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Microwave and RF Vacuum Electronic Power Sources - Richard G. Carter 2018-04-12 Get up-to-speed on the theory, principles and design of vacuum electron devices.

Portable Spectroscopy and Spectrometry, Applications - Richard A. Crocombe 2021-04-26 The most comprehensive resource available on the many applications of portable spectrometers, including material not found in any other published work Portable Spectroscopy and Spectrometry: Volume Two is an authoritative and up-to-date compendium of the diverse applications for portable spectrometers across numerous disciplines. Whereas Volume One focuses on the specific technologies of the portable spectrometers themselves, Volume Two explores the use of portable instruments in wide range of fields, including pharmaceutical development, clinical research, food analysis, forensic science, geology, astrobiology, cultural heritage and archaeology. Volume Two features contributions by a multidisciplinary team of experts with hands-on experience using portable instruments in their respective areas of expertise. Organized both by instrumentation type and by scientific or technical discipline, 21 detailed chapters cover various applications of portable ion mobility spectrometry (IMS), infrared and near-infrared (NIR) spectroscopy, Raman and x-ray fluorescence (XRF) spectroscopy, smartphone spectroscopy, and many others. Filling a significant gap in literature on the subject, the second volume of Portable Spectroscopy and Spectrometry: Features a significant amount of content published for the first time, or not available in existing literature Brings together work by authors with assorted backgrounds and fields of study Discusses the central role of applications in portable instrument development Covers the algorithms, calibrations, and libraries that are of critical importance to successful applications of portable instruments Includes chapters on portable spectroscopy applications in areas such as the military, agriculture and feed, hazardous materials (HazMat), art conservation, and environmental science Portable Spectroscopy and Spectrometry: Volume Two is an indispensable resource for developers of portable instruments in universities, research institutes, instrument companies, civilian and government purchasers, trainers, operators of portable instruments, and educators and students in portable spectroscopy courses.

DN to [lambda] - James R. Janesick 2007 Contains more than 230 figures that present experimental CCD and CMOS data products and modeling simulations connected to photon transfer. This title also provides hundreds of relations that support photon transfer theory, simulations, and data.

Atom Interferometry - G.M. Tino 2014-10-16 Since atom interferometers were first realized about 20 years ago, atom interferometry has had many applications in basic and applied science, and has been used to measure gravity acceleration, rotations and fundamental physical quantities with unprecedented precision. Future applications range from tests of general relativity to the development of next-generation inertial navigation systems. This book presents the lectures and notes from the Enrico Fermi

school "Atom Interferometry", held in Varenna, Italy, in July 2013. The aim of the school was to cover basic experimental and theoretical aspects and to provide an updated review of current activities in the field as well as main achievements, open issues and future prospects. Topics covered include theoretical background and experimental schemes for atom interferometry; ultracold atoms and atom optics; comparison of atom, light, electron and neutron interferometers and their applications; high precision measurements with atom interferometry and their application to tests of fundamental physics, gravitation, inertial measurements and geophysics; measurement of fundamental constants; interferometry with quantum degenerate gases; matter wave interferometry beyond classical limits; large area interferometers; atom interferometry on chips; and interferometry with molecules. The book will be a valuable source of reference for students, newcomers and experts in the field of atom interferometry.

Gravity, Magnetic and Electromagnetic Gradiometry - Alexey V. Veryaskin 2021

Gradiometry is a multidisciplinary area that combines theoretical and applied physics, ultra-low noise electronics, precision engineering, and advanced signal processing. Applications include the search for oil, gas, and mineral resources, GPS-free navigation, defence, space missions, and medical research. This book provides readers with a comprehensive and updated overview of the history, applications, and current developments in relation to some of the most advanced technologies in the 21st Century, especially regarding future challenges in natural resource exploration in the changing energy supply environment and a post COVID world.

Neutrino Mass - Guido Altarelli 2003-09-08

Reviews the current state of knowledge of neutrino masses and the related question of neutrino oscillations. After an overview of the theory of neutrino masses and mixings, detailed accounts are given of the laboratory limits on neutrino masses, astrophysical and cosmological constraints on those masses, experimental results on neutrino oscillations, the theoretical interpretation of those results, and theoretical models of neutrino masses and mixings. The book concludes with an examination of the potential of long-baseline experiments. This is an essential reference text for workers in elementary-particle physics, nuclear physics, and astrophysics.

