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Springer Handbook of Atomic, Molecular, and Optical Physics
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Optique, mécanique des fluides, ondes et thermodynamique

MOHAMMED GLOVER

Instrumentation et structures atomiques Springer Science & Business Media
This book presents an overview of both the theory and experimental methods required to realize high efficiency solar absorber devices. It begins with a historical description of the study of spectrally selective solar absorber materials and structures based on optical principles and methods developed over the past few decades. The optical properties of metals and dielectric materials are addressed to provide the background necessary to achieve high performance of the solar absorber devices as applied in the solar energy field. In the following sections, different types of materials and structures, together with the relevant experimental methods, are discussed for practical construction and fabrication of the solar absorber devices, aiming to maximally harvest the solar energy while at the same time effectively suppressing the heat-emission loss. The optical principles and methods used to evaluate the performance of solar absorber devices with broad applications in different physical conditions are presented. The book is suitable for graduate students in applied physics, and provides a valuable reference for researchers working actively in the field of solar energy.
Springer
In recent years there has been a tremendous growth in the use of

vibrational spectroscopic methods for diagnosis and screening. These applications range from diagnosis of disease states in humans, such as cancer, to rapid identification and screening of microorganisms. The growth in such types of studies has been possible thanks to advances in instrumentation and associated computational and mathematical tools for data processing and analysis. This volume of Advances in Biomedical Spectroscopy contains chapters from leading experts who discuss the latest advances in the application of Fourier transform infrared (FTIR), Near infrared (NIR), Terahertz and Raman spectroscopy for diagnosis and screening in fields ranging from medicine, dentistry, forensics and aquatic science. Many of the chapters provide information on sample preparation, data acquisition and data interpretation that would be particularly valuable for new users of these techniques including established scientists and graduate students in both academia and industry.

Springer Handbook of Atomic, Molecular, and Optical Physics

Springer Science & Business Media

Provides fully updated coverage of new experiments in quantum optics This fully revised and expanded edition of a well-established textbook on experiments on quantum optics covers new concepts, results, procedures, and developments in state-of-the-art experiments. It starts with the basic building blocks and ideas of quantum optics, then moves on to detailed procedures and new techniques for each experiment. Focusing on metrology, communications, and quantum logic, this new edition also places more emphasis on single photon technology and hybrid detection. In addition, it offers end-of-chapter summaries and full problem sets throughout. Beginning with an introduction to the subject, A Guide to Experiments in Quantum Optics, 3rd Edition presents readers with chapters on classical models of light, photons, quantum models of light, as well as basic optical components. It goes on to give readers full coverage of lasers and amplifiers, and examines numerous photodetection techniques being used today. Other chapters examine quantum noise, squeezing experiments, the application of squeezed light, and fundamental tests of quantum mechanics. The book finishes with a section on quantum information before summarizing of the contents and offering an outlook on the future of the field. -Provides all new updates to the field of quantum optics, covering the building blocks, models and concepts, latest results, detailed procedures, and modern experiments -Places emphasis on three major goals: metrology, communications, and quantum logic -Presents fundamental tests of quantum mechanics (Schrodinger Kitten, multimode entanglement, photon systems as quantum emulators), and introduces the density function -Includes new trends and technologies in quantum optics and photodetection, new results in sensing and metrology, and more coverage of quantum gates and logic, cluster states, waveguides for multimodes, discord and other quantum measures, and quantum control -Offers end of chapter summaries and problem sets as new features A Guide to Experiments in Quantum Optics, 3rd Edition is an ideal book for professionals, and graduate and upper level students in physics and engineering science.

Comparative Aeronomy De Boeck Supérieur

For beginners and specialists in other fields: the Nobel Laureate's introduction to atomic spectra and their relationship to atomic structures, stressing basics in a physical, rather than mathematical, treatment. 80 illustrations.

