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Physics and Astronomy

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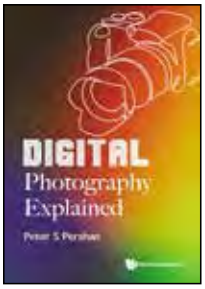
APPLIED AND TECHNICAL PHYSICS

Digital Photography Explained



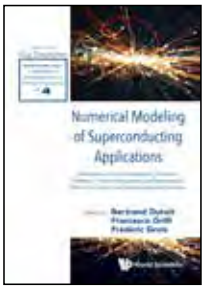
by **Peter S Pershan** *(Harvard University, USA)*

This book can serve as a missing guide for technical features of digital photograph. The book expounds on procedures that are necessary to obtain true color images. For example, CMOS (complementary metal oxide semiconductor) sensors are equipped with color filters such that the intensity of the red, green and blue colors are recorded separately. Since the colors must be combined for print and digital displays, the separate colors recorded in the camera must somehow be merged. This process known as demosaicing is vividly explained. In fact, the technology for defining colors is a separate issue that is also treated in this book.

150pp	**Nov 2023**	
978-981-128-392-5(pbk)	**US$28**	**£25**
978-981-128-342-0	**US$58**	**£55**
978-981-128-343-7(ebook)	**US$98**	**£90**

World Scientific Series in Applications of Superconductivity and Related Phenomena - Vol 4

Numerical Modeling of Superconducting Applications



Simulation of Electromagnetics, Thermal Stability, Thermo-Hydraulics and Mechanical Effects in Large-Scale Superconducting Devices

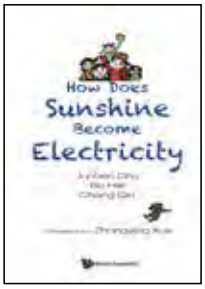
edited by **Bertrand Dutoit** *(École Polytechnique Fédérale de Lausanne, Switzerland)*, **Francesco Grilli** *(Karlsruhe Institute of Technology, Germany)* & **Frédéric Sirois** *(Polytechnique Montréal, Canada)*

This book aims to present an introduction to numerical modeling of different aspects of large-scale superconducting applications: electromagnetics, thermal, mechanics and thermo-hydraulics. The importance of computational modeling to advance current superconductor research cannot be overlooked, especially given the enormous benefits provided by superconductors in many human endeavours, including energy generation, medical treatments, and future electrical technologies. It reviews of the modeling of electromagnetic phenomena in superconductors, emphasising the theoretical aspects of the different numerical formulations.

Readership: Researchers, practitioners and graduate students in the field of applied superconductivity.

328pp	**Apr 2023**	
978-981-127-143-4	**US$138**	**£125**

How Does Sunshine Become Electricity



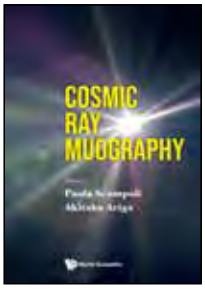
by **Junhao Chu** *(Chinese Academy of Sciences, China)*, **Bo Hai** *(Shanghai Media Group, China)* & **Chang Qin** *(Shanghai Media Group, China)*

Translated by: **Zhongying Xue** *(Chinese Academy of Sciences, China)*

This book is a compilation of the series of 'Dialogues With Great Chinese Scientists', where several great scientists in different research files were invited to share their stories and scientific knowledge. It is meant to inspire more students to become great scientists in the future.

128pp	**Apr 2023**	
978-981-124-685-2(pbk)	**US$24**	**£20**
978-981-124-686-9(ebook)	**US$98**	**£90**

Cosmic Ray Muography



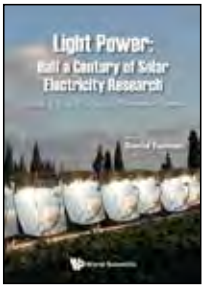
edited by **Paola Scampoli** *(University of Napoli Federico II, Italy & University of Bern, Switzerland)* & **Akitaka Ariga** *(Chiba University, Japan & University of Bern, Switzerland)*

Muography was made possible by the development of detectors in the field of particle physics, allowing the exploitation of this natural source for imaging in a vast variety of fields, characterizing this technique as truly interdisciplinary, and leading to significant advances in several disciplines. This book covers all aspects of this methodology, with the different chapters pointing to the general physics principles, to the technological and image reconstruction challenges and to the principal applications in several fields.

Readership: Advanced undergraduate and graduate students, researchers and practitioners in the fields of particle and detector physics and geology.

308pp	**Apr 2023**	
978-981-126-490-0	**US$108**	**£100**
978-981-126-491-7(ebook)	**US$173**	**£160**

Light Power: Half a Century of Solar Electricity Research



Volume 3: Early 21st Century Photovoltaic Systems

edited by **David Faiman** *(Ben-Gurion University of the Negev, Israel)*

This is the final volume of a 3-volume history of solar power generating systems covering the approximately 50 years of research and development surrounding the energy crisis of 1973. The lectures document many technical details including some pertaining to technologies that were successfully demonstrated but subsequently discontinued owing to their not having been deemed to be cost-effective at the time.

Readership: Historians, researchers, students, professionals interested in the photovoltaic and alternative energy source industry.

392pp	**Feb 2023**	
978-981-126-582-2	**US$128**	**£120**
978-981-126-583-9(ebook)	**US$205**	**£190**

Advanced Ferroelectric and Piezoelectric Materials

With Improved Properties and their Applications

by **Ivan A Parinov** *(Southern Federal University, Russia)*, **Sergey V Zubkov** *(Southern Federal University, Russia)*, **Alexander S Skaliukh** *(Southern Federal University, Russia)*, **Valery A Chebanenko** *(Southern Scientific Center of the Russian Academy of Sciences, Russia)*, **Alexander V Cherpakov** *(Southern Federal University, Russia)* & **Yuri E Drobotov** *(Southern Federal University, Russia)*

Discover the latest advances in ferroelectric and piezoelectric material sciences with this comprehensive monograph, divided into six chapters, each offering unique insights into the field.The authors present a comprehensive mathematical model that allows the determination of various characteristics.

As a diverse addition to the literature, this book is a relevant resource for researchers, engineers, and students seeking to expand their knowledge of cutting-edge developments in this exciting field.

250pp	**Jan 2024**	
978-981-128-424-3	**US$98**	**£90**
978-981-128-425-0(ebook)	**US$157**	**£145**

ASTRONOMY, ASTROPHYSICS, COSMOLOGY AND GEOPHYSICS

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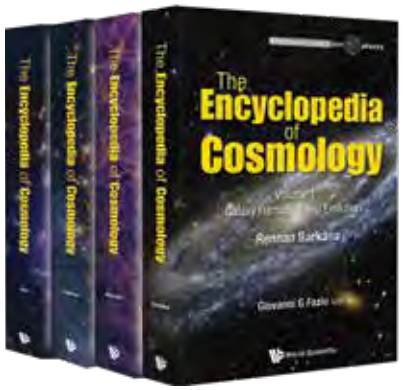


World Scientific Series in Astrophysics

The Encyclopedia of Cosmology

(In 4 Volumes)
Volume 1: Galaxy Formation and Evolution
Volume 2: Numerical Simulations in Cosmology
Volume 3: Dark Energy
Volume 4: Dark Matter

by **Rennan Barkana** *(Tel Aviv University, Israel)*, **Shinji Tsujikawa** *(Tokyo University of Science, Japan)* & **Jihn E Kim** *(Seoul National University, South Korea)*

edited by **Kentaro Nagamine** *(Osaka University, Japan & University of Nevada, Las Vegas, USA)*

Editor-in-chief: **Giovanni G Fazio** *(Harvard Smithsonian Center for Astrophysics, USA)*

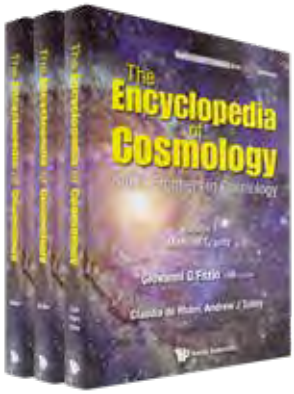
The book in four volumes, is a major, long-lasting, seminal reference at the graduate student level, laid out by the most prominent, respected researchers in the general field of Cosmology. These volumes will be a comprehensive review of the most important concepts and current status in the field, covering both theory and observation.

One of the attractive features of the encyclopedia is that it is accompanied by supplementary materials including videos and simulations of the numerical computation. This will help the readers to better understand and visualize the concepts discussed.

Readership: Graduate students and researchers interested in cosmology and astrophysics.

1404pp May 2018
978-981-4656-19-1(Set)
US$1280 £1180

978-981-4656-20-7(Set)(ebook)
US$2048 £1885



World Scientific Series in Astrophysics

The Encyclopedia of Cosmology

Set 2: Frontiers in Cosmology
(In 3 Volumes)
Volume 1: Modified Gravity
Volume 2: Neutrino Physics and Astrophysics
Volume 3: Black Holes

by **Claudia de Rham** *(Imperial College London, UK)* & **Andrew J Tolley** *(Imperial College London, UK)*

Edited by: **Floyd W Stecker** *(NASA/Goddard Space Flight Center, USA & University of California, Los Angeles, USA)* & **Zoltan Haiman** *(Columbia University, USA)*

Editor-in-chief: **Giovanni G Fazio** *(Harvard & Smithsonian, USA)*

The second set of *The Encyclopedia of Cosmology*, in three volumes, continues this major, long-lasting, seminal reference at the graduate student level laid out by the most prominent researchers in the general field of cosmology. Together, these volumes will be a comprehensive review of the most important current topics in cosmology, discussing the important concepts and current status in each field, covering both theory and observation.

These three volumes are edited by Dr Giovanni Fazio from the Center for Astrophysics

Readership: University astronomy departments (faculty, graduate and undergraduate students), researchers in the field of astrophysics, in particular, cosmology.

1440pp Nov 2023
978-981-128-969-9
US$950 £835

978-981-128-970-5(Set)(ebook)
US$1888 £1740

World Scientific Series in Astrophysics

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Volume 2: UV, Optical & IR Instrumentation: Part 1
Volume 3: UV, Optical & IR Instrumentation: Part 2
Volume 4: X-Ray Astronomical Instrumentation
Volume 5: Gamma-Ray and Multimessenger Astronomical Instrumentation

edited by **Alex Wolszczan** *(The Pennsylvania State University, USA)* & **Anna M Moore** *(Australian National University, Australia)*

Editor-in-chief: **David N Burrows** *(The Pennsylvania State University, USA)*

Review of Volume 4:
"The Handbook can be a good reference for a higher-degree science student approaching the subject or for an expert in a similar field in astronomical instrumentation. The reader requiring an in-depth presentation of a specific topic will be guided by the rich reference lists included at the end of each chapter."
The Observatory

The authors aim to produce a comprehensive handbook of the current state of the art of astronomical instrumentation with a forward view encompassing the next decade. The purpose of this handbook is to bring together some of the leading experts in the world to discuss the frontier of astronomical instrumentation across the electromagnetic spectrum and extending into multimessenger astronomy.

Readership: Graduate students and practitioners in the field of astronomical instrumentation.

1556pp Jul 2021
978-981-4644-31-0(Set)
US$1850 £1700

978-981-4644-33-4(Set)(ebook)
US$2960 £2725

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Space Time and Dark Matter

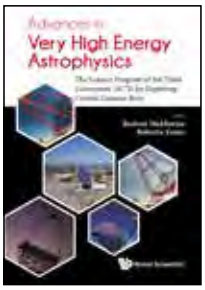
The Hidden Sectors of Particle Physics and Cosmology

by **Alberto Grasso** *(Italian Ministry of Education, Universities and Research, Italy)*

This book critically explores the role of the "space time" by fixing the representations of its underlying symmetries and classifying the relevant scattering portals of the principal dark matter candidates. With particular reference to the experimental constraints on annihilation and direct detection cross sections, the author in a consistent way reviews the kinetic and thermodynamic evolution since the decoupling era of what would have become the dark matter relics at the cosmological scale and the dark halos at the galactic scale.

350pp	**Nov 2024**	
978-981-3276-94-9	**US$128**	**£120**
978-981-3276-95-6(ebook)	**US$205**	**£190**

Advances in Very High Energy Astrophysics



The Science Program of the Third Generation IACTs for Exploring Cosmic Gamma Rays

edited by **Reshmi Mukherjee** *(Columbia University, USA)* & **Roberta Zanin** *(Cherenkov Telescope Array Observatory gGmbH, Italy)*

This book reviews the progress in the field since the advent of the second generation IACTs around 2004. Going through the scientific highlights obtained by the three current instruments of this kind, H.E.S.S., MAGIC and VERITAS, operating now for more than 15 years, this book presents knowledge in four areas of modern astrophysics and cosmology, namely the origin of the cosmic rays, the physics of compact objects and their resulting relativistic outflows, gamma-ray cosmology, and the search for dark matter. Along with a detailed review of the outstanding scientific outcomes, a summary of the key technological developments that yielded the recognized success of the technique is also provided.

250pp	**Feb 2024**	
978-981-3275-71-3	**US$118**	**£110**
978-981-3275-72-0(ebook)	**US$189**	**£175**

Spacetime Geometry of Relativity

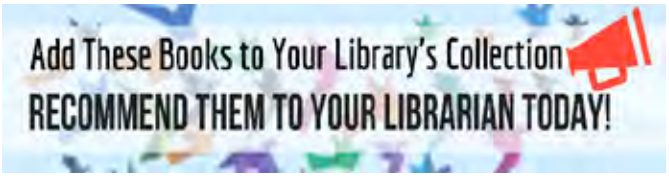
Extending Pythagorean Theorem

by **Takashi Kenjo** *(NIDEC Motor Engineering Research Laboratory, Japan)* & **Shigeru Sano** *(NIDEC Motor Engineering Research Laboratory, Japan)*

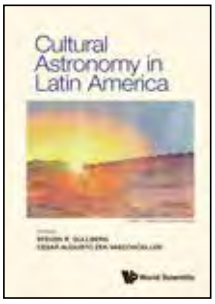
The theory of relativity was created by Einstein in two stages, extending over a decade from 1905 to 1915. General relativity is said to be the most powerful tool that can be used to explain the behavior of the universe.