Seeing Photons - National Research Council 2010-09-28

The Department of Defense recently highlighted intelligence, surveillance, and reconnaissance (ISR) capabilities as a top priority for U.S. warfighters. Contributions provided by ISR assets in the operational theaters in Iraq and Afghanistan have been widely documented in press reporting. While the United States continues to increase investments in ISR capabilities, other nations not friendly to the United States will continue to seek countermeasures to U.S. capabilities. The Technology Warning Division of the Defense Intelligence Agency's (DIA) Defense Warning Office (DWO) has the critical responsibility, in collaborations with other components of the intelligence community (IC), for providing U.S. policymakers insight into technological developments that may impact future U.S. warfighting capabilities. To this end, the IC requested that the National Research Council (NRC) investigate and report on key visible and infrared detector technologies, with potential military utility, that are likely to be developed in the next 10-15 years. This study is the eighth in a series sponsored by the DWO and executed under the auspices of the NRC TIGER (Technology Insight-Gauge, Evaluate, and Review) Standing Committee.

Optical and Infrared Detectors for Astronomy - James David Garnett 2004

Proceedings of SPIE present the original research papers presented at SPIE conferences and other high-quality conferences in the broad-ranging fields of optics and photonics. These books provide prompt access to the latest innovations in research and technology in their respective fields. Proceedings of SPIE are among the most cited references in patent literature.

High-Power Electromagnetic Effects on Electronic Systems - D.V. Giri 2020-03-31

This is the first book that comprehensively addresses the issues relating to the effects of radio frequency (RF) signals and the environment of electrical and electronic systems. It covers testing methods as well as methods to

analyze radio frequency. The generation of high-powered electromagnetic (HPEM) environments, including moderate band damped sinusoidal radiators and hyperband radiating systems is explored. HPEM effects on component, circuit, sub-system electronics, as well as system level drawing are discussed. The effects of HPEM on experimental techniques and the standards which can be used to control tests are described. The validity of analytical techniques and computational modeling in a HPEM effects context is also discussed. Insight on HPEM effects experimental techniques and the standards which can be used to control tests is provided, and the validity of analytical techniques and computational modeling in a HPEM effects context is discussed. This book dispels myths, clarifies good experimental practice and ultimately draws conclusions on the HPEM interaction with electronics. Readers will learn to consider the importance of HPEM phenomena as a threat to modern electronic based technologies which underpin society and to therefore be pre-emptive in the consideration of HPEM resilience.

Advanced Display Technology - In Byeong Kang 2021-05-20

This book provides a comprehensive and up-to-date guide to the AMOLED technologies and applications which have become industry standard in a range of devices, from small mobile displays to large televisions. Unlike other books on the topic, which cover the fundamentals, materials, processing, and manufacturing of OLEDs, this one-stop book discusses the core components, such as TFT backplanes, OLED materials and devices, and driving schematics together in one volume with chapters written by experts from leading international companies in the field of OLED materials and OLED TVs. It also examines emerging areas, such as micro-LEDs, displays using quantum dots, and AR & VR displays. Presenting the latest research trends as well as the basic principles of each topic, this book is intended for undergraduate and postgraduate students taking display-related courses, new researchers, and engineers in related fields.

Mesospheric Models and Related Experiments - Esrin-Eslab Symposium 1971-12-31

Proceedings of the Fourth ESRIN-ESLAB Symposium Held in Frascati, Italy, July 6-10, 1970

Solid-State Imaging with Charge-Coupled Devices - A.J. Theuwissen 2006-04-11

Solid-State Imaging with Charge-Coupled Devices covers the complete imaging chain: from the CCD's fundamentals to the applications. The book is divided into four main parts: the first deals with the basics of the charge-coupled devices in general. The second explains the imaging concepts in close relation to the classical television application. Part three goes into detail on new developments in the solid-state imaging world (light sensitivity, noise, device architectures), and part four rounds off the discussion with a variety of applications and the imager technology. The book is a reference work intended for all who deal with one or more aspects of solid- state imaging: the educational, scientific and industrial world. Graduates, undergraduates, engineers and technicians interested in the physics of solid-state imagers will find the answers to their imaging questions. Since each chapter concludes with a short section `Worth Memorizing', reading this short summary allows readers to continue their reading without missing the main message from the previous section.

Meteoroids - Galina O. Ryabova 2019-10-10

The definitive guide to modern meteor science, destined to be the standard resource for advanced students and researchers.