Astronomical Spectroscopy for Amateurs Springer-Verlag

Principles and Clinical Diagnostic Applications of Surface-Enhanced Raman Spectroscopy summarizes the principles of surface-enhanced Raman scattering/spectroscopy (SERS) and plasmonic nanomaterials for SERS, with a focus on SERS applications in clinical diagnostics. This book covers the key concepts from the fundamentals, materials, experimental aspects, and applications of SERS in clinical diagnostics with discussions on label-free/direct SERS assay, design and synthesis of SERS nanotags, SERS nanotags for point-of-care diagnostics, microfluidic SERS assay, and in vitro and in vivo sensing and imaging. Written by experts from around the world, this comprehensive volume showcases the recent progress of SERS applications in clinical diagnostics and helps readers understand when and how to use SERS in a clinical setting. Introduces the basics of SERS and suitable nanomaterials for SERS application Gives an overview of the cutting-edge research on SERS applications for clinical diagnosis, including the latest advances in our understanding of underlying principles to enable material design and clinical applications Gradually builds from the fundamental concepts to the applications of SERS for clinical diagnostics

Switching Arc Phenomena in Transmission Voltage Level Vacuum Circuit Breakers Elsevier

Cet ouvrage propose des expériences dans différents domaines de la physique, réalisées en laboratoire d'enseignement. Les auteurs ont souhaité adopter une présentation qui insiste sur les différentes étapes de la démarche expérimentale : modélisation du phénomène étudié, construction argumentée du protocole expérimental, interprétation et analyse critique des résultats obtenus et des écarts à la modélisation. Ce choix facilite une prise en main rapide et une utilisation efficace en séance de travaux pratiques. L'ouvrage s'adresse à un large public : candidats aux concours du CAPES, de l'agrégation, enseignants du secondaire et de l'enseignement supérieur, élèves de CPGE, Licence et Master. Les lecteurs pourront également trouver dans cet ouvrage des schémas clairs et précis des dispositifs expérimentaux utilisés, des photographies des expériences et des phénomènes observés, un traitement des données expérimentales réalisé avec le langage libre Python, et de nombreuses références bibliographiques.

Photon Processing in Microelectronics and Photonics Springer Science & Business Media

This book provides a comprehensive overview of nano-optics, including basic theory, experiment and applications, particularly in nanofabrication and optical characterization. The contributions clearly demonstrate how advances in nano-optics and photonics have stimulated progress in nanoscience and -fabrication, and vice versa. Their expert authors address topics such as three-dimensional optical lithography and microscopy beyond the Abbe diffraction limit, optical diagnostics and sensing, optical data- and telecommunications, energy-efficient lighting, and efficient solar energy

conversion. Nano-optics emerges as a key enabling technology of the 21st century. This work will appeal to a wide readership, from physics through chemistry, to biology and engineering. The contributions that appear in this volume were presented at a NATO Advanced Study Institute held in Erice, 4-19 July, 2015. Re Ch. 73 - Structure and Luminescence Properties of Nanofluorapatite Activated with Eu3+ Ions Synthesized by Hydrothermal Method, pp 567-569: The authors would like to acknowledge the National Science Centre (NSC) for financial support within the Project 'Preparation and characterization of nanoapatites doped with rare earth ions and their biocomposites' UMO-2012/05/E/ST5/03904

