahertz sources, (2) Laser beam manipulation, (3) Intense pulse propagation phenomena, and (4) Metrology. The book addresses such topics like: Q-switching, mode-locking, various laser systems, terahertz source driven by lasers, micro-lasers, fiber lasers, pulse and beam shaping techniques, pulse contrast metrology, and improvement techniques. This book is a great starting point for newcomers to laser physics.

Lasers

The MRS Symposium Proceeding series is an internationally recognised reference suitable for researchers and practitioners.

Artificially Induced Grain Alignment in Thin Films: Volume 1150

Understanding, controlling and, more importantly, enhancing the interaction between light (photons) and spin waves (magnons) can be, among others, a step towards the realization of magnon-mediated microwave-to-optical transducers for quantum computing applications or hybrid solid-state spintronic-photonic interconnections. In this respect, the development of novel composite multifunctional micro/nanostructures — so-called optomagnonic — which simultaneously control optical and spin waves and enhance their interaction, is particularly attractive.This book constitutes a collective work, comprising seven chapters from leading researchers in the field of optomagnonics and related areas. Apart from exciting recent developments, it provides the necessary fundamental knowledge in an explanatory manner and, therefore, it is accessible to non-experts. It is suitable for PhD students, post-docs, and researchers who are willing to get engaged in optomagnonics, while selected parts could also serve as lecture material for advanced courses. With increasing demand for miniaturized optomagnonic devices, this book will be an important resource to researchers working on optomagnonics, magneto-optics, spintronics, as well as on hybrid micro/nano devices for information processing.

Guide to Reprints

The five-volume set may serve as a comprehensive reference on electromagnetic analysis and its applications at all frequencies, from static fields to optics and photonics. The material includes micro- and nanomagnetics, the new generation of electric machines, renewable energy, hybrid vehicles, low-noise motors; antennas and microwave devices, plasmonics, metamaterials, lasers, and

more.Written at a level accessible to both graduate students and engineers, Electromagnetic Analysis is a comprehensive reference, covering methods and applications at all frequencies (from statics to optical). Each volume contains pedagogical/tutorial material of high archival value as well as chapters on state-of-the-art developments.

Scientific and Technical Books and Serials in Print

Optical computers and photonic integrated circuits in high capacity optical networks are hot topics, attracting the attention of expert researchers and commercial technology companies. Optical packet switching and routing technologies promise to provide a more efficient source of power, and footprint scaling with increased router capacity; integrating more optical processing elements into the same chip to increase on-chip processing capability and system intelligence has become a priority. This book is an in-depth look at modelling techniques and the simulation of a wide range of liquid crystal based modern photonic devices with enhanced high levels of flexible integration and enhanced power processing. It covers the physics of liquid crystal materials; techniques required for modelling liquid crystal based devices; the state-of-the art liquid crystal photonic based applications for telecommunications such as couplers, polarization rotators, polarization splitters and multiplexer-demultiplexers; liquid core photonic crystal fiber (LC-PCF) sensors including biomedical and temperature sensors; and liquid crystal photonic crystal based encryption systems for security applications. Key features Offers a unique source of in-depth learning on the fundamental principles of computational liquid crystal photonics. Explains complex concepts such as photonic crystals, liquid crystals, waveguides and modes, and frequency- and time-domain techniques used in the design of liquid crystal photonic crystal photonic devices in terms that are easy to understand. Demonstrates the useful properties of liquid crystals in a diverse and ever-growing list of technological applications. Requires only a foundational knowledge of mathematics and physics.

Optomagnonic Structures: Novel Architectures For Simultaneous Control Of Light And Spin Waves

An important guide to the major techniques for generating coherent light in the mid-infrared region of the spectrum Laser-based Mid-infrared Sources and Applications gives a comprehensive overview of the existing methods for generating coherent light in the important yet difficult-to-reach mid-infrared region of the spectrum (2–20 μm) and their applications. The book describes major approaches for mid-infrared light generation including ion-doped solid-state lasers, fiber lasers, semiconductor lasers, and laser sources based on nonlinear optical frequency conversion, and reviews a range of applications: spectral recognition of molecules and trace gas sensing, biomedical and military applications, high-field physics and attoscience, and others. Every chapter starts with the fundamentals for a given technique that enables self-directed study, while extensive references help conduct deeper research. Laser-based Mid-infrared Sources and Applications provides up-to-date information on the state-of the art mid-infrared sources, discusses in detail the advancements made over the last two decades such as microresonators and interband cascade lasers, and explores novel approaches that are currently subjects of intense research such as supercontinuum and frequency combs generation. This important book: • Explains the fundamental principles and major techniques for coherent mid-infrared light generation • Discusses recent advancements and current cutting-edge research in the field • Highlights important biomedical, environmental, and military applications Written for researchers, academics, students, and engineers from different disciplines, the book helps navigate the rapidly expanding field of mid-infrared laser-based technologies.