The book aims to comprehend the universe with a fundamental formula known as the Pythagorean theorem, used as a vehicle to review the essence of Euclidean geometry and non-Euclidean geometry, then move on to Newtonian mechanics, and review the historical development of electromagnetism, setting the stage for special relativity. The book introducing the work of Roger Penrose on black holes, which is closely related to Schwarzschild's solution, and the existence of intrinsic singularity at the center of black holes.

500pp	**Jan 2024**	
978-981-128-575-2	**US$148**	**£135**
978-981-128-576-9(ebook)	**US$237**	**£220**



Cultural Astronomy in Latin America



edited by **Steven R Gullberg** *(University of Oklahoma, USA)* & **César Augusto Zen Vasconcellos** *(Universidade Federal do Rio Grande do Sul (UFRGS), Brazil & International Center for Relativistic Astrophysics Network (ICRANet), Italy)*

This book provides a unique view of Astronomy in Culture, Archaeoastronomy and Ethnoastronomy involving ancient civilizations in Latin America, emphasizing scientific and cultural knowledge combined with historical, cognitive, archaeological and anthropological aspects. Topics covered in the book include different associations of ancient civilizations with the stars and planets, whether in farming, architecture, social organization, beliefs, myths, religion, metric systems, calendar construction, shrines, and variations in astronomical research methods.

404pp	**Jan 2024**	
978-981-128-192-1	**US$148**	**£135**
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The Physics of Supernovae and Their Mathematical Models

by **Alexey G Aksenov** *(Russian Academy of Sciences, Russia)* & **Valery M Chechetkin** *(Russian Academy of Sciences, Russia)*

This book is dedicated to the theory of supernovae, focussing on new computational methods and simulations. It contains three parts: basic principles, numerical methods, and applications. The first part contains the non-formal introduction into the topics of supernovae, Boltzmann kinetic equations — with details of two particles reaction rate calculations — and the transformation of Boltzmann kinetic equations into hydrodynamic elements of statistical physics. It contains the equation of state for matter of high energy density, with details of calculations for thermodynamic parameters, weak interactions reaction rate details, and thermonuclear burning. The second part introduces elements of computational physics.

300pp	**Jan 2024**	
978-981-128-509-7	**US$108**	**£100**
978-981-128-510-3(ebook)	**US$173**	**£160**

The Enchantment of Urania

25 Centuries of Exploration of the Sky

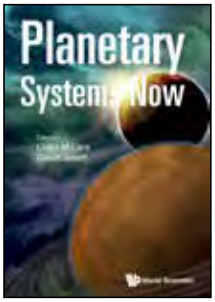
by **Massimo Capaccioli** *(University of Naples Federico II, Italy)*

We have learned of the existence of another type of matter, indifferent to light and yet decisive for the formation of galaxies, and we have a hint of a dark energy that since the last 4.5 billion years has taken over the control of the cosmos The book is a narration of the answers to these questions that had evolved over time: a progressive path, inserted in the general history, with some second thoughts and many obstacles. This is a saga of men and machines where greatness sometimes mixes with misery and passion often borders on sacrifice and even martyrdom.

The challenge has been to present this complex and intricate subject without resorting to any formulas, so that it can be accessible to a wide audience of curious people, including high school and university students and in general all those who normally keep themselves informed of scientific things. A rich bibliography has also been added in the appendix for those wishing to learn more on one or more topics.

550pp	**Dec 2023**	
978-981-124-927-3(pbk)	**US$48**	**£45**
978-981-124-777-4	**US$98**	**£90**
978-981-124-778-1(ebook)	**US$157**	**£145**

Planetary Systems Now



edited by **Luisa M Lara** *(Instituto de Astrofísica de Andalucía - CSIC, Granada, Spain)* & **David Jewitt** *(University of California, Los Angeles, USA)*

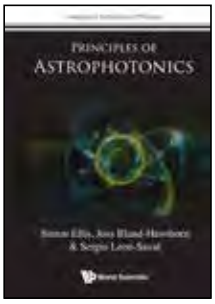
"… What is striking, however, is the limited number of books that provide stimulating, more general, overviews of this information and that give the interested student a well thought-out, immediately accessible text to bring to them to the forefront of the field. Lara and Jewitt have collated a cohesive set of well-explained chapters that beautifully fit in this gap incorporating material that is highly relevant for any student wishing to obtain a broad background in planetary science today."

Nicolas Thomas
Prof. of Experimental Physics
University of Bern, Switzerland

440pp	**May 2023**	
978-1-80061-313-3	**US$148**	**£135**
978-1-80061-314-0(ebook)	**US$237**	**£220**

Advanced Textbooks in Physics

Principles of Astrophotonics



by **Simon Ellis** *(Macquarie University, Australia)*, **Joss Bland-Hawthorn** *(The University of Sydney, Australia)* & **Sergio Leon-Saval** *(The University of Sydney, Australia)*

"… The material covered by this textbook is thorough, up-to-date, and clearly laid out in three sections: a comprehensive review of key concepts of astronomical instrumentation and photonics to bring readers up to speed in both technical areas, a detailed discussion of several astrophotonic devices demonstrated in the lab or on-sky, and an inspiring section on unexploited photonics and the future of astrophotonics. This book is bound to become an indispensable pedagogical tool for students and teachers and an important reference source for experienced researchers in astrophotonics."

Sylvain Veilleux
Professor, Optical Director
Department of Astronomy
University of Maryland

This is the first book focussed on astrophotonics, written by three experts in the field. Beginning with a sound introduction to the basic principles of astrophotonics, it is intended to communicate the current status, potential, and future possibilities of astrophotonics to the wider astronomical, optics and photonics communities.

284pp	**Apr 2023**	
978-1-80061-335-5(pbk)	**US$48**	**£45**
978-1-80061-325-6	**US$98**	**£90**
978-1-80061-326-3(ebook)	**US$157**	**£145**

About the Biggest, the Smallest, and Everything Else

Travelling Through the Universe with a Physicist Guide

by **Serge Parnovsky** *(Taras Shevchenko National University of Kyiv, Ukraine)*

It is written as a guide for a tour along the ladder of scales from the Universe as a whole to the microcosm. The main scales are the Universe, Solar System, the Earth, normal human size, atoms, and elementary particles. Exotic objects such as black holes and neutron stars are also considered, as well as the foundations of the scientific method, its connection with philosophy, and a story about how modern science arose. This book contains many useful illustrations.

568pp	**Jan 2023**	
978-981-125-603-5	**US$148**	**£135**
978-981-125-604-2(ebook)	**US$237**	**£220**

Shadows of the Circle

From Conic Sections to Planetary Motion
2nd Edition

by **Vagn Lundsgaard Hansen**
(Technical University of Denmark, Denmark)

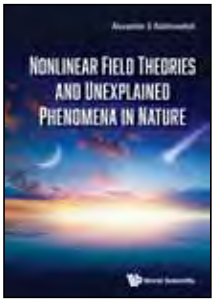
Reviews of the First Edition:
"This lively written book shows that even "old fashioned" geometry such as conic sections can be presented in a very attractive form ... The text under review maintains a nice balance between informal presentation of mathematical problems, their connections and history on one hand and concrete mathematics on the other."

Mathematical Reviews

In the second edition, the four chapters in the first edition on conic sections (two chapters), isoperimetric problems for plane figures, and non-Euclidean geometry, are treated in four revised chapters with many new exercises added. In three new chapters, the reader is taken through mathematics in curves, mathematics in a Nautilus shell, and mathematics in the panorama of the heavens. In all chapters of the book, the circle plays a prominent role.

224pp	**Jan 2025**	
978-981-126-092-6	**US$68**	**£65**
978-981-126-096-4(ebook)	**US$109**	**£100**

Nonlinear Field Theories and Unexplained Phenomena in Nature



by **Alexander S Rabinowitch**
(HSE University, Russia)

The book is devoted to several topical questions in modern mathematical and theoretical physics, astrophysics, geophysics, and cosmology that remain unsolved within the framework of the standard approaches. To them, one can attribute unexplained properties of the magnetic fields of stars and planets, puzzles of the Earth's atmosphere, the phenomenon of ball lightning, the problem of a qualitative description for nuclear forces and their well-known property of saturation, enigmatic properties of spiral galaxies, the problem of the cosmological singularity, mysteries of the dark matter and dark energy, amongst others. To find theoretical ways for understanding such phenomena, new nonlinear generalizations of the classical field theories and advanced methods to solve nonlinear equations arising in them are studied and presented in this book.

324pp	**Jul 2023**	
978-981-126-411-5	**US$118**	**£110**
978-981-126-412-2(ebook)	**US$189**	**£175**

Enigma of the Skies

Unveiling the Secrets of Auroras

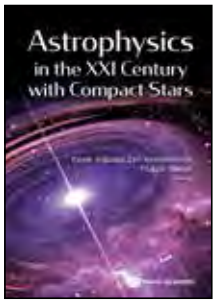
by **Yohsuke Kamide** *(Rikubetsu Space and Earth Science Museum, Japan & Nagoya University, Japan)*, **Yoshi Otsuka** *(Nanook Aurora Tours, Canada)*

Edited by: **Yusuke Ebihara**
(Kyoto University, Japan)

Enigma of the Skies is a joint endeavor by a scientist and a photographer to present to readers everything there is to know about auroras in an easy-to-understand matter. It explains the phenomena and describes how to predict when auroras occur using simple physics alongside a collection of beautiful photos taken both from Earth and from space. The book contains original photos taken from Earth and from space

160pp	**Oct 2022**	
978-981-123-039-4(pbk)	**US$38**	**£35**
978-981-122-877-3	**US$88**	**£80**
978-981-122-878-0(ebook)	**US$141**	**£130**

Astrophysics in the XXI Century with Compact Stars



edited by **César Augusto Zen Vasconcellos** *(Universidade Federal do Rio Grande do Sul, Brazil & ICRANet, Italy)* & **Fridolin Weber** *(San Diego State University, USA & University of California at San Diego, USA)*

"Most chapters include large numbers of references that are likely to be valuable for investigators working in these areas. Both observers and theorists may therefore find this volume to be a useful resource."
The Observatory

There are reasons to believe the 21st century will be the best ever for astrophysics: the James Webb Space Telescope will extend nearly twenty times the present observational limit of visible light; neutrino massiveness opens a new window for exploration on dark energy and dark matter physics and is expected to provide insights into the fate of the Universe; the Higgs boson may allow for an understanding of the weakness of gravity; gravitational waves produced at the birth of the Universe and by compact stellar objects (supermassive black holes, black hole/neutron star mergers, gamma-ray bursts, white dwarf inspirals) have unveiled a new area of astronomy. Against this background, compact stars, the theme of this volume, present unique astrophysical laboratories for probing the fabric of space-time and the building blocks of matter and their interactions at physical regimes not attainable in terrestrial laboratories.

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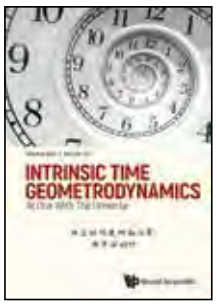
Intrinsic Time Geometrodynamics



At One With The Universe
by **Chopin Soo** *(National Cheng Kung University, Taiwan)* & **Hoi Lai Yu** *(Academia Sinica, Taiwan)*

The book provides a thorough discussion of the canonical framework of Einstein's theory and its extensions without the paradigm of four covariance. Discourse on the synergy among Initial State of the Universe, Penrose Weyl Curvature Hypothesis, and physical signatures of Quantum Gravity in the early universe.

Readership: Graduate students, researchers and practitioners in General Relativity and Gravitation, Cosmology, Quantum Field Theory,

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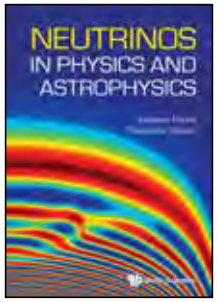
Neutrinos in Physics and Astrophysics



by **Esteban Roulet** *(CONICET, Argentina)* & **Francesco Vissani** *(INFN, Italy)*

This book covers the field of neutrino physics and astrophysics, providing an up-to-date presentation of the different research topics on the frontier of the field. It starts with a historical description to understand how the different aspects of our knowledge about the neutrinos evolved up to the present state. Authors introduce the various ways to give neutrinos a mass and the phenomenon of neutrino oscillations which provides the main evidence for non-vanishing neutrino masses. We then consider the neutrinos produced in the Sun, what we have learned from them, and how they can also be useful to study our star.

Readership: Advanced undergraduate and graduate, researchers particle physics,astrophysics,and cosmology.

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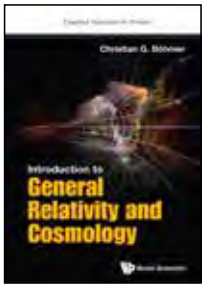

by **Christian G Böhmer**
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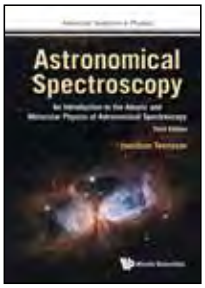

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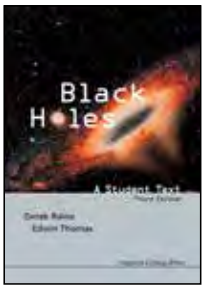

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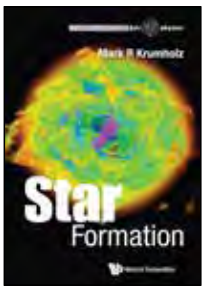

by **Mark R Krumholz**
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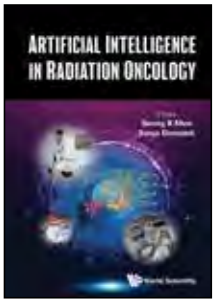

edited by **Seong K Mun** *(Virginia Tech, USA)* & **Sonja Dieterich** *(University of California, Davis, USA)*

"... Perspectives are offered from major universities, commercial firms, and university-based hospital systems, and software vendors. Aspects of the Radiation Oncology process are examined from an AI perspective, including treatment planning, image analysis, genetics, radiomics, and patient safety. The book concludes discussing ethics. The reader will gain knowledge to pursue the use of Artificial Intelligence within the clinic, how to use these systems, and determine the best treatment possible for their patients."