Essays in Physics Springer Nature

« Un regard nouveau sur une science ancienne ! Voilà un ouvrage qui synthétise les principaux domaines de la spectroscopie atomique, une science en évolution rapide et spectaculaire depuis plusieurs décennies. » Une partie des secrets véhiculés par la lumière nous est transmise par la spectroscopie. Depuis l'époque de Newton, considéré comme le père de la spectroscopie, jusqu'au XXIe siècle, cette science a connu des avancées multiples et souvent très spectaculaires. Un seul exemple : il suffit de penser à l'impact extraordinaire et universel dû à la découverte du laser! Le but du présent ouvrage est, en partant de considérations historiques, de décrire l'état actuel de cette discipline dont les méthodes apparaissent comme un outil indispensable dans de multiples domaines. Depuis l'analyse des spectres astrophysiques enregistrés par le Hubble Space Telescope jusqu'à l'étude des oeuvres d'art en archéométrie, en ne négligeant pas les contributions relatives à l'environnement, à la métrologie, aux recherches à caractère militaire, à l'industrie des matériaux ou aux sciences biomédicales, la spectroscopie a accru de manière considérable son impact sur de multiples domaines qui relèvent des sciences pures et appliquées. Cet ouvrage a pour ambition de synthétiser les principaux aspects de cette science en mutation. La première partie initie le lecteur à l'instrumentation à laquelle il est fait appel pour disperser la lumière et elle décrit ensuite les principales sources ainsi que les détecteurs de radiation. La seconde partie étudie les structures et les spectres atomiques, des plus simples au plus complexes. Elle s'attarde aussi sur l'interaction de la radiation avec les atomes ou sur l'effet des champs extérieurs qu'ils soient électriques ou magnétiques. Ce livre s'adresse aux étudiants en 3e année de Licence et en Master de physique, de chimie, de biologie, et en écoles d'ingénieurs. Il intéressera également les chercheurs et doctorants ayant pour objet d'étude cette matière ou plus spécialisés en astrophysique. Les «plus» Ouvrage détaillé mais synthétique Il tient compte des développements récents dans le domaine Orienté vers l'expérience et vers la théorie Rigoureux tout en étant accessible pour le lecteur débutant en la matière

On Einstein's Path Taylor & Francis

Los investigadores Rafael Escribano e Isabel Tanarro cuentan con una larga experiencia en espectroscopia molecular y física del plasma, y se han centrado durante los últimos quince años en el estudio de sistemas de relevancia atmosférica y astrofísica. En este libro, presentan una serie de contribuciones de otros renombrados colegas a cerca de la

atmósfera, la espectroscopia y la astronomía, la metodología y la descripción de técnicas empleadas en estos campos, así como los resultados actualizados de sus propias investigaciones. Esta obra incluye en definitiva algunos temas de gran interés tanto para la comunidad científica como para el público en general, como las recientes misiones espaciales a cometas, sucesos luminosos espectaculares en la alta atmósfera, o la controvertida cuestión del calentamiento global y el cambio climático.

Optics in Astrophysics Springer Science & Business Media

This third edition of Peter Bernath's successful Spectra of Atoms and Molecules is designed to provide advanced undergraduates and graduate students a working knowledge of the vast field of spectroscopy. Also of interest to chemists, physicists, astronomers, atmospheric scientists, and engineers, this volume emphasizes the fundamental principles of spectroscopy with the primary goal of teaching the interpretation of spectra. Features include a presentation of group theory needed to understand spectroscopy, detailed worked examples and a large number of excellent problems at the end of each chapter. Prof. Bernath provides a large number of diagrams and spectra which have been specifically recorded for this book. Molecular symmetry, matrix representation of groups, quantum mechanics, and group theory are among the topics covered; atomic, rotational, vibrational, electronic and Raman spectra are analyzed. Bernath's clear treatment of the confusing topic of line strengths as needed for quantitative applications is featured. This much-needed new edition has been updated to include the 2010 CODATA revision of physical constants, and a large number of corrections and clarifications. Responding to student requests, the main new feature is the addition of detailed worked examples in each chapter. Spectra of Atoms and Molecules, 3e will help demystify spectroscopy by showing readers the necessary steps in a derivation, as well as the final result.