Environmental Instrumentation and Analysis Handbook - Randy D. Down 2005-11-22

A comprehensive resource for information about differenttechnologies and methods to measure and analyze contamination ofair, water, and soil. * Serves as a technical reference in the field of environmentalscience and engineering * Includes information on instrumentation used for measurement andcontrol of effluents and emissions from industrial facilities thatcan directly influence the environment * Focuses on applications, making it a practical reference tool

To Measure the Sky - Frederick R. Chromey 2016-10-20

A quantitative yet accessible undergraduate introduction to the collection and analysis of observational data in optical and infrared astronomy.

Handbook of Medical Imaging - Jacob Beutel 2000
This volume describes concurrent engineering developments that affect or are expected to influence future development of digital diagnostic imaging. It also covers current developments in Picture Archiving and Communications System (PACS) technology, with particular emphasis on integration of emerging imaging technologies into the hospital environment.
EAI International Conference on Big Data Innovation for Sustainable Cognitive Computing - Anandakumar Haldorai 2019-10-18
This proceeding features papers discussing big data innovation for sustainable cognitive computing. The papers feature detail on cognitive computing and its self-learning systems that use data mining, pattern recognition and natural language processing (NLP) to mirror the way the human brain works. This international conference focuses on cognitive computing technologies, from knowledge representation techniques and natural language processing algorithms to dynamic learning approaches. Topics covered include Data Science for Cognitive Analysis, Real-Time Ubiquitous Data Science, Platform for Privacy Preserving Data Science, and Internet-Based Cognitive Platform. The EAI International Conference on Big Data Innovation for Sustainable Cognitive Computing (BDCC 2018), took place on 13 – 15 December 2018 in Coimbatore, India.
Astronomy at High Angular Resolution - Henri M. J. Boffin 2016-08-24
This book offers an essential compendium of astronomical high-resolution techniques. Recent years have seen considerable developments in such techniques, which are critical to advances in many areas of astronomy. As reflected in the book, these techniques can be divided into direct methods, interferometry, and reconstruction methods, and can be applied to a huge variety of astrophysical systems, ranging from planets, single stars and binaries to active galactic nuclei, providing angular resolution in the micro- to tens of milliarcsecond scales. Written by experts in their fields, the chapters cover adaptive optics, aperture masking imaging, spectra disentangling, interferometry, lucky imaging, Roche tomography, imaging with interferometry, interferometry of AGN, AGN reverberation mapping, Doppler- and magnetic imaging of stellar surfaces, Doppler tomography, eclipse mapping, Stokes imaging, and stellar tomography. This book is intended to enable a next generation of astronomers to apply high-resolution techniques. It informs readers on how to achieve the best angular resolution in the visible and near-infrared regimes from diffraction-limited to micro-arcsecond scales.
Physical Principles of Astronomical Instrumentation - Peter A. R. Ade 2021-11-10
Offering practical advice on a range of wavelengths, this highly accessible and self-contained book presents a broad overview of astronomical instrumentation, techniques, and tools. Drawing on the notes and lessons of the authors' established graduate course, the text reviews basic concepts in astrophysics, spectroscopy, and signal analysis. It includes illustrative problems and case studies and aims to provide readers with a toolbox for observational capabilities across the electromagnetic spectrum and the knowledge to understand which tools are best suited to different observations. It is an ideal guide for undergraduates and graduates studying astronomy. Features: Presents a self-contained account of a highly complex subject. Offers practical advice and instruction on a wide range of wavelengths and tools. Includes case studies and problems for further learning opportunities.
Bulletin Agence Spatiale Européenne - European Space Agency 2013

Optical Payloads for Space Missions - Shen-En Qian 2015-11-13
Optical Payloads for Space Missions is a comprehensive collection of optical spacecraft payloads with contributions by leading international rocket-scientists and instrument builders. Covers various applications, including earth observation, communications, navigation, weather, and science satellites and deep space exploration Each chapter covers one or more specific optical payload Contains a review chapter which provides readers with an overview on the background, current status, trends, and future prospects of the optical payloads Provides information on the principles

of the optical spacecraft payloads, missions' background, motivation and challenges, as well as the scientific returns, benefits and applications

Data Analysis and Regression - Frederick Mosteller 1977

Approaching data analysis; Indication and indicators; Displays and summaries for batches; Straightening curves and plots; The practice of re-expression; Need we re-express? Hunting out the real uncertainty; A method of direct assessment; Two-and more-way tables; Robust and resistant measures; Standardizing for comparison; Regression for fitting; Woes of regression coefficients; A class of mechanisms for fitting; Guided regression; Examining regression residuals.