Coleman W Rosen, MS, DABR
MedStar RadAmerica
Vice President - Technical Management

392pp	**Jan 2023**	
978-981-126-353-8	**US$148**	**£135**
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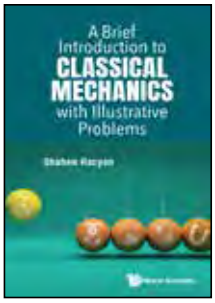
CLASSICAL MECHANICS, CONTINUUM PHYSICS AND ACOUSTICS

A Brief Introduction to Classical Mechanics with Illustrative Problems



by **Shahen Hacyan** *(Universidad Nacional Autónoma de México, Mexico)*

Based on the lecture notes for a course on Classical Mechanics. Unlike other textbooks, exercises are not included because the main goal is to equip students with the skills to problem-solve. An old-fashioned yet efficient method has been to provide a step-by-step derivation of the fundamental formulas, giving students an overview of the subject through various illustrative examples and showing how to apply the general results to relevant problems in Classical Mechanics.

Readership: Graduate students in Classical Mechanics with a basic knowledge of Calculus.

184pp	**Oct 2023**	
978-981-127-535-7(pbk)	**US$28**	**£25**
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by **Torsten Fliessbach** *(University of Siegen, Germany)*

This textbook introduces the field of mechanics. Within the framework of elementary Newtonian mechanics, the basic concepts — such as trajectory curves, mass point, equations of motion, reference frames — are introduced. The book also deals in detail with special relativity (principle of relativity by Einstein, length contraction, time dilation, relativistic equation of motion, production of heavy particles, twin paradox, etc.), and is supplemented with an appendix that examines the relation between the Newtonian force and the Minkowksi force.

Readership: Undergraduates in physics and engineering.

480pp	**Feb 2024**	
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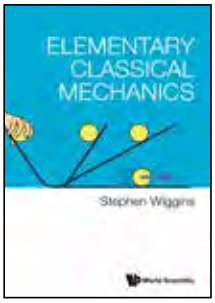
Elementary Classical Mechanics



by **Stephen Wiggins** *(University of Bristol, UK)*

This book develops elementary classical mechanics in a setting that is appropriate for beginning university mathematics students without requiring a background in physics. It is an ideal first look at the subject for those who will go on to study more advanced aspects of the subject, such as Lagrangian, Hamiltonian, and quantum mechanics. These more advanced developments of mechanics are at the forefront of research in modern mathematics. Certainly, topics such as symplectic geometry, Lagrangian intersection theory, spectral theory, pseudodifferential operators, etc. do not require a background in classical mechanics, but studies in these areas are greatly enriched by a knowledge of their roots and how some of their motivational issues arose.

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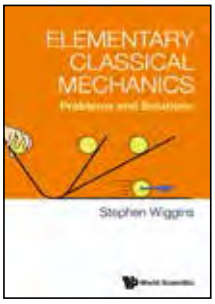
Elementary Classical Mechanics

Problems and Solutions



by **Stephen Wiggins** *(University of Bristol, UK)*

This *Problems and Solutions* book addresses the numerous problems in the textbook that develops elementary classical mechanics in a setting that is appropriate for beginning university mathematics students without requiring a background in physics. It is an ideal first look at the subject for those who will go on to study more advanced aspects of the subject, such as Lagrangian, Hamiltonian, and quantum mechanics. These more advanced developments of mechanics are at the forefront of research in modern mathematics. Certainly, topics such as symplectic geometry, Lagrangian intersection theory, spectral theory, pseudodifferential operators, etc. do not require a background in classical mechanics, but studies in these areas are greatly enriched by a knowledge of their roots and how some of their motivational issues arose.

Readership: Undergraduate students in physics, mathematics and engineering.

88pp	**Jul 2023**	
978-981-127-748-1(pbk)	**US$24**	**£20**
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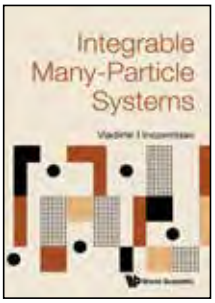
Integrable Many-Particle Systems



by **Vladimir I Inozemtsev** *(Joint Institute for Nuclear Research, Russia)*

It is commonly known that three or more particles interacting via a two-body potential is an intractable problem. However, similar systems confined to one dimension yield exactly solvable equations, which have seeded widely pursued studies of one-dimensional n-body problems. This book is written with concerning the models of many-particle systems, such as the interaction between light particles and infinitely massive particles, as well as interacting quasiparticles. Author introduces readers to interesting problems in mathematical physics, with the prime objective of finding integrals of motion for classical many-particle systems as well as the exact solutions of the corresponding equations of motions. The book focuses on a quintessential problem in the quantum theory of magnetism: namely, to find all integrable one-dimensional systems involving quasiparticles of interacting one-half spins.

268pp	**Jun 2023**	
978-1-80061-381-2	**US$78**	**£70**
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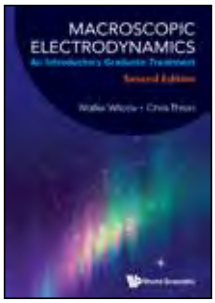
Macroscopic Electrodynamics



An Introductory Graduate Treatment
2nd Edition
by **Walter Wilcox** *(Baylor University, USA)* & **Chris Thron** *(Texas A&M University, USA)*

This is a comprehensive two-semester introductory graduate level textbook on classical electrodynamics for use in physics and engineering programs. Macroscopic Electrodynamics emphasizes principles and practical methods of analysis, which are often presented in fresh and original ways. At the end of each chapter, many original problems are provided with illustrations or expanded upon specific sections of the text.

700pp	**Jan 2024**	
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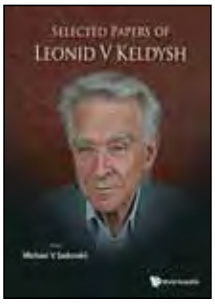
Selected Papers of Leonid V Keldysh



edited by **Michael V Sadovskii**
(Russian Academy of Sciences, Russia)

This book is a compilation of reprints of the major works by the prominent Soviet and Russian theoretical physicists, Leonid V Keldysh. He made important contributions to condensed matter theory, developing new approaches and methods, and discovering beautiful new physical effects later confirmed by experiments. Keldysh developed the consistent theory of phonon assisted tunneling in semiconductors and calculated the electric field induced shift of absorption edge in semiconductors, what is now called Franz – Keldysh effect.

Readership: Studying these classic papers may be equally inspiring both to young and well-experienced scientists working in the fields of theoretical physics, condensed matter, semiconductors, optics and laser physics. Many stimulating ideas of L V Keldysh may still be helpful for modern physicists.

308pp	**Nov 2023**	
978-981-127-945-4	**US$118**	**£110**
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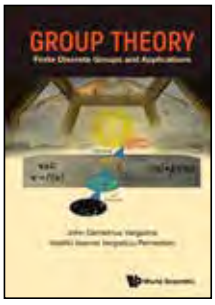
Group Theory



Finite Discrete Groups and Applications
by **John Demetrius Vergados** *(University of Ioannina, Greece)* & **Vasiliki-Ioanna Vergadou-Remediaki**

This book deals with the role played by symmetry in the understanding of the physical world, beginning with the notion of geometric symmetries of the ancient Greek philosophers and mathematicians. The recognition of the existence of symmetries led to the notion of transformations, which led from one state of the system to another. The book provides a good balance between mathematical rigor and utilizing the mathematical results for obtaining useful applications without too much demand on the student. It contains many suitable illustrative examples, accompanied with useful figures and tables.

Readership: Undergraduate and graduate students in related field for their course and researchers in group theory.

364pp	**Jul 2023**	
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R Shankar
J W Gibbs Professor of Physics
Professor of Applied Physics
Yale University

Yoichiro Nambu was one of the giants in the physics of the last century. His profound ideas in fundamental physics are still playing an important role and are being rediscovered over and over again.

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Professor H Arthur Weldon
West Virginia University

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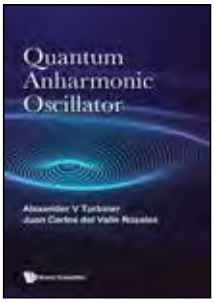
Quantum Anharmonic Oscillator



by **Alexander V Turbiner** *(National Autonomous University of Mexico, Mexico)* & **Juan Carlos del Valle Rosales** *(National Autonomous University of Mexico, Mexico)*

This book is focused on studying eigenfunctions as a primary object for any g^2. Perturbation theory in g^2 for the logarithm of the wavefunction is matched to the true semiclassical expansion in powers of $\hbar$: it leads to locally-highly-accurate, uniform approximation valid for any $g^2 \in [0,\infty)$ for eigenfunctions and even more accurate results for eigenvalues. This method of matching can be easily extended to the general anharmonic oscillator as well as to the radial oscillators. Quartic, sextic and cubic (for radial case) oscillators are considered in detail as well as quartic double-well potential.

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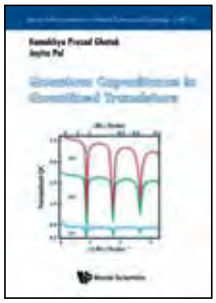

Quantum Capacitance in Quantized Transistors

by **Kamakhya Prasad Ghatak** *(University of Engineering and Management, India)* & **Jayita Pal** *(Meghnad Saha Institute of Technology, India)*

This book provides comprehensive information of the Quantum Capacitance In Quantized Transistors and we have considered the quantum capacitances in 2D MOSFETs of non-linear optical, ternary, quaternary, III-V compounds, II-VI, IV-VI, stressed Kane type, Ge, Gap, Bismuth telluride, Gallium Antimonide and their 1D NWFETs counter parts. This book contains 100 open research problems which form the integral part of the text and are useful for both Ph.D. aspirants and researchers.

620pp	**Feb 2024**	
978-981-127-939-3	**US$168**	**£155**
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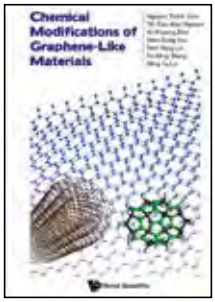
Chemical Modifications of Graphene-Like Materials



by **Nguyen Thanh Tien** *(Can Tho University, Vietnam)*, **Thi Dieu Hien Nguyen** *(National Cheng Kung University, Taiwan)*, **Vo Khuong Dien** *(National Cheng Kung University, Taiwan)*, **Wen-Dung Hsu** *(National Cheng Kung University, Taiwan)*, **Shih-Yang Lin** *(National Cheng Kung University, Taiwan)*, **Yu-Ming Wang** *(National Cheng Kung University, Taiwan)* & **Ming-Fa Lin** *(National Cheng Kung University, Taiwan)*

The contents present the diverse phenomena under development in the grand quasiparticle framework through the first-principles calculations. The scope of the book is sufficiently broad and deep in terms of the geometric, electronic, magnetic, and optical properties of 3D, 2D, 1D, and 0D graphene-like materials with different kinds of chemical modifications. It provides an obvious strategy for the theoretical framework, very useful for science and engineering communities.

600pp	**Jan 2024**	
978-981-126-793-2	**US$178**	**£165**
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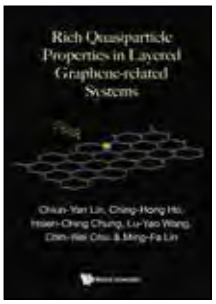
Rich Quasiparticle Properties in Layered Graphene-related Systems



by **Chiun-Yan Lin** *(National Cheng Kung University, Taiwan)*, **Ching-Hong Ho** *(National Cheng Kung University, Taiwan)*, **Hsien-Ching Chung** *(National Cheng Kung University, Taiwan)*, **Lu-Yao Wang** *(National Cheng Kung University, Taiwan)*, **Chih-Wei Chiu** *(National Cheng Kung University, Taiwan)* & **Ming-Fa Lin** *(National Cheng Kung University, Taiwan)*

This book delves into the quasiparticle properties of graphene-related materials. The authors thoroughly explore the intricate effects of intrinsic and extrinsic interactions on the material's properties, while unifying the single-particle and many-particle properties through the development of a theoretical framework. The book covers a wide range of research topics, including long-range Coulomb interactions, dynamic charge density waves, Friedel oscillations and plasmon excitations, as well as optical reflection and transmission spectra of thin films.

550pp	**Jan 2024**	
978-981-127-778-8	**US$158**	**£145**
978-981-127-779-5(ebook)	**US$253**	**£235**

Hydrodynamic Scales of Integrable Many-Body Systems

by **Herbert Spohn** *(Technical University of Munich, Germany)*

This book provides an introduction to integrable systems with many degrees of freedom. Within the much larger domain, there are well studied classical models such as Toda lattice, Calogero fluid, Ablowitz-Ladik discretized nonlinear Schrö dinger equation, and Korteweg-de Vries equation. For quantum mechanical systems, there are the Lieb-Liniger delta-Bose gas and the quantum Toda fluid. While integrable microscopic models are very diverse, the central theme of this book is to elucidate their structural similarity on hydrodynamic scales.

240pp	**Dec 2023**	
978-981-128-352-9	**US$88**	**£80**
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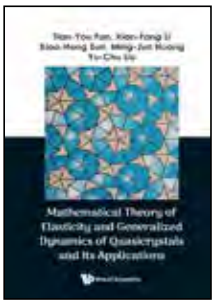
Mathematical Theory of Elasticity and Generalized Dynamics of Quasicrystals and Its Applications



by **Tian-You Fan** *(Beijing Institute of Technology, China)*, **Xian-Fang Li** *(Central South University, China)*, **Xiao-Hong Sun** *(Zheng Zhou University, China)*, **Ming-Jun Huang** *(South China University of Technology, China)* & **Yu-Chu Liu** *(South China University of Technology, China)*

This book gives a detailed description on mathematical theory of elasticity and generalized dynamics of solid quasicrystals and its applications. This book is the first and only monograph in the scope of quasicrystals since first published in 1999 in China and worldwide. In this edition, the two-dimensional quasicrystals of second kind, soft-matter quasicrystals and photonic bade-gap and application of photonic quasicrystals are added. This book combines the mechanical and physical behavior of quasicrystals and mathematical physics.