Thirty-two thoughtful essays on topics in undergraduate-level physics Springer Science & Business Media

Astronomy, astrophysics and space research have witnessed an explosive development over the last few decades. The new observational potential offered by space stations and the availability of powerful and highly specialized computers have revealed novel aspects of the fascinating realm of galaxies, quasars, stars and planets. The present completely revised 5th edition of The New Cosmos provides ample evidence of these dramatic developments. In a concise presentation, which assumes only a modest prior knowledge of mathematics and physics, the book gives a coherent introduction to the entire field of astronomy and astrophysics. At the same time it takes into account the art of observation and the fundamental ideas behind their interpretation. Like its predecessors, this edition of The New Cosmos will provide new insight and enjoyment not only to students and researchers in the fields of astronomy, physics and earth sciences, but also to a wide range of interested amateurs.

Atomic Spectra and Atomic Structure Springer Science & Business Media

Vacuum circuit breakers are widely used in distribution power systems for their

advantages such as maintenance free and eco-friendly. Nowadays, most circuit breakers used at transmission voltage level are SF6 circuit breakers, but the SF6 they emit is one of the six greenhouse gases defined in Kyoto Protocol. Therefore, the development of transmission voltage level vacuum circuit breaker can help the environment. The switching arc phenomena in transmission voltage level vacuum circuit breakers are key issues to explore. This book focuses on the high-current vacuum arcs phenomena at transmission voltage level, especially on the anode spot phenomena, which significantly influence the success or failure of the short circuit current interruption. Then, it addresses the dielectric recovery property in current interruption. Next it explains how to determine the closing/opening displacement curve of transmission voltage level vacuum circuit breakers based on the vacuum arc phenomena. After that, it explains how to determine key design parameters for vacuum interrupters and vacuum circuit breakers at transmission voltage level. At the end, the most challenging issue for vacuum circuit breakers, capacitive switching in vacuum, is addressed. The contents of this book will benefit researchers and engineers in the field of power engineering, especially in the field of power circuit breakers and power switching technology.

Spectroscopic Investigation of the Vapor Plume During Laser Processing of AISI 52100 Steel Using a High Brightness Diode-pumped Nd:YAG Laser

SpectrophysicsPrinciples and Applications This book describes the methods of experimental spectroscopy and their use in the study of physical phenomena. The applications of optical spectroscopy may be grouped under three broad headings: chemical analysis, elucidation of atomic and molecular structure, and investigations of the interactions of radiating atoms and molecules with their environment. I have used the word 'Spectro physics' for the third of these by analogy with spectrochemistry for the first and in preference to 'quantitative spectroscopy'. A number of textbooks treat atomic and molecular structure at varying levels of profundity, but elementary spectrophysics is not, so far as I am aware, covered in anyone existing book. There is moreover a lack of up-to-date books on experimental techniques that treat in a fairly elementary fashion interfero metric, Fourier transform and radiofrequency methods as well as prism and grating spectroscopy. In view of the importance of spectrophysics in astrophys ics and plasma physics as well as in atomic and molecular spectroscopy there seemed a place for a book describing both the experimental methods and their spectrophysical applications.

Principles and Clinical Diagnostic Applications of Surface-Enhanced Raman Spectroscopy Springer Science & Business Media

This book is a stop-gap contribution to the science and technology of carbon plasmas and carbon vapors. It strives to cover two strongly related fields: the molecular quantum theory of carbon plasmas and carbon nanostructures; and the molecular and atomic spectroscopy of such plasmas and vapors. These two fields of research are strongly intertwined and thus reinforce one another.Even though the use of carbon nanostructures is increasing by the day and their practical uses are emerging,

there is no modern review on carbon plasmas, especially from molecular theoretical and spectroscopic viewpoints. The importance of the present book is therefore great from both educational and practical aspects. This review might be the first step towards bringing such textbooks into existence for university education. Similarly, for applied and engineering works in carbon nanostructures, the book provides a theoretical salient point for technologists in the field.