Basic Concepts in Computational Physics - Benjamin A. Stickler 2016-03-21

This new edition is a concise introduction to the basic methods of computational physics. Readers will discover the benefits of numerical methods for solving complex mathematical problems and for the direct simulation of physical processes. The book is divided into two main parts: Deterministic methods and stochastic methods in computational physics. Based on concrete problems, the first part discusses numerical differentiation and integration, as well as the treatment of ordinary differential equations. This is extended by a brief introduction to the numerics of partial differential equations. The second part deals with the generation of random numbers, summarizes the basics of stochastics, and subsequently introduces Monte-Carlo (MC) methods. Specific emphasis is on MARKOV chain MC algorithms. The final two chapters discuss data analysis and stochastic optimization. All this is again motivated and augmented by applications from physics. In addition, the book offers a number of appendices to provide the reader with information on topics not discussed in the main text. Numerous problems with worked-out solutions, chapter introductions and summaries, together with a clear and application-oriented style support the reader. Ready to use C++ codes are provided online.

2021 19th IEEE International New Circuits and Systems Conference (NEWCAS) - IEEE Staff 2021-06-13

The topics include, but are not limited to Analog mixed signal circuits Biomedical circuits and systems CAD and design tools Communication circuits and systems Test and verification RF & microwave circuits Computer architecture and memory Digital circuits Digital signal processing Imaging and image sensors Low power low voltage designs Embedded systems Energy harvesting circuits Sensory circuits and systems Neuromorphic circuits & systems Technology Trends

Millimeter-Wave (mmWave) Communications - Manuel García Sanchez 2020-03-25

The millimeter-wave frequency band (30–300 GHz) is considered a potential candidate to host very high data rate communications. First used for high capacity radio links and then for broadband indoor wireless networks, the interest in this frequency band has increased as it is proposed to accommodate future 5G mobile communication systems. The large bandwidth available will enable a number of new uses for 5G. In addition, due to the large propagation attenuation, this frequency band may provide some additional advantages regarding frequency reuse and communication security. However, a number of issues have to be addressed to make mm-wave communications viable. This book collects a number of contributions that present solutions to these challenges.

Optical and Infrared Detectors - Robert James Keyes 1980

The Earth-Moon System as a Dynamical Laboratory - Elisa Maria Alessi 2019-09-25

The Earth-Moon neighborhood is the scene of a large variety of applications that concern asteroids, lunar exploration and space debris in Earth orbit. In particular, recent efforts by the scientific community have focused on the possibility of extending the human operations beyond the radiation belts; of exploiting in-situ resources, either on the lunar surface or on asteroids retrieved to the vicinity of the Earth; and of mitigating the space debris concern by taking advantage of the lunar perturbation. The characteristic dynamics in the cislunar space represents an opportunity for the mission designer, but also a challenge in terms of theoretical understanding and operational control. This Research Topic covers the Earth-

Moon dynamics in its complexity and allure, considering the most relevant aspects for both natural and artificial objects, in order to get a new comprehension of the dynamics at stake along with the operational procedures that can handle it.

Outskirts of Galaxies - Johan H. Knapen 2017-07-09

This book consists of invited reviews written by world-renowned experts on the subject of the outskirts of galaxies, an upcoming field which has been understudied so far. These regions are faint and hard to observe, yet hide a tremendous amount of information on the origin and early evolution of galaxies. They thus allow astronomers to address some of the most topical problems, such as gaseous and satellite accretion, radial migration, and merging. The book is published in conjunction with the celebration of the end of the four-year DAGAL project, an EU-funded initial training network, and with a major international conference on the topic held in March 2016 in Toledo. It thus reflects not only the views of the experts, but also the scientific discussions and progress achieved during the project and the meeting. The reviews in the book describe the most modern observations of the outer regions of our own Galaxy, and of galaxies in the local and high-redshift Universe. They tackle disks, haloes, streams, and accretion as observed through deep imaging and spectroscopy, and guide the reader through the various formation and evolution scenarios for galaxies. The reviews focus on the major open questions in the field, and explore how they can be tackled in the future. This book provides a unique entry point into the field for graduate students and non-specialists, and serves as a reference work for researchers in this exciting new field.