Readership: Graduate students and researchers in the field of new materials, condensed matter physics, applied mathematics and engineering science.

500pp	**Dec 2023**	
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Series in Soft Condensed Matter - Vol 8

Wet Granular Matter

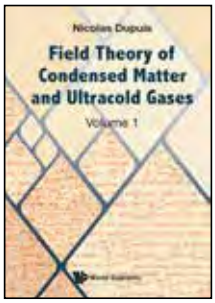
A Truly Complex Fluid
2nd Edition

by **Stephan Herminghaus** *(Max Planck Institute for Dynamics and Self-Organisation, Germany)*

This is a monograph written for the young and advanced researcher who is entering the field of wet granular matter, keen to understand the basic physical principles governing this state of soft matter. It treats wet granulates as a ternary system consisting of the grains, a primary, and a secondary fluid. After generally addressing wetting phenomena and outlining the basic facts on dry granular systems, a chapter on basic mechanisms and their effects is dedicated to every region of the ternary phase diagram.

344pp	**Oct 2023**	
978-981-128-225-6	**US$128**	**£120**
978-981-128-226-3(ebook)	**US$205**	**£190**

Field Theory of Condensed Matter and Ultracold Gases



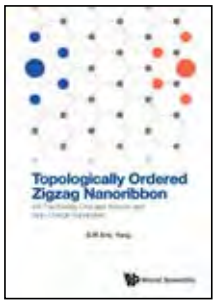
Volume 1

by **Nicolas Dupuis** *(CNRS, France & Sorbonne Université, France)*

This book provides a pedagogical introduction to the concepts and methods of quantum field theory necessary for the study of condensed matter and ultracold atomic gases. After a thorough discussion of the basic methods of field theory and many-body physics (functional integrals, perturbation theory, Feynman diagrams, correlation functions and linear response theory, symmetries and their consequences, etc.), the book covers a wide range of topics, from electron gas and Fermi-liquid theory to superfluidity and superconductivity, magnetic instabilities in electron systems, and dynamical mean-field theory of Mott transition.

688pp	**Aug 2023**	
978-1-80061-390-4	**US$178**	**£165**
978-1-80061-391-1(ebook)	**US$285**	**£260**

Topologically Ordered Zigzag Nanoribbon



e/2 Fractionally Charged Anyons and Spin-Charge Separation

by **S-R Eric Yang** *(Korea University, South Korea)*

"This book is a very pedagogical book that can introduce various examples of topological electronic systems to the students who want to study modern condensed matter physics. In order to draw the conclusion regarding the topological order in zigzag graphene nanoribbons, the author introduces several key concepts of topological state of matter, including Berry phase, Chern number, superconductivity and quantum Hall effect, zero energy solitons. The book is suitable for a graduate-level textbook with many examples and well-designed self-study problems."

Prof Philip Kim
Harvard University

This is the first graduate level textbook of topologically ordered phases with emphasis on graphene zigzag nanoribbons. It also explains common properties of several other topologically ordered phases as well as the e/2 fractional charge quantization and spin-charge separation of an electron.

564pp	**May 2023**	
978-981-126-189-3	**US$168**	**£155**
978-981-126-190-9(ebook)	**US$269**	**£245**

Second Harmonic and Sum-Frequency Spectroscopy

Basics and Applications

by **Yuen-Ron Shen** *(University of California, Berkeley, USA)*

The book provides a comprehensible description on the basics of the technique and gives detailed accounts with illustrating examples on the wide range of applications of the technique. It clearly points out the unique capabilities of the technique as a spectroscopic tool for studies of bulk and interface structures in different disciplines. underscores recent advances of sum-frequency spectroscopy at the technical front as well as over its wide range of applications, with the author's perspective in each area. Most chapters end with a section of summary and prospects that hopefully can help stimulate interest to further develop the technique and explore possibilities of applying the technique.

400pp	**Mar 2023**	
978-981-126-227-2	**US$148**	**£135**
978-981-126-228-9(ebook)	**US$237**	**£220**

Discontinuous Phase Transitions in Condensed Matter

Symmetry Breaking in Bulk Martensite, Quasiperiodic and Low-Dimensional Nanostructures

by **Vladimir Dmitriev** *(ESRF, France)*

The book also considers the applicability domains of the symmetry-based approach in physics of low-dimensional systems. It includes comparisons of stability of different surface superstructures and metal monoatomic coverage structures on the surface of single-crystalline substrates. The example of the twisted graphene bilayer demonstrates how parametrization in the spirit of an advanced phenomenological approach can establish symmetry-controlled, and therefore model-free, links between geometrical parameters of the twisted bilayer structure and reconstruction of its Brillouin zone and energy bands.

468pp	**Feb 2023**	
978-1-80061-291-4	**US$158**	**£145**
978-1-80061-292-1(ebook)	**US$253**	**£235**

Magnetism of Heavy-Fermion Metals

by **William Knafo** *(CNRS, France)*

Correlated-electron systems offer a unique playground for discovering and studying new quantum states of matter, at the crossway between itinerant quantum magnetism and unconventional superconductivity. The understanding of their basic properties, although needing experimental environments which cannot be transposed at industrial scales, will surely benefit within mid- and long-term perspectives to future revolutionary applications in the domains of applied physics, micro and nano-electronics, energetics.

As textbook examples of quantum magnets and unconventional superconductors, heavy-fermion compounds offer a fertile ground for testing new concepts in condensed matter. Quantum magnetic phase transitions can be easily tuned experimentally, leading to a large variety of electronic ground states, from a heavy Fermi liquid to long-range magnetic-order and unconventional superconducting phases. This book written by William Knafo, an expert in correlated-electron physics, proposes a systematic and thorough review on the experimental advances in the study of magnetism in heavy-fermion metals over the last decades. The phase diagrams of these quantum materials under multiple sets of tuning parameters, the questions of the dual localized-itinerant nature of the f-electrons and of the critical role of magnetic fluctuations, in relation with nearby quantum magnetic phase transitions and the stabilization of superconductivity, are carefully addressed.

Readership: Graduate students and research professionals in condensed matter physics.

300pp	**Apr 2024**	
978-981-126-579-2	**US$118**	**£110**
978-981-126-580-8(ebook)	**US$189**	**£175**

A New Perspective and a Foundation on Topological Nanodevices

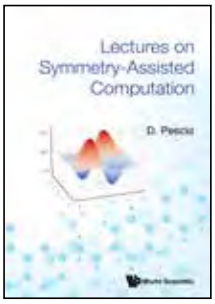
by **Felix A Buot** *(University of SanCarlos Nasipit, Philippines)*

This book employs nonequilibrium quantum transport, based on the use of mixed Hilbert space representations and real time quantum superfield transport theory, to explain various topological phases of systems with entangled chiral degrees of freedom. It presents an entirely new perspective on topological systems, entanglement-induced localization and delocalization, integer quantum Hall effect (IQHE), fractional quantum Hall effect (FQHE), and its respective spectral zones in the Hofstadter butterfly spectrum. A simple and powerful, intuitive, and wide-ranging perspective on chiral transport dynamics.

350pp	**Jun 2024**	
978-981-126-471-9	**US$128**	**£120**
978-981-126-472-6(ebook)	**US$205**	**£190**

Lectures on Symmetry-Assisted Computation

by **D Pescia** *(ETH Zurich, Switzerland)*



The lecture Notes have, essentially, two components. The first one reports the content of a set of lectures, held at ETH Zurich at the master and PhD level, frequented mainly by students from the department of Physics, Chemistry and Material Science. The lectures were accompanied by a set of student projects on various scientific subjects related to symmetry. These projects ended with a manuscript, worked out by the students themselves and edited into the second component of these Lecture Notes.

Readership: Advanced undergraduates, graduates and PhD students in the fields of physics in general and condensed matter physics and quantum physics.

550pp	**Mar 2024**	
978-981-128-011-5	**US$148**	**£135**
978-981-128-012-2(ebook)	**US$237**	**£220**

Flexoelectricity in Solid, Soft and Living Matter

by **Yordan G Marinov** *(Bulgarian Academy of Sciences, Bulgaria)* & **Alexander G Petrov** *(Bulgarian Academy of Sciences, Bulgaria)*

This monograph is intended to provide an overview on the achievements in the field of flexoelectricity. Flexoelectricity is a fundamental property of condensed matter, with significant potential for further scientific study, and is highly promising to many applied activities. Organized by the type of condensed matter considered — solid, soft and living — for detailed comparison and analysis, the focus is on the fundamentals of the topic, on experimental methods applied over the years to determine flexoelectric coefficients, as well as on reviewing different and even controversial approaches, all of which could provoke an examination of the subject with fresh eyes.

Readership: Caters to undergraduates, graduates and researchers interested in the subject of flexoelectricity with focus mainly on fundamental flexoelectric studies and possible practical implementations.

300pp	**Aug 2024**	
978-981-3279-00-1	**US$118**	**£110**
978-981-3279-01-8(ebook)	**US$189**	**£175**

New Superconductors: From Granular to High T_C

2nd Edition

by **Guy Deutscher** *(Tel Aviv University, Israel)*

Review of the First Edition

"... readers of New Superconductors will benefit from the unusual and compelling insights of a researcher who has thought deeply about both grandular and high-T_c superconductors. I recommend it as a self-study guide for students, instructors, and researchers who are looking for understandable and crisp material on the potential and promise of high-T_c superconductors."

Physics Today

This book provides the impact of thermodynamical fluctuations and inhomogeneous structure on the properties of the vortex state and the practical properties of First and Second Generation high T_c conductors.

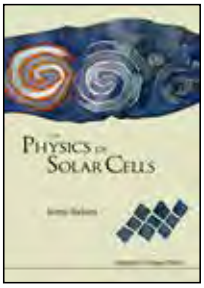
Readership: Condensed matter physicists, researchers and engineers in applied superconductivity.

350pp	**Sep 2024**	
978-981-283-889-6(pbk)	**US$82**	**£75**
978-981-283-888-9	**US$138**	**£125**

FEATURED BACKLIST ON CONDENSED MATTER PHYSICS

The Physics of Solar Cells

by **Jenny Nelson** *(Imperial College, UK)*



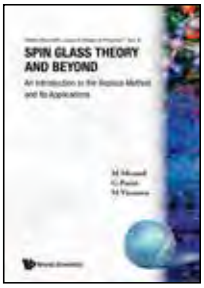
384pp	**May 2003**	
978-1-86094-349-2(pbk)	**US$58**	**£48**
978-1-86094-340-9	**US$104**	**£86**
978-1-84816-126-9(ebook)	**US$166**	**£140**

World Scientific Lecture Notes in Physics - Vol 9

Spin Glass Theory and Beyond

An Introduction to the Replica Method and Its Applications

by **M Mezard** *(Paris)*, **G Parisi** *(Roma)* & **M Virasoro** *(Roma)*



476pp	**Nov 1987**	
978-9971-5-0116-7(pbk)	**US$52**	**£43**
978-9971-5-0115-0	**US$52**	**£43**
978-981-279-937-1(ebook)	**US$98**	**£80**

Fractional Quantum Hall Effects

New Developments

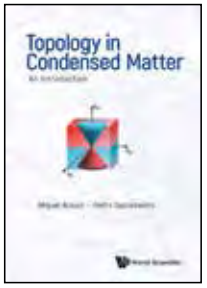
edited by **Bertrand I Halperin** *(Harvard University, USA)* & **Jainendra K Jain** *(Penn State University, USA)*

552pp	**Jun 2020**	
978-981-121-822-4(pbk)	**US$48**	**£45**
978-981-121-748-7	**US$148**	**£135**
978-981-121-749-4(ebook)	**US$237**	**£220**

Topology in Condensed Matter

An Introduction

by **Miguel Araújo** *(University of Évora Portugal)* & **Pedro Sacramento** *(University of Lisbon, Portugal)*



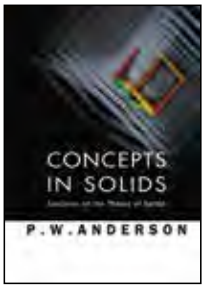
276pp	**May 2021**	
978-981-123-721-8	**US$98**	**£90**
978-981-123-722-5(ebook)	**US$157**	**£145**

World Scientific Lecture Notes in Physics - Vol 58

Concepts in Solids

Lectures on the Theory of Solids

by **P W Anderson** *(Princeton)*



204pp	**Nov 1997**	
978-981-02-3231-3(pbk)	**US$21**	**£17**
978-981-02-3195-8	**US$55**	**£46**
978-981-238-620-5(ebook)	**US$98**	**£80**

Quantum Dissipative Systems

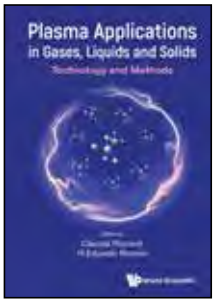
5th Edition

by **Ulrich Weiss** *(University of Stuttgart, Germany)*

608pp	**Sep 2021**	
978-981-12-4149-9(pbk)	**US$98**	**£90**
978-981-12-4313-4	**US$198**	**£180**
978-981-12-4150-5(ebook)	**US$317**	**£290**

ELECTROMAGNETISM AND PLASMA PHYSICS

Plasma Applications in Gases, Liquids and Solids



Technology and Methods

edited by **Claudia Riccardi** *(University of Milano-Bicocca, Italy)* & **H Eduardo Roman** *(University of Milano-Bicocca, Italy)*

This book explores the exciting and evolving world of plasma physics in materials manufacturing and processing. From ionized discharges to non-thermal equilibrium plasmas, new phenomena in physics are constantly emerging. Written, organized, and edited by internationally recognized experts, the various chapters delve into diverse issues in plasma science, including new applications at the nanoscale to the development of diagnostic tools and simulations. The interactions between the plasma state and matter, both surface and bulk, as well as gases and liquids, are explored.