Nano-Optics: Principles Enabling Basic Research and Applications Editorial CSIC - CSIC Press

Each of this book's 32 essays discusses a chosen topic, at a level that is generally within that of a four-year degree course in Physics. The essays supplement (indeed sometimes correct) treatments usually given, or supplies reasoning that tends to fall through the cracks. The author uses his life long experience of tutorial teaching at Oxford to know what topics often need such discussion, for clarification, or for avoidance of common confusions. The book contains accounts of even-standard topics, accounts that offer an unusual emphasis, or a fresh insight, or more than customary rigour, or a cross-link to apparently unrelated material. The student (and their teachers) who really wants to understand physics will find this book indispensable. Often the outcome of tutorial discussion has been an understanding that lies a little to the side of what is presented in standard texts. Such understanding is presented here in the essays. The topics covered are diverse and have something useful to say across most areas of a physics degree.

Principles and Applications World Scientific

SpectrophysicsPrinciples and ApplicationsSpringer Science & Business Media

Spectroscopie atomique Oxford University Press

The Compendium of Practical Astronomy is unique. The practical astronomer, whether student, novice or accomplished amateur, will find this handbook the most comprehensive, up-to-date and detailed single guide to the subject available. It is based on Roth’s celebrated German language handbook for amateur astronomers, which first appeared over 40 years ago.

Atom, Laser And Spectroscopy Elsevier

Laser-Induced Breakdown Spectroscopy, Second Edition, covers the basic principles and latest developments in instrumentation and applications of Laser Induced Breakdown Spectroscopy (LIBS). Written by active experts in the field, it serves as a useful resource for analytical chemists and spectroscopists, as well as graduate students and researchers engaged in the fields of combustion, environmental science, and planetary and space exploration. This fully revised second edition includes several new chapters on new LIBS techniques as well as several new applications, including flame and off-gas measurement, pharmaceutical samples, defense applications, carbon sequestration and site monitoring, handheld instruments, and more. LIBS has rapidly developed into a major analytical technology with the capability of detecting all chemical elements in a sample, of real- time response, and of close-contact or stand-off analysis of targets. It does not require any sample preparation, unlike conventional spectroscopic analytical techniques. Samples in the form of solids, liquids, gels,

gases, plasmas, and biological materials (like teeth, leaves, or blood) can be studied with almost equal ease. This comprehensive reference introduces the topic to readers in a simple, direct, and accessible manner for easy comprehension and maximum utility. Covers even more applications of LIBS beyond the first edition, including combustion, soil physics, environment, and life sciences Includes new chapters on LIBS techniques that have emerged in the last several years, including Femtosecond LIBS and Molecular LIBS Provides inspiration for future developments in this rapidly growing field in the concluding chapter

Vol 1 Springer Science & Business Media

This collection of nearly forty essays in honor of the noted physicist and cosmologist Engelbert Schucking spans the gamut of research in Einsteins theory of general relativity and presents a lively and personal account of current work in the field. Indispensable for physicists involved in research in the field, the book includes important chapters by noted theorists such as A. Ashtekar, P.G. Bergmann, J. Ehlers, E.T. Newman, J.V. Narlikar, R. Penrose, D.W. Sciama, J. Stachel, and W. Rindler.

Vibrational Spectroscopy in Diagnosis and Screening Springer Science & Business Media

Astronomical Spectroscopy for Amateurs is a complete guide for amateur astronomers who are looking for a new challenge. After a brief overview of the development of spectroscopes and an introduction to the theory of stellar spectra, the book goes on to examine the various types of spectroscopes available to amateurs. Next, practical sections address all aspects of setting-up and using various types of commercially-available and home-built spectroscopes. A final part gives detailed instructions for the design and construction of three different spectroscopes, along with the necessary design theory (minimal math). The home-made spectroscopes have performance capabilities near or equal to commercial units but are constructed using basic hand tools for a fraction of the cost! This up-to-date practical spectroscopy book will enable amateur astronomers to develop the skills and equipment needed to prepare scientifically acceptable spectra data, and to make a valuable contribution to ProAm projects.