Small Satellites for Earth Observation - Rainer Sandau 2008-04-18

The 6th IAA Symposium on Small Satellites for Earth Observation, initiated by the International Academy of Astronautics (IAA), was again hosted by DLR, the German Aerospace Center. The participation of scientists, engineers, and managers from 24 countries reflected the high interest in the use of small satellites for dedicated missions applied to Earth observation. The contributions showed that dedicated Earth observation missions cover a wide range of very different tasks.

Adaptive Optics Systems VI - Laird M. Close 2018

The Secret Shofar of Barcelona - Jacqueline Dembar Greene 2014-01-01

Symphony conductor Don Fernando longs to hear the sounds of the shofar. Like other conversos during the Spanish Inquisition, he has to hide his Jewish religion and pretend to follow the teachings of the church. But when he is asked to perform a concert celebrating the new world, he and his son Rafael devise a clever plan to usher in the Jewish New Year in plain sight of the Spanish nobility.

Microwave Engineers' Handbook - Theodore S. Saad 1971

These two volumes are clearly the most complete reference sources for working microwave engineers and technicians available today, containing vital microwave material no longer available in one source. Each chapter contains hundreds of indispensable charts, graphs, and tables that you'll refer to daily.

Hyperspectral Satellites and System Design - Shen-En Qian 2020-04-22

Hyperspectral Satellites and System Design is the first book on this subject. It provides a systematic analysis and detailed design of the entire development process of hyperspectral satellites. Derived from the author’s 25-year firsthand experience as a technical lead of space missions at the Canadian Space Agency, the book offers engineers, scientists, and decision-makers detailed knowledge and guidelines on hyperspectral satellite system design, trade-offs, performance modeling and simulation, optimization from component to system level, subsystem design, and implementation strategies. This information will help reduce the risk, shorten the development period, and lower the cost of hyperspectral satellite missions. This book is a must-have reference for professionals in developing hyperspectral satellites and data applications. It is also an excellent introductory book for early practitioners and students who want to learn more about hyperspectral satellites and their applications.

Scientific Charge-coupled Devices - James R. Janesick 2001

"The book provides invaluable information to scientists, engineers, and product managers involved with imaging CCDs, as well as those who need a comprehensive introduction to the subject."--Page 4 de la couverture

Inorganic Scintillators for Detector Systems - Paul Lecoq 2010-02-12

Thelasttwodecadeshaveseenaspectacularincreaseofinterestforinorganic scintillators. Thishasbeentoalargepartaconsequenceofthevisibilitygiven to this ?eld by several large crystal-based detectors in particle physics. To answer the very challenging requirements for these experiments (huge data rates, linearity of response over a large dynamic range, harsh radiation en- ronment, impressive crystal quantities to be produced in a short time period andatana?ordablecost,etc. . .)ane?ortofcoordination was needed. S- eral groups of experts working in di?erent aspects of material science have combinedtheire?ortsininternationalandmultidisciplinarycollaborationsto better understand the fundamental mechanisms underlying the scintillation processanditse?ciency. Similarly,thestabilityofthescintillationproperties andtheroleofcolorcentershasbeenextensivelystudiedtodevelop radiation hard scintillators. Dedicated conferences on inorganic scintillators have seen an increasing participation from di?erent communities of users outside the domain of high-energy physics. This includes nuclear physics, astrophysics, security systems, industrial applications, and medical imaging. This last - main in particular is growing very fast since a few years at the point that the volume of scintillating crystals to be produced for positron emission tom- raphy (PET) is going to exceed the one for high-energy physics. As more and more crystal producers are also attending these conferences, a very fruitful synergy was progressively built up among scienti?c experts, technologists, and end users. This aspect of a multidisciplinary collaboration is essential to helppeopledesignandbuilddetectorsofever-increasingperformancethrough the choice, optimization or development of the best scintillator, and a th- ough investigation of the technologies to produce the crystals of the highest quality.

Exoplanet Science Strategy - National Academies of Sciences, Engineering, and Medicine 2019-01-17

The past decade has delivered remarkable discoveries in the study of exoplanets. Hand-in-hand with these advances, a theoretical understanding of the myriad of processes that dictate the formation and evolution of planets has matured, spurred on by the avalanche of unexpected discoveries. Appreciation of the factors that make a planet hospitable to life has grown in sophistication, as has understanding of the context for biosignatures, the remotely detectable aspects of a planet's atmosphere or surface that reveal the presence of life. Exoplanet Science Strategy highlights strategic priorities for large, coordinated efforts that will support the scientific goals of the broad exoplanet science community. This report outlines a strategic plan that will answer lingering questions through a combination of large, ambitious community-supported efforts and support for diverse, creative, community-driven investigator research.