Readership: Researchers in low energy plasma physics, both basic and applied research.

296pp	**Oct 2023**	
978-981-127-592-0	**US$108**	**£100**
978-981-127-593-7(ebook)	**US$173**	**£160**

Insight on Multifractal Dynamics of ns-Laser Produced Plasmas

by **Stefan Andrei Irimiciuc** *(National Institute for Lasers, Plasma and Radiation Physics, Romania)*, **Maricel Agop** *(Gheorghe Asachi Technical University of Iasi, Romania)* & **Ioan Merches** *(Alexandru Ioan Cuza University, Iasi, Romania)*

The book tackles the two sides of laser produced plasmas with experimental data on a wide range of materials, from metallic alloys to geological samples and the associated mathematical model is developed in the multifractal theory of motion. The book explored in analyzing and interpreting the data collected by electrical or optical methods, focusing especially on the charged particles dynamics and the nature of fractal fluctuations and their influence during measurements as well as to the scattering process and plasma splitting phenomena.

Readership: Graduate students and research professionals in the field of laser-based technologies.

232pp	**Sep 2023**	
978-981-127-066-6	**US$88**	**£80**
978-981-127-067-3(ebook)	**US$141**	**£130**

Nonlinear Waves and Inverse Scattering Transform

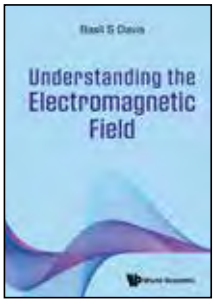
by **Spencer Kuo** *(New York University, USA)*

This book was prepared to familiarize students with nonlinear waves and methods of solving NLPDEs, which will enable them to expand their studies into related areas. The selection of topics and the focus given to each provide essential materials for a lecturer teaching a nonlinear wave course. The book introduces "mode" types in nonlinear systems as well as Bäcklund transform, an indispensable technique to solve generic NLPDEs for stationary solutions.

Readership: Graduate and senior graduate courses on nonlinear waves, also relevant as a reference book for researchers, research labs and academic institutes.

200pp	**Jul 2023**	
978-1-80061-403-1	**US$78**	**£70**
978-1-80061-404-8(ebook)	**US$125**	**£115**

Understanding the Electromagnetic Field



by **Basil S Davis** *(Univ. of Notre Dame, USA)*

This book explores the relationship between the field and electric charges. The earlier part of the book deals with the derivation of Maxwell's equations from experimental laws. Next, the electromagnetic field is studied in the light of special relativity, leading logically to the quantum theory of radiation. Quantum mechanics is introduced as a quantum field theory of the electromagnetic field. A chapter is devoted to the study of angular momentum in quantum mechanics, uniquely showing its importance in the understanding of the interaction between the field and charges.

404pp	**Apr 2023**	
978-981-127-536-4(pbk)	**US$78**	**£70**
978-981-127-481-7	**US$148**	**£135**
978-981-127-482-4(ebook)	**US$237**	**£220**

Essential Textbooks in Physics

Electromagnetism — Principles and Modern Applications

With Exercises and Solutions

by **Chris D White** *(Queen Mary University of London, UK)*

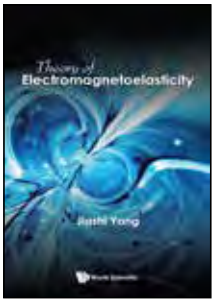
".. The author manages to strike a fine balance between insightful, simplified examples that develop a quantitative grasp of electromagnetism and detailed chapters on applied aspects of electromagnetism, including circuits. Moreover, the introduction doesn't shy away from presenting comparably modern topics.

Some 150 years after its first comprehensive formulation, electromagnetism still shapes our modern understanding of physics. White's 'Electromagnetism' equips undergraduate students with the essential tools, insights, and enticing outlook that make this textbook an extraordinary introduction to the topic."

Professor Christoph Englert
Particle Theory Group
School of Physics and Astronomy
University of Glasgow

292pp	**Apr 2023**	
978-1-80061-368-3(pbk)	**US$38**	**£35**
978-1-80061-361-4	**US$88**	**£80**
978-1-80061-362-1(ebook)	**US$141**	**£130**

Theory of Electromagnetoelasticity



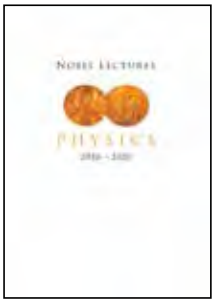
by **Jiashi Yang** *(University of Nebraska-Lincoln, USA)*

The book presents a systematic and unique treatment of elastic, electric and magnetic interactions in solids including various thermal and dissipative effects such as viscoelasticity and electrical conduction. In this book, a general and nonlinear continuum theory is constructed. The fundamental building blocks of the theory — the electromagnetic body force, couple and power — are calculated from a multi-continuum model consisting of a lattice continuum for elastic deformation, a bound charge continuum for electric polarization, a circulating current continuum for magnetization, and a free charge fluid for electrical conduction.

200pp	**Feb 2024**	
978-981-128-188-4	**US$88**	**£80**
978-981-128-189-1(ebook)	**US$141**	**£130**

GENERAL PHYSICS

Nobel Lectures in Physics (2016 – 2020)



edited by **Lars Bergström**
(Stockholm University, Sweden)

List of Nobel laureates and their award citations:

(2016) **David J Thouless**, **F Duncan M Haldane** and **J Michael Kosterlitz** "for theoretical discoveries of topological phase transitions and topological phases of matter"

(2017) **Rainer Weiss**, **Barry C Barish** and **Kip S Thorne** "for decisive contributions to the LIGO detector and the observation of gravitational waves"

(2018) **Arthur Ashkin** "for the optical tweezers and their application to biological systems", **Gé rard Mourou** and **Donna Strickland** "for their method of generating high-intensity, ultra-short optical pulses"

(2019) **James Peebles** "for theoretical discoveries in physical cosmology", **Michel Mayor** and **Didier Queloz** "for the discovery of an exoplanet orbiting a solar-type star"

(2020) **Roger Penrose** "for the discovery that black hole formation is a robust prediction of the general theory of relativity", **Reinhard Genzel** and **Andrea Ghez** "for the discovery of a supermassive compact object at the centre of our galaxy"

450pp	**Apr 2024**	
978-981-126-054-4	**US$148**	**£135**
978-981-126-055-1(ebook)	**US$237**	**£220**

Physics Illuminated for 'A' Levels

Volume 1
by **Kwok Wai Loo**

This book addresses the challenges by using three overlapping conceptual lenses of representation, conservation laws and system interaction to focus and illuminate the complexity and simplicity of the physical quantities in our universe. It also includes exercises and solutions that will be useful to readers.

Readership: For students preparing for their 'A' Levels Cambridge examinations, students in the International Baccalaureate (IB) program and first year undergraduates in Physics or Engineering.

650pp	**Mar 2024**	
978-981-127-533-3(pbk)	**US$48**	**£45**
978-981-127-441-1	**US$88**	**£80**
978-981-127-442-8(ebook)	**US$141**	**£130**

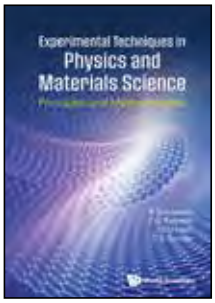
Low-Cost Physics Experiments Using New Technologies

by **Salvador Gil** *(Universidad Nacional de San Martín, Argentina)*

This book presents a set of low-cost physics experiments, making use of the new technologies available (data collection and analysis systems by computers, Internet, video, commercial electronics, smartphones, etc.), while highlighting the methodological aspects of physics and science in general. The projects are aimed at university students of science and engineering, although some may be used in high schools.

750pp	**Jan 2024**	
978-981-127-775-7	**US$178**	**£165**
978-981-127-776-4(ebook)	**US$285**	**£260**

Experimental Techniques in Physics and Materials Science



Principles and Methodologies
by **R Srinivasan**, **retired** *(Indian Institute of Technology Madras, India)*, **T G Ramesh**, **retired** *(CSIR – National Aerospace Laboratories, India)*, **G Umesh**, **retired** *(National Institute of Technology Karnataka, India)* & **C S Sundar**, **retired** *(Indira Gandhi Centre for Atomic Research, India)*

The book is divided into five sections: (1) Techniques for preparing materials in the bulk, nanoscale and thin film forms; (2) Techniques for characterizing materials like X ray and neutron powder diffraction, ESCA, Ellipsometry for thin films, Ultrasonic techniques, Electron microscopy, Surface probe techniques (3) Techniques for measurements, at research level, of the elastic, thermal, electrical, dielectric and magnetic properties; (4) Spectroscopic techniques and (5) Phase transitions. In each of the above topics the basic principles are clearly laid out, the experimental set-ups are described, and typical examples are cited to illustrate the physics revealed by these techniques.

532pp	**Nov 2023**	
978-981-127-888-4	**US$168**	**£155**
978-981-127-889-1(ebook)	**US$269**	**£245**

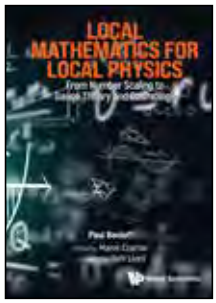
Mind the Gap

The Labyrinthine Story of Planetary Orbits, Mathematics, and the Titius-Bode Rule
by **Martin Beech** *(University of Regina, Canada)*

This book is concerned with two tightly knit topics — those of mathematics and astronomy. Its focus is primarily concerned with planetary astronomy, and specifically the history of accounting for the spacing of planetary orbits. The story begins with the ancient Greek philosophers and continues to the modern era and the new data being gleaned from the study of exoplanetary systems. Throughout the text, the manner in which mathematical theory has been used to decipher, and impose order upon the solar system, will be examined. Attention and discussion will be directed towards the so-called Titius-Bode rule, a long-standing ordering principle, that in fact it has no physical underpinning or explanation.

400pp	**Sep 2023**	
978-981-127-640-8(pbk)	**US$48**	**£45**
978-981-127-397-1	**US$138**	**£125**
978-981-127-398-8(ebook)	**US$221**	**£205**

Local Mathematics for Local Physics



From Number Scaling to Gauge Theory and Cosmology
by **Paul Benioff**

Edited by: **Marek Czachor** *(Gdańsk University of Technology, Poland)*

Foreword by: **Seth Lloyd** *(Massachusetts Institute of Technology, USA)*

The author introduces the concept of the value field and uses it to reformulate the basic framework of number theory, calculus, and vector spaces and bundles. The book moves on to find applications to classical field theory, quantum mechanics and gauge theory. The last two chapters address the relationship between theory and experiment, and the possible physical consequences of both the existence and non-existence of the value field.

278pp	**Jan 2024**	
978-1-80061-496-3	**US$98**	**£90**
978-1-80061-497-0(ebook)	**US$157**	**£145**

INTERDISCIPLINARY PHYSICS

Time and Science

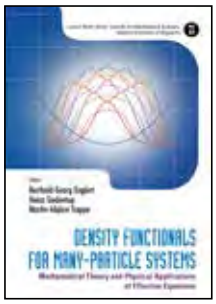
In 3 Volumes
Volume 1: The Metaphysics of Time and Its Evolution
Volume 2: Life Sciences
Volume 3: Physical Sciences and Cosmology
edited by **Rémy Lestienne** *(Centre National de la Recherche Scientifique, France)* & **Paul A Harris** *(Loyola Marymount University, USA)*
Foreword by: **Carlo Rovelli**

Prominent scientists and philosophers of science address contemporary debates on the nature of Time. Their contributions freely discuss its unity and reality, its compatibility with the orders of classical philosophy (present, past and future) and with the disputed idea of free will (Vol 1). They also present a detailed and updated state of the role of Time in the so-called exact sciences: biology — or more precisely genetics, evolution, neurosciences, natural and artificial intelligence (Vol 2) , and physics — relativity, quantum mechanics and quantum gravity, and cosmology (Vol 3).

1012pp	**Jul 2023**	
978-1-80061-997-5(Set)	**US$328**	**£300**
978-1-80061-998-2(Set)(ebook)	**US$525**	**£485**

Lecture Notes Series, Institute for Mathematical Sciences, sNational University of Singapore - Vol 41

Density Functionals for Many-Particle Systems



Mathematical Theory and Physical Applications of Effective Equations
edited by **Berthold-Georg Englert** *(National University of Singapore, Singapore)*, **Heinz Siedentop** *(Ludwig-Maximilians-Universität München, Germany)* & **Martin-Isbjörn Trappe** *(National University of Singapore, Singapore)*

This review volume is a collection of contributions from the September 2019 Workshop on the topic, held in the Institute for Mathematical Sciences, National University of Singapore. The volume is a blend of comprehensive review articles on the Mathematical and the Physicochemical aspects of DFT and shorter contributions on particular themes, including numerical implementations.

396pp	**Mar 2023**	
978-981-127-214-1	**US$138**	**£125**
978-981-127-215-8(ebook)	**US$221**	**£205**

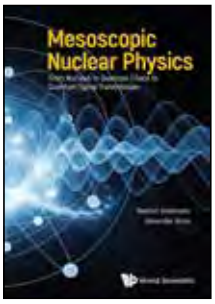
NUCLEAR PHYSICS

Quark-Gluon Plasma, Heavy Ion Collisions and Hadrons

by **Edward Shuryak** *(State University of New York, Stony Brook, USA)*
The present one describes the rather mature field, with extensive program at RHIC and LHC colliders and corresponding theory. QGP turns out to be a strongly coupled medium made up of quarks and gluons, existing in exploding fireballs. It is the hottest form of matter created in a laboratory. Other subjects discussed in the book are QCD vacuum structure, including topological solitons and nonperturbative phenomena. It also includes some recent progress in theory of hadrons, bridging hadronic spectroscopy with partonic observables.

600pp	**Mar 2024**	
978-981-128-234-8	**US$178**	**£165**
978-981-128-235-5(ebook)	**US$285**	**£260**

Mesoscopic Nuclear Physics



From Nucleus to Quantum Chaos to Quantum Signal Transmission
by **Vladimir Zelevinsky** *(Michigan State University, USA)* & **Alexander Volya** *(Florida State University, USA)*

This book summarizes the recent development of nuclear science as an important part of mesoscopic physics, the intermediate world between the macroscopic and microscopic. This fast developing area with many practical applications includes complex atoms, molecules (including biological), nuclei, small-scale solid state systems, and future quantum computers.

192pp	**Mar 2023**	
978-981-126-314-9	**US$78**	**£70**
978-981-126-315-6(ebook)	**US$125**	**£115**

OPTICS AND LASER PHYSICS

Optical Materials and Applications - Vol 1

Novel Optical Materials

edited by **Iam Choon Khoo** *(The Pennsylvania State University, USA)*, **Francesco Simoni** *(Università Politecnica delle Marche, Italy)* & **Cesare Umeton** *(Università della Calabria, Italy)*

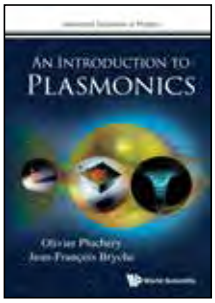
This book comprises timely contributions from active research groups covering several classes of materials and processes including nano-structured plasmonic and photonic materials, 2-D materials, photo-polymers, liquid crystals, photo-sensitive and opto-thermal, and other specially engineered materials. It will serve as a useful reference for researchers, engineers, and optical and materials scientists in both industry and academia. It is also an excellent supplement and reference for graduate courses in materials science, physics, and optical engineering.

Readership: Graduate students, researchers, engineers, and optical and materials scientists.

350pp	**Dec 2023**	
978-981-128-059-7	**US$128**	**£120**
978-981-128-060-3(ebook)	**US$205**	**£190**

Advanced Textbooks in Physics

An Introduction to Plasmonics



by **Olivier Pluchery** *(Sorbonne University, France)* & **Jean-François Bryche** *(CNRS, France & Sherbrooke University, Canada)*

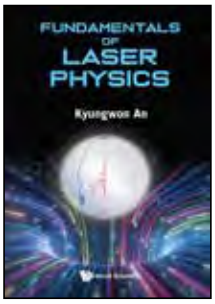
This book begins by exploring the concepts behind waves, and the electromagnetic description of light when it interacts with metals. In particular, the surface plasmon polariton wave is explained in full detail, as well as the localized surface plasmon resonance of metallic nanoparticles. The active research area opened by plasmonics, as well as its applications, are also briefly explained. The book is adapted for graduate students and places a special emphasis on providing complete explanations of the fundamental concepts of plasmonics. Further, each of these concepts is illustrated with examples drawn from the most recent scientific literature. More than 70 exercises are included.

Readership: The book is intended for academia: university, college and engineering schools. Specially suited for graduate students in physics, materials science or chemistry. Also useful for PhD students and researchers entering the field of plasmonics as well as undergraduate courses in physics and electromagnetism.

356pp	**Sep 2023**	
978-1-80061-339-3	**US$98**	**£90**
978-1-80061-340-9(ebook)	**US$157**	**£145**

Fundamentals of Laser Physics

by **Kyungwon An** *(Seoul National University, South Korea)*



"Laser is one of the pillars of the modern technological world, and there are wide spectrum of books on it from fundamental principles to specific engineering aspects. As the title suggests, Fundamentals of Laser Physics by Professor Kyungwon An approaches the topic from quantum mechanical understanding of the basic interactions between light and atoms. The author is a world expert in both theoretical and experimental study of atom-photon interaction, broadly known as atomic, molecular, and optical physics. The book is intended as a graduate-level textbook on laser physics. The book has a few interesting pedagogical tools, namely, the Frequently Asked Questions (and Answers), which not only elucidates some of the confusing concepts but also induces more thinking for deeper understanding, and the Computer Codes to allow visualization of dynamics of a fundamental system using a few lines of codes. In addition, critical formulae are derived step by step, and solutions of the Exercise problems are given at the end of the book. These features should be very helpful for a graduate student or a beginning researcher in AMO physics, who does not have a chance to attend a formal lecture on laser physics."

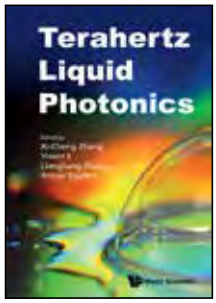
Prof Donghyun Cho
Department of Physics
Korea University, Seoul

Readership: Advanced undergraduates and first-year graduate students in physics and engineering who need to use lasers in their labs.

324pp	**Mar 2023**	
978-981-126-527-3	**US$108**	**£100**
978-981-126-528-0(ebook)	**US$173**	**£160**

Terahertz Liquid Photonics

edited by **Xi-Cheng Zhang** *(University of Rochester, USA)*, **Yiwen E** *(University of Rochester, USA)*, **Liangliang Zhang** *(Capital Normal University, China)* & **Anton Tcypkin** *(ITMO University, Russia)*



"Terahertz liquid photonics is an emerging area, and this book will provide a comprehensive summary in both theories and experiments on the existing and promising technologies for terahertz wave generation and detection in liquids. It is timely and interesting."

Qijie Wang
Professor, Nanyang Technological University, Singapore

"In this book, X-C Zhang et al review several state-of-the-art topics in terahertz liquid photonics, which includes crucial observations and discussions on terahertz emission from laser-induced ionization, ultrafast dynamics, and nonlinearity in liquids. X-C Zhang's group is one of the first to report terahertz wave emission from flowing liquid targets shined with ultrashort laser pulses, which has been an active field in recent years. This book will be helpful to researchers."

Yutong Li
Professor, Chinese Academy of Sciences, China

Readership: Academics, researchers, lecturers, and graduate students in universities and institutes in terahertz photonics and spectroscopy, laser physics, AMO physics, ultrafast science, and related areas such as semiconductors, photochemistry and physical chemistry.

268pp	**Sep 2023**	
978-981-126-563-1	**US$98**	**£90**
978-981-126-564-8(ebook)	**US$157**	**£145**

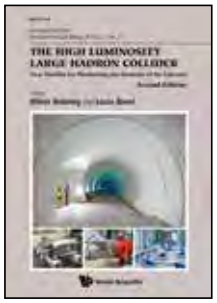
PARTICLE PHYSICS / HIGH ENERGY PHYSICS / QUANTUM FIELDS

Advanced Series on Directions in High Energy Physics - Vol 31

The High Luminosity Large Hadron Collider

New Machine for Illuminating the Mysteries of the Universe
2nd Edition

edited by **Oliver Brüning** *(CERN, Switzerland)* & **Lucio Rossi** *(University of Milano, Italy)*



This book introduces the physics and technology of the High-Luminosity Large Hadron Collider (LHC). The book is a self-consistent series of papers, which addresses all technology and design issues. Each paper can be read separately as well. The first few papers provide a summary of the whole project, the physics motivation, and the accelerator challenges. Altogether, this book brings the reader to the heart of the technologies that will also be key for the next generation of hadron colliders.

This book is an essential reference for physicists and engineers in the field of hadron colliders and LHC related issues and can also be read by postgraduate students.

550pp	**Feb 2024**	
978-981-127-894-5	**US$158**	**£145**

Advanced Series on Theoretical Physical Science - Vol 14

General Yang – Mills Symmetry

From Quark Confinement to an Antimatter Half-Universe

by **Jong-Ping Hsu** *(University of Massachusetts Dartmouth, USA)* & **Leonardo Hsu** *(Santa Rosa Junior College, USA)*

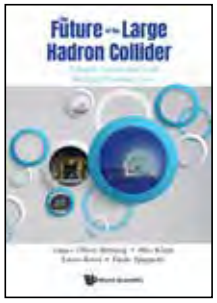
This monograph expounds on general Yang – Mills symmetry, a new symmetry based on arbitrary vector gauge functions and Hamilton's characteristic phase functions in the gauge transformations of Abelian and non-Abelian groups. This volume also discusses how CPT invariance in particle physics suggests a "Big Jets" model for the birth of the universe, proposing one explanation for the dearth of anti-matter in our universe. Finally, we discuss a simplified quantum shell model for N baryons with a quark Hamiltonian and a Sonine – Laguerre equation that gives reasonable eigenvalues for the energies of the 29 N baryons.

248pp	**Oct 2023**	
978-981-122-290-0	**US$98**	**£90**
978-981-122-291-7(ebook)	**US$157**	**£145**

The Future of the Large Hadron Collider

A Super-Accelerator with Multiple Possible Lives

edited by **Oliver Brüning** *(CERN, Switzerland)*, **Max Klein** *(University of Liverpool, UK)*, **Lucio Rossi** *(University of Milano, Italy & INFN, Italy)* & **Paolo Spagnolo** *(INFN Pisa, Italy)*

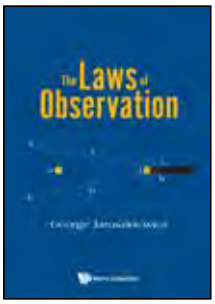


The book is driven by the realisation of the unique value of the accelerator complex and by the recognition of the status of high energy physics, described by a Standard Model — which still leaves too many questions unanswered to be the appropriate theory of elementary particles and their interactions. The various technical and physics chapters, provided by 61 authors, characterise the fascinating opportunities the LHC offers for the next two decades ahead.

456pp	**Sep 2023**	
978-981-128-017-7	**US$148**	**£135**

The Laws of Observation

by **George Jaroszkiewicz** *(The University of Nottingham, UK)*



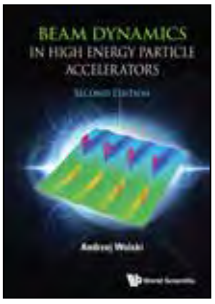
For several decades, the Standard Model of particle physics has managed to fit vast amounts of particle scattering data remarkably well, but many questions remain. During those decades, some sophisticated theoretical hypotheses such as string theory, quantum gravity, and quantum cosmology have been proposed and studied intensively, in an effort to break the log-jam of the Standard Model. This book is a restatement of those principles, covering numerous aspects of observation. A particular focus is on contextuality versus realism, the two fundamentally contrasting ideologies that underpin modern physics.

560pp	**Jul 2023**	
978-981-126-598-3	**US$158**	**£145**
978-981-126-599-0(ebook)	**US$253**	**£235**

Beam Dynamics in High Energy Particle Accelerators

2nd Edition

by **Andrzej Wolski** *(University of Liverpool, UK)*



Review of the First Edition:

"This is a recommendable addition to the literature, covering its topics clearly and thoroughly."

CERN Courier

The book provides introduction to phenomena regularly encountered when working with beams in accelerators; from the basic principles of motion of relativistic particles in electromagnetic fields, to instabilities that can affect beam quality in machines operating at high current.

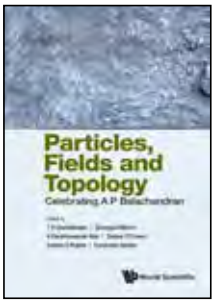
Readership: Advanced undergraduate and graduate students, researchers in Particle Physics.

680pp	**Jun 2023**	
978-981-127-332-2	**US$178**	**£165**
978-981-127-333-9(ebook)	**US$285**	**£260**

Particles, Fields and Topology

Celebrating A P Balachandran

edited by **T R Govindarajan** *(The Institute of Mathematical Sciences, India)*, **Giuseppe Marmo** *(Federico II University of Naples, Italy)*, **V Parameswaran Nair** *(The City College of New York, USA)*, **Denjoe O'Connor** *(Dublin Institute for Advanced Study, Ireland)*, **Sarada G Rajeev** *(University of Rochester, USA)* & **Sachindeo Vaidya** *(Indian Institute of Science, Bangalore, India)*

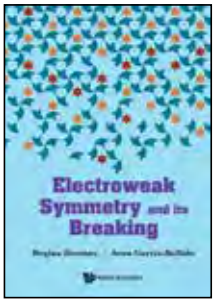


This book consists of articles by students and associates of Balachandran. Most of the articles are scientific in nature, with topics ranging from noncommutative geometry, particle physics phenomenology, to condensed matter physics. Various chapters focus on new perspectives and directions resulting from Balachandran's contributions to physics, as well as some reminiscences of collaborating and working with Balachandran.

Readership: University libraries, research institutions, physicists, and graduate students in physics.

340pp	**May 2023**	
978-981-127-042-0	**US$118**	**£110**
978-981-127-043-7(ebook)	**US$189**	**£175**

Electroweak Symmetry and its Breaking

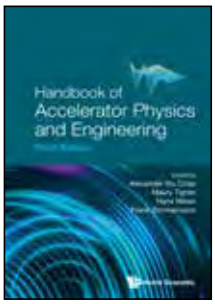


by **Regina Demina** *(University of Rochester, USA)* & **Aran Garcia-Bellido** *(University of Rochester, USA)*

The unified theory of electroweak interactions was developed over 50 years ago. The Higgs scalar field named after one of the theorists that proposed it, is believed to be responsible for the breaking of the electroweak symmetry. This book discusses the theoretical developments that led to the construction of this theory, the discovery and the experimental observations that need to come to fully establish the validity of the model.

236pp	**Apr 2023**	
978-981-122-224-5	**US$88**	**£80**
978-981-122-225-2(ebook)	**US$141**	**£130**

Handbook of Accelerator Physics and Engineering



3rd Edition
edited by **Alexander Wu Chao** *(SLAC National Accelerator Laboratory, USA)*, **Maury Tigner** *(Cornell University, USA)*, **Hans Weise** *(DESY, Germany)* & **Frank Zimmermann** *(CERN, Switzerland)*

"This Handbook is an essential tool for any practicing accelerator physicists and engineer. The editors have made use of their large contact base around the world to have the dominant experts in each subtopic write insightful summaries, including the most relevant references. For each topic, the reader therefore receives a truly expert overview and is lead to most relevant literature. A more concise accumulation of particle-accelerator knowledge can hardly be imagined."

Georg H Hoffstaetter de Torquat, Professor of Physics
Cornell University and Brookhaven National Laboratory
Director of ERL / EIC collaboration, Cornell PI CBETA
Fellow of the German National Merit Foundation and APS

A detailed name and subject index is provided together with reliable references to the literature where the most detailed information available on all subjects treated can be found.

960pp	**Feb 2023**	
978-981-127-015-4(pbk)	**US$98**	**£90**
978-981-126-917-2	**US$188**	**£175**
978-981-126-918-9(ebook)	**US$301**	**£275**

New Phenomena and New States of Matter in the Universe

From Quarks to Cosmos
edited by **César Augusto Zen Vasconcellos** *(Universidade Federal do Rio Grande do Sul, Brazil & International Center for Relativistic Astrophysics Network, Italy)*, **Peter Otto Hess** *(Universidad Nacional Autó noma de México, Mexico & Frankfurt Institute for Advanced Studies, Germany)* & **Thomas Boller** *(Max Planck Institute for Extraterrestrial Physics, Germany)*

The new phenomena and new states of matter in the Universe revealed the deep connection between quarks and the Cosmos. Motivated by these themes, this book discusses different topics: gravitational waves, dark matter, dark energy, exotic contents of compact stars, high-energy and gamma-ray astrophysics, heavy ion collisions and the formation of the quark – gluon plasma in the early Universe.

376pp	**Feb 2023**	
978-981-122-090-6	**US$128**	**£120**
978-981-122-091-3(ebook)	**US$205**	**£190**

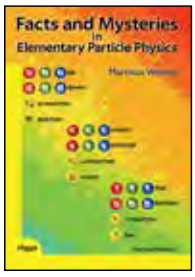
FEATURED BACKLIST

An Introduction to Black Holes, Information and the String Theory Revolution

The Holographic Universe
by **Leonard Susskind** *(Stanford University, USA)* & **James Lindesay** *(Howard University, USA)*

200pp	**Dec 2004**	
978-981-256-131-2(pbk)	**US$19**	**£16**
978-981-256-083-4	**US$72**	**£65**
978-981-256-309-5(ebook)	**US$115**	**£100**

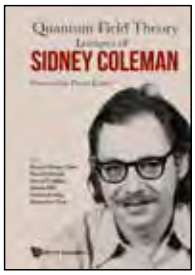
Facts and Mysteries in Elementary Particle Physics



(Revised Edition)
by **Martinus Veltman** *(University of Michigan, Ann Arbor, USA & NIKHEF, Amsterdam, The Netherlands)*

352pp	**May 2018**	
978-981-3237-49-0(pbk)	**US$28**	**£25**
978-981-3237-05-6	**US$85**	**£80**
978-981-3237-06-3(ebook)	**US$136**	**£125**

Lectures of Sidney Coleman on Quantum Field Theory



Foreword by David Kaiser
edited by **Bryan Gin-ge Chen** *(Leiden University, Netherlands)*, **David Derbes** *(University of Chicago, USA)*, **David Griffiths** *(Reed College, USA)*, **Brian Hill** *(Saint Mary's College of California, USA)*, **Richard Sohn** *(Kronos, Inc., Lowell, USA)* & **Yuan-Sen Ting** *(Harvard University, USA)*

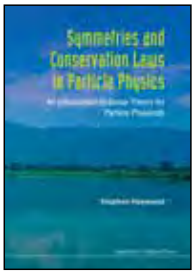
1196pp	**Dec 2018**	
978-981-4635-50-9(pbk)	**US$88**	**£80**
978-981-4632-53-9	**US$168**	**£155**
978-981-4635-51-6(ebook)	**US$269**	**£245**

Handbook of Accelerator Physics and Engineering (2nd Edition)

edited by **Alexander Wu Chao** *(SLAC National Accelerator Laboratory, USA)*, **Karl Hubert Mess** *CERN)*, **Maury Tigner** *(Cornell)* & **Frank Zimmermann** *(CERN)*

848pp	**May 2013**	
978-981-4417-17-4(pbk)	**US$85**	**£71**
978-981-4415-84-2	**US$155**	**£129**
978-981-4415-85-9(ebook)	**US$248**	**£205**

Symmetries and Conservation Laws in Particle Physics



An Introduction to Group Theory for Particle Physicists
by **Stephen Haywood** *(Rutherford Appleton Laboratory, UK)*

168pp	**Oct 2010**	
978-1-84816-703-2(pbk)	**US$30**	**£25**
978-1-84816-659-2	**US$61**	**£51**
978-1-84816-704-9(ebook)	**US$98**	**£80**

Introduction to Quantum Field Theory and the Standard Model

by **Wolfgang Hollik** *(Max Planck Institute for Physics, Germany)*

252pp	**Feb 2022**	
978-981-124-217-5	**US$88**	**£80**
978-981-124-218-2(ebook)	**US$141**	**£130**

POPULAR PHYSICS

No Wisdom without Folly

The Extraordinary Life of François Englert, Nobel Laureate

by **Danielle Losman**

"This book is a Bruegel painting where unbridled characters overflowing with life dance to the music of a klezmer band. It is an ode to the magic universe of physics, to intelligence and laughter, to friendship and resilience, to humanism."

Foreword by Physicist Nathalie Deruelle

This book is a biography of François Englert, the first Belgian Nobel Laureate in Physics. Jointly awarded to him and British physicist Peter Higgs, the 2013 Nobel Prize in Physics was celebrated for the understanding of the origin of massive particles in the emerging Universe, one of the most important breakthroughs in Physics in the second half of the 20th century.

Although written with a great concern for scientific accuracy, the book's primary goal is to offer the lay reader an accessible account of the life and scientific work of François Englert. This is to address the fact that the development of fundamental physics, one of the greatest intellectual revolution in the history of mankind, remains largely unknown to the general public.

220pp	**Nov 2023**	
978-981-128-391-8(pbk)	**US$28**	**£25**
978-981-128-324-6	**US$68**	**£65**
978-981-128-325-3(ebook)	**US$109**	**£100**

Everyday Physics

Waves — From Sounds and Light to Tsunamis and Gravitation

by **Michel A Van Hove**, **retired** *(Hong Kong Baptist University, Hong Kong)*

This book aims to popularize physics by emphasizing conceptual ideas of physics and their interconnections, while avoiding mathematics entirely. The approach is to explore intriguing topics of daily relevance by asking and discussing questions: thereby the reader can participate in developing answers, which enables a deeper understanding than is achievable with memorization. The topic of this book — waves — is chosen because we experience waves in many forms every minute of our lives, from sound waves and light waves to quantum waves and brain waves.

The target readership of this book is very broad: all those with a curious mind about nature and with a desire to understand how nature works, especially laymen, youngsters, secondary-school children and their teachers.

538pp	**Feb 2024**	
978-981-127-965-2	**US$158**	**£145**
978-981-127-964-5(ebook)	**US$253**	**£235**

The Living Record of Scientific History

Conversations with CN Yang

by **Lizhen Ji** *(University of Michigan, USA)* & **Liping Wang**

Professor Chen-Ning Yang is best known for his achievements in Physics. He has also made significant contributions to the development of mathematics, as mathematics is extensively used in his research. In his long and fruitful academic career, he has witnessed many important events in the fields of Physics and Mathematics, and has collaborated or interacted with many great scientists in history. This book records eight interviews with Professor Chen-Ning Yang, which were conducted by the authors from 2016 to 2019. some stories unknown to the public before are also revealed in this book.

Readership: Undergraduate/graduate/researchers in physics/mathematics/science. General audience interested in history of science.

400pp	**Jan 2024**	
978-981-128-493-9	**US$58**	**£55**
978-981-128-494-6(ebook)	**US$98**	**£90**

World of Chips

Roaming Integrated Circuit World

by **Shichang Zou** *(Chinese Academy of Sciences, China)*, **Bo Hai** *(Shanghai Media Group, China)* & **Chang Qin** *(Shanghai Media Group, China)*

Translated by: **Zhongying Xue** *(Chinese Academy of Sciences, China)*

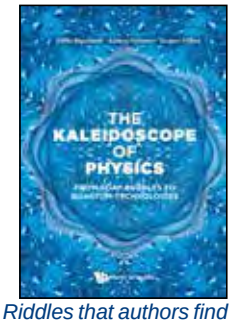
The book is Zou Shichang's introduction of chips and integrated circuits to elementary students. It includes many talks, where Dr. Zou introduces to children common knowledge of chips and integrated circuits and the present situation of China's chip industry. With the great scientist's introduction of cutting-edge science and industry, this book is a rare-to-find popular science book for elementary students.

108pp	**Sep 2023**	
978-981-120-902-4	**US$48**	**£45**
978-981-120-903-1(ebook)	**US$98**	**£90**

The Kaleidoscope of Physics

From Soap Bubbles to Quantum Technologies

by **Attilio Rigamonti** *(University of Pavia, Italy)*, **Andrey Varlamov** *(SPIN-CNR, Italy)* & **Jacques Villain** *(Academy of Sciences of France, France)*



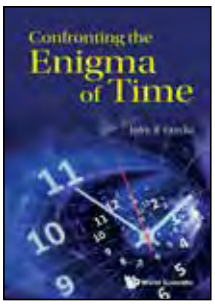
"This book talks about physics and its role in the world around us. It was written by professional scientists who have devoted their entire lives to finding answers to the riddles posed by Nature. Riddles that authors find in a seemingly mundane world, and riddles of the quantum world, which they manage to penetrate, continuing the path of many generations of scientists.The book has an unusual history…In 2014, it was published as Le Kaleidoscope de la Physique by the publishing house Belin. The following year it received the Roberval prize, an international award for the best popular science book of the year in French... Today, thanks to the efforts of the World Scientific Publishing Company, the book, having been considerably expanded, becomes available to the English-speaking reader."

Pitaevskii
Member of Russian Academy of Sciences

436pp	**Jul 2023**	
978-981-126-524-2	**US$58**	**£55**
978-981-126-525-9(ebook)	**US$98**	**£90**

Confronting the Enigma of Time

by **John R Fanchi** *(Texas Christian University, USA)*



"Confronting the Enigma of Time by John R Fanchi is an engaging and highly enjoyable survey of time as central concept in physics. The author, a significant contributor to the notion of time in quantum mechanics, offers a comprehensive tour of our understanding of time, from ancient philosophy, through classical and modern physics, and including contemporary theories under active research. While the writing is accessible to a general audience, working physicists will find the book highly informative and useful in providing background and context for their research."

Land
Department of Computer Science
Hadassah College

268pp	**Apr 2023**	
978-1-80061-334-8(pbk)	**US$28**	**£25**
978-1-80061-318-8	**US$58**	**£55**
978-1-80061-319-5(ebook)	**US$98**	**£90**

The Reinvention of Science

Slaying the Dragons of Dogma and Ignorance

by **Bernard J T Jones** *(University of Groningen, The Netherlands)*, **Vicent J Martínez** *(University of Valencia, Spain)* & **Virginia L Trimble** *(University of California, Irvine, USA)*

"A compelling account of some of the most important questions in science, both historical and contemporary, showing how understanding develops, how wrong ideas can halt progress, and how the wrong people sometimes get the credit. Written by experts in a thoroughly engaging style, it is a great read."

Alan Heavens
Professor of Astrostatistics, ICIC, Imperial College London

"Science and the sometimes irrational behavior of supposedly rational scientists, by three people who write well and understand what they are writing about."

Jim Peebles
Professor emeritus, Princeton University
Nobel Prize in Physics (2019)

Throughout the history of science, different thinkers, philosophers and scientists postulated the existence of entities that, in spite of their not being visible or detectable in their time, or perhaps ever, were nevertheless useful to explain the real world. We started this book by looking at a handful of these entities. These included phlogiston to account for fire; the luminiferous ether for propagation of radiation; the homunculus to provide for heredity; and crystalline spheres to carry the wandering planets around the earth. Many of these erroneous beliefs had held up progress, just as dragons drawn on the edges of a map discouraged exploration.

418pp	**Nov 2023**	
978-1-80061-360-7(pbk)	**US$38**	**£35**
978-1-80061-336-2	**US$58**	**£55**
978-1-80061-337-9(ebook)	**US$98**	**£90**

"Yours Ever, Freeman"

The Wisdom of Freeman Dyson

by **Dwight E Neuenschwander** *(Southern Nazarene University, USA)*

This book is devoted to this correspondence between Professor Dyson and the students. His responses went beyond answering questions, as he enlarged the scope of the questions by sharing stories from his experiences. Topics ranged from the existential to headlines of the day, from national policies to personal values.

344pp	**Jun 2023**	
978-981-127-231-8(pbk)	**US$38**	**£35**
978-981-127-185-4	**US$58**	**£55**
978-981-127-186-1(ebook)	**US$98**	**£90**

Energy

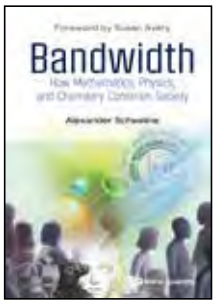
What About It?

by **Jean Pierre Fillard** *(University of Montpellier II, France)*

The book explores the topic by beginning with what "energy" means and where it comes from; the different forms of energy we currently known and when they were discovered; as well as the innovative breakthroughs and historical milestones which followed their discovery. It then expounds on how each newly discovered form of energy with the use of increased scientific and engineering knowhow needed for these discoveries, and their impacts that have powered our evolution of human civilizations.

172pp	**Nov 2023**	
978-981-126-746-8	**US$48**	**£45**
978-981-126-747-5(ebook)	**US$98**	**£90**

Bandwidth



How Mathematics, Physics, and Chemistry Constrain Society

by **Alexander Scheeline** *(University of Illinois at Urbana-Champaign, USA)*

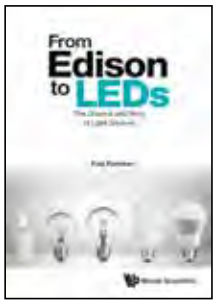
"In Bandwidth, Alex Scheeline describes how we get trapped in wells of information while struggling to perceive the universe. Science is only one of many possible wells, he argues, while agreeing that spiritual understandings of the universe are also valid. Scheeline makes a persuasive argument that certain core insights from science constrain how society functions, despite one's spiritual beliefs. As he puts it, 'gravity can be resented, but it can't be ignored.'"

Raima Larter
Former Professor of Chemistry, Indiana University – Purdue University Indianapolis, USA

The physical sciences and mathematics are extraordinarily useful in explaining the material world. People and society are constrained by physical reality, but we are often unclear on what constraints are absolute, which may be relative, and those that are simply a matter of taste. Bandwidth explains how limitations in the movement and perception of information constrain human behavior, cognition, interaction, and perspective. How fast can we learn? How much? Why are habits and biases unavoidable?

448pp	**Jun 2023**	
978-981-123-854-3(pbk)	**US$48**	**£45**
978-981-123-787-4	**US$108**	**£100**
978-981-123-788-1(ebook)	**US$173**	**£160**

From Edison to LEDs



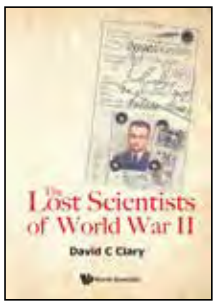
The Science and Story of Light Sources

by **Faiz Rahman** *(Ohio University, USA)*

This book attempts to describe the stories and technologies related to many light sources — some common, some less so. The book looks at developments from Edison and Swan's invention of the incandescent lamp, through lasers, to LEDs, and more. While the main focus is on sources of visible light, a number of devices that produce invisible radiation are also covered for the sake of completeness. The book provides a holistic view of common and uncommon light sources from both historic and technical perspectives, to help readers place more modern developments in the context of what came before, and how.

512pp	**May 2023**	
978-981-126-827-4(pbk)	**US$58**	**£55**
978-981-126-758-1	**US$128**	**£120**
978-981-126-759-8(ebook)	**US$205**	**£190**

The Lost Scientists of World War II



by **David C Clary** *(University of Oxford, UK)*

The Lost Scientists of World War II tells the stories of scientists from Germany and other European countries who vanished during World War II. These erudite scholars contributed to diverse scientific fields and were associated with some of the world's leading universities and research institutions. Despite their proficiency, they all sought help from agencies to relocate to the UK in the 1930s, but were unable to secure the necessary assistance. This book highlights the extraordinary narratives of thirty such scientific refugees, delving into the reasons behind the unavailability of aid and presenting fresh insights into the tragic fates or astounding survival experiences of these individuals.

276pp	**Jan 2024**	
978-1-80061-491-8(pbk)	**US$38**	**£29.90**
978-1-80061-475-8	**US$78**	**£70**
978-1-80061-476-5(ebook)	**US$125**	**£115**

QUANTUM MECHANICS AND QUANTUM INFORMATION

Lectures on Quantum Mechanics

(In 3 Companion Volumes)
Volume 1: Basic Matters
Volume 2: Simple Systems
Volume 3: Perturbed Evolution
2nd Edition

by **Berthold-Georg Englert** *(National University of Singapore, Singapore)*

Vol 1 is a first introduction to quantum mechanics. In Vol 2, the step to Dirac's more abstract and much more powerful formalism is taken immediately, followed by reviews of quantum kinematics and quantum dynamics. The important standard examples (force-free motion, constant force, harmonic oscillator) are then treated in considerable detail. Vol 3 has a closer link to Simple Systems than it has to Basic Matters, but any reader familiar with the subject matter of a solid introduction to quantum mechanics — such as Dirac's formalism of kets and bras, Schrö dinger's and Heisenberg's equations of motion, and the standard examples that can be treated exactly.

690pp	**May 2024**	
978-981-128-951-4(Set)(pbk)	**US$108**	**£100**
978-981-128-952-1(Set)	**US$199**	**£185**

Back-of-the-Envelope Quantum Mechanics

With Extensions to Many-Body Systems, Integrable PDEs, and Rare and Exotic Methods
2nd Edition

by **Maxim Olshanii** *(University of Massachusetts Boston, USA)*

The aim of this book is to teach the craft of qualitative analysis using a set of problems, some with solutions and some without, in advanced undergraduate and beginning graduate Quantum Mechanics. Examples include a dimensional analysis solution for the spectrum of a quartic oscillator, simple WKB formulas for the matrix elements of a coordinate in a gravitational well, and a three-line-long estimate for the ionization energy of atoms uniformly valid across the whole periodic table.

220pp	**Dec 2023**	
978-981-128-637-7	**US$78**	**£70**
978-981-128-638-4(ebook)	**US$125**	**£115**

Quantum Mechanics for Engineers and Material Scientists

An Introduction

by **M P Anantram** *(University of Washington, Seattle, USA)* & **Daryoush Shiri** *(Chalmers University of Technology, Sweden)*

This introductory book is aimed at students of engineering and material science who want to learn the necessary toolboxes of practical quantum mechanics. The authors have made sure that all the calculations are complete, and they have avoided the usage of the familiar phrase, "it can be easily shown" while being mathematically rigorous. Knowledge of the sophomore level introduction to ordinary differential equations is all that is needed. Well-designed and modern examples help the reader grasp and digest the concept before moving to the next one. The book offers a lucid exposition to the modern field of quantum computing and quantum gates, two-level systems, orbitals, spin, periodic solids, tunneling, and Fermi golden rule. The basics of electronic and optical properties of nanomaterials using the basics of quantum mechanics are presented without the reader getting lost in research articles with different notations and units.

610pp	**Nov 2023**	
978-981-127-532-6(pbk)	**US$88**	**£80**
978-981-127-438-1	**US$178**	**£165**
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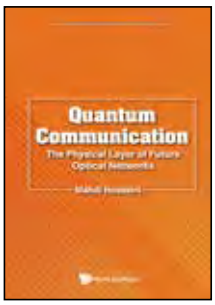
New Era Electronics: A Lecture Notes Series - Vol 2

Quantum Communication



The Physical Layer of Future Optical Networks

by **Mahdi Hosseini** *(Purdue University, USA)*

Quantum communication is introduced in this volume through the coverage of relevant, basic concepts of quantum mechanics and the introduction of quantum elements of a quantum optical communication system. Also included is a quantum description of electromagnetic fields and its interaction with atoms to generate, store, measure and control quantum optical information encoded onto optical fields.

208pp	**Jul 2023**	
978-981-127-908-9(pbk)	**US$48**	**£45**
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Series on the Foundations of Natural Science and Technology - Vol 16

Electron Statistics in Quantum Confined Superlattices

by **Kamakhya Prasad Ghatak** *(University of Engineering and Management, India & Institute of Engineering and Management, India)* & **Arindam Biswas** *(Kazi Nazrul University, India)*

The concepts of the Electron Statistics (ES) and the ES dependent electronic properties are basic pillars in semiconductor electronics and this first-of-its-kind book deals with the said concepts in doping superlattices (SLs), quantum well, quantum wire and quantum dot SLs, effective mass SLs, SLs with graded interfaces and Fibonacci SLs under different physical conditions respectively. This book contains hundred open research problems which form the integral part of the text and are useful for both PhD aspirants and researchers.

792pp	**May 2023**	
978-981-126-365-1	**US$198**	**£180**
978-981-126-366-8(ebook)	**US$317**	**£290**

Quantum Physics and Modern Applications

Problems and Solutions

by **Seng Ghee Tan** *(Chinese Culture University, Taiwan)*, **Ching Hua Lee** *(National University of Singapore, Singapore)* & **Mansoor B A Jalil** *(National University of Singapore, Singapore)*

"…an excellent resource for learners seeking quick and specific answers of basic concepts and modern applications of quantum physics. With over 120 exercises and explicitly worked out solutions, this book effectively engages readers in practical problem-solving. Apart from fundamentals of quantum mechanics, the authors' focus on contemporary research topics, such as graphene, topological materials, spintronics, and quantum computation and information, ensures relevance and currency. This well-structured and informative book is a valuable companion for students and researchers looking to delve into the fascinating realm of quantum physics."

Prof Yihong Wu
Department of Electrical and Computer Engineering
National University of Singapore

296pp	**Apr 2023**	
978-981-127-101-4(pbk)	**US$38**	**£35**
978-981-127-039-0	**US$78**	**£70**
978-981-127-040-6(ebook)	**US$125**	**£115**

World Scientific Book Series in Quantum Information, Science and Technology - Vol 1

Quantum Hardware and Algorithms for Engineering and Life Sciences Applications

A Review of the Danish Quantum Research Community

edited by **Mark Nicholas Jones** *(Molecular Quantum Solutions ApS, Denmark)*, **Albert H Werner** *(University of Copenhagen, Denmark)* & **Sofie Lindskov Hansen** *(Sparrow Quantum, Denmark)*

This unique compendium gives an overview of the current research activities and developments within the areas of quantum hardware, quantum computing, quantum software, quantum communication and quantum sensing in Denmark. Renowned contributing authors are part of the Danish research community and work in research institutions or companies dealing with and related to quantum technologies.

The useful reference text allows readers to identify the research groups within Denmark working on specific topics as well as learning about topics which might be unfamiliar to them. The intention of each chapter is to give a good introduction to the scientific theory and the current state of the art.

Readership: Researchers, professionals, academics and graduate students in quantum mechanics/quantum information, and computational, mathematical and theoretical physics.

240pp	**Aug 2024**	
978-981-128-543-1	**US$88**	**£80**
978-981-128-544-8(ebook)	**US$141**	**£130**

Quantum Mechanics

An Accessible Introduction

2nd Edition

by **Robert Scherrer** *(Vanderbilt University, USA)*

This book provides a comprehensive introduction to quantum mechanics from the ground up. It is designed to be completely self-contained and assumes very little knowledge or mathematical background on the part of students as it takes them through the major topics of quantum mechanics. The book includes three "math interludes" covering such topics as complex numbers, linear operators, vector spaces, and matrix manipulation. The book also discusses some interesting modern applications of quantum mechanics: magnetic resonance imaging and quantum computing, and it concludes with an introduction to relativistic quantum theory.

This second edition includes expanded and improved coverage of the Heisenberg uncertainty principle, the use of ladder operators to solve the harmonic oscillator, as well as the treatment of the Lamb shift.

Readership: Undergraduate students, useful for all Physics majors and some Engineering majors; Educators of undergrad students.

380pp	**May 2024**	
978-981-12-8729-9 (pbk)	**US$58**	**£55**
978-981-12-8665-0	**US$138**	**£125**
978-981-12-8673-5 (ebook)	**US$221**	**£205**

Quantum Computation and Information Using Continuous Variables

by **Christian Weedbrook** *(Massachusetts Institute of Technology, USA)* & **Bhaskar Roy Bardhan** *(Massachusetts Institute of Technology, USA)*

This book is an introductory text to the field of Continuous Variable Quantum Computing and Quantum Information. Continuous variables (CVs) offer an extremely important alternative to the usual qubit substrate, as it involves easy to analyze Gaussian statistics, off-the-shelf experimental components and near universal deterministic quantum gates and operations. For communications, CVs can be easily adapted to the current telecommunication infrastructures and components, offering much higher communication rates. The contents intend to cover the most exciting topics in this field.

Readership: Advanced undergraduate and graduate students, researchers

350pp	**Jan 2025**	
978-981-3234-79-6	**US$78**	**£70**

FEATURED BACKLIST

Quantum Mechanics

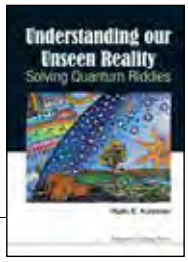
A Modern Development

2nd Edition

by **Leslie E Ballentine** *(Simon Fraser University, Canada)*

740pp	**Nov 2014**	
978-981-4578-58-5(pbk)	**US$75**	**£62**
978-981-4578-57-8	**US$115**	**£95**
978-981-4578-59-2(ebook)	**US$184**	**£150**

Understanding Our Unseen Reality



Solving Quantum Riddles

by **Ruth E Kastner** *(University of Maryland, USA)*

248pp	**Apr 2015**	
978-1-78326-646-3(pbk)	**US$28**	**£23**
978-1-78326-695-1	**US$58**	**£48**
978-1-78326-647-0(ebook)	**US$98**	**£80**

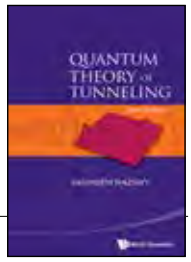
Forces of the Quantum Vacuum

An Introduction to Casimir Physics

edited by **William M R Simpson** *(The Weizmann Institute of Science, Israel)* & **Ulf Leonhardt** *(The Weizmann Institute of Science, Israel)*

276pp	**May 2015**	
978-981-4632-91-1(pbk)	**US$45**	**£37**
978-981-4632-90-4	**US$85**	**£71**
978-981-4644-76-1(ebook)	**US$136**	**£115**

Quantum Theory of Tunneling

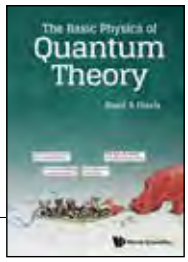


2nd Edition

by **Mohsen Razavy** *(University of Alberta, Canada)*

792pp	**Feb 2014**	
978-981-4525-00-8	**US$285**	**£250**
978-981-4525-02-2(ebook)	**US$456**	**£400**

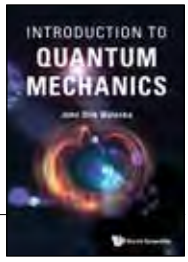
The Basic Physics of Quantum Theory



by **Basil S Davis** *(Xavier University of Louisiana, USA)*

208pp	**Apr 2020**	
978-981-121-995-5(pbk)	**US$48**	**£45**
978-981-121-939-9	**US$98**	**£90**
978-981-121-940-5(ebook)	**US$157**	**£145**

Introduction to Quantum Mechanics



by **John Dirk Walecka** *(College of William and Mary, USA)*

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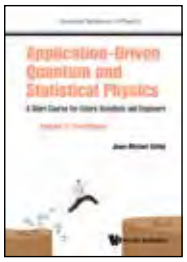
Essential Textbooks in Physics

Application-Driven Quantum and Statistical Physics



A Short Course for Future Scientists and Engineers