Japanese Journal of Applied Physics

Applications of semiconductor lasers with optical feedback systems are driving rapid developments in theoretical and experimental research. The very broad wavelength-gain-bandwidth of semiconductor lasers combined with frequency-filtered, strong optical feedback create the tunable, single frequency laser systems utilised in telecommunications, environmental sensing, measurement and control. Those with weak to moderate optical feedback lead to the chaotic semiconductor lasers of private communication. This resource illustrates the diversity of dynamic laser states and the technological applications thereof, presenting a timely synthesis of current findings, and providing the roadmap for exploiting their future potential. * Provides theory-based explanations underpinned by a vast range of experimental studies on optical feedback, including conventional, phase conjugate and frequency-filtered feedback in standard, commercial and single-stripe semiconductor lasers * Includes the classic Lang-Kobayashi equation model, through to more recent theory, with new developments in techniques

for solving delay differential equations and bifurcation analysis * Explores developments in self-mixing interferometry to produce sub-nanometre sensitivity in path-length measurements * Reviews tunable single frequency semiconductor lasers and systems and their diverse range of applications in sensing and optical communications * Emphasises the importance of synchronised chaotic semiconductor lasers using optical feedback and private communications systems Unlocking Dynamical Diversity illustrates all theory using real world examples gleaned from international cutting-edge research. Such an approach appeals to industry professionals working in semiconductor lasers, laser physics and laser applications and is essential reading for researchers and postgraduates in these fields.

Guide to Reprints

Providing an interdisciplinary approach to plasma engineering and techniques, the book contains a timely examination of the physics of laser-induced breakdown.

JJAP

Vols. for 1980- issued in three parts: Series, Authors, and Titles.

Compendium On Electromagnetic Analysis - From Electrostatics To Photonics: Fundamentals And Applications For Physicists And Engineers (In 5 Volumes)

Renewed interest in laser communication systems has sparked development of useful new analytic models. This book discusses optical scintillation and its impact on system performance in free-space optical communication and laser radar applications, with a detailed look at propagation phenomena and the role of scintillation on system behavior. Intended for practicing engineers, scientists, and students.

Forthcoming Books

Recent years have witnessed rapid advances in the development of solid state, fiber, semiconductor, and parametric sources of coherent radiation, which are opening up new opportunities for laser applications. Laser Sources and Applications provides a tutorial introduction to the basic principles of these developments at a level suitable for postgraduate research students and others with a basic knowledge of lasers and nonlinear optics. Encompassing both the physics and engineering aspects of the field, the book covers the nature of nonlinear optical interactions; solid state, fiber, and semiconductor lasers; optical parametric oscillators; and ultrashort pulse generation and applications. It also explores applications of current interest, such as electromagnetically induced transparency, atomic trapping, and soliton optical communications.

British Books in Print

This book explains the principles of laser beam interactions applied to the recording, readout, and processing of information-carrying optical waves. It treats both quantitatively and qualitatively the specific effects that appear due to the fine-scale speckle structure of the spatial profile of a laser-originated wave. The basics of the nature, physics, and properties of the speckle fields, as well as the fundamentals of holography and nonlinear optics, are discussed.

Computational Liquid Crystal Photonics

Soft X-rays have great potential for use in a wide variety of applications, including the semiconductor industry and the life sciences. X-Rays from Laser Plasmas: Generation and Applications focuses exclusively and in detail on the science and technology of soft X-rays produced with non-synchrotron sources. Using a minimum of mathematical formulae, it discusses how such X-rays can be efficiently and economically generated from plasmas produced by lasers, and how they interact with matter. Authored by Dr Edmond Turcu, one of the pioneers in this field, X-Rays from Laser Plasmas: Generation and Applications will be of great interest to a wide variety of readers, including all those working in X-ray lithography, microscopy, and radiobiology.

Whitaker's Books in Print

This volume contains the lectures and seminars presented at the NATO Advanced Study Institute on "Physics of New Laser Sources\

Lasers Generation of Light by Stimulated Emission

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

The British National Bibliography

Liquid Crystals