Optical 3D-Spectroscopy for Astronomy - Roland Bacon 2017-06-19

Over the last 50 years, a variety of techniques have been developed to add a third dimension to regular imaging, with an extended spectrum associated to every imaging pixel. Dubbed 3D spectroscopy from its data format, it is now widely used in the astrophysical domain, but also inter alia for atmospheric sciences and remote sensing purposes. This is the first book to comprehensively tackle these new capabilities. It starts with the fundamentals of spectroscopic instruments, in particular their potentials and limits. It then reviews the various known 3D techniques, with particular emphasis on pinpointing their different `ecological? niches. Putative users are finally led through the whole observing process, from observation planning to the extensive ? and crucial - phase of data reduction. This book overall goal is to give the non-specialist enough hands-on knowledge to learn fast how to properly use and produce meaningful data when using such a 3D capability.

Filter Design Solutions for RF systems - Leonardo Pantoli 2020-11-19

This Special Issue focuses on the state-of-the-art results from the definition and design of filters

for low- and high-frequency applications and systems. Different technologies and solutions are commonly adopted for filter definition, from electrical to electromechanical and mechanical solutions, from passive to active devices, and from hybrid to integrated designs. Aspects related to both theoretical and experimental research in filter design, CAD modeling and novel technologies and applications, as well as filter fabrication, characterization and testing, are covered. The proposed research articles deal with different topics as follows: Modeling, design and simulation of filters; Processes and fabrication technologies for filters; Automated characterization and test of filters; Voltage and current mode filters; Integrated and discrete filters; Passive and active filters; Variable filters, characterization and tunability.

Scientific Detectors for Astronomy - P. Amico 2006-04-18

Dear Friends, It seems like it was only yesterday that we drove the last of you to the airport. The memories and the spirit of the Scientific Detectors for Astronomy Workshop (SDW2002) remain fresh and strong. For us, this was a very special event, a great gathering of what may be one of the friendliest and most cooperative technical communities on our little planet. We have tried to capture the spirit of the Workshop in these Proceedings and we hope you are able to relive your week in Hawaii. For those readers who did not attend, we invite you into this community. As you probably noticed, there is a new name on the cover: Jenna Beletic was the ace up our sleeve for these Proceedings. As a summer intern at Keck, she took up the task of organizing, proofreading, editing and formatting the papers. She also made the graphics (her artistic talents shine on pages xxxiii and xxxv), contacted authors and prepared the mountain of paperwork which goes with producing a book. Jenna's enthusiasm at learning, her passion for the job and creativity (e. g. find 100 ways to get Paola and Jim to do their jobs) have been a motivating addition to our team of "old workshop foxes"..... and a source for a good deal of paternal pride. We are honoured to have her as a fellow editor.

Quantum Gas Experiments - Päivi Törmä 2014-09

Quantum phenomena of many-particle systems are fascinating in their complexity and are consequently not fully understood and largely untapped in terms of practical applications. Ultracold gases provide a unique platform to build up model systems of quantum many-body physics with highly controlled microscopic constituents. In this way, many-body quantum phenomena can be investigated with an unprecedented level of precision, and control and models that cannot be solved with present day computers may be studied using ultracold gases as a quantum simulator. This book addresses the need for a comprehensive description of the most important advanced experimental methods and techniques that have been developed along with the theoretical framework in a clear and applicable format. The focus is on methods that are especially crucial in probing and understanding the many-body nature of the quantum phenomena in ultracold gases and most topics are covered both from a theoretical and experimental viewpoint, with interrelated chapters written by experts from both sides of research. Graduate students and post-doctoral researches working on ultracold gases will benefit from this book, as well as researchers from other fields who wish to gain an overview of the recent fascinating developments in this very dynamically evolving field. Sufficient level of both detailed high level research and a pedagogical approach is maintained throughout the book so as to be of value to those entering the field as well as advanced researchers. Furthermore, both experimentalists and theorists will benefit from the book; close collaboration between the two are continuously driving the field to a very high level and will be strengthened to continue the important progress yet to be made in the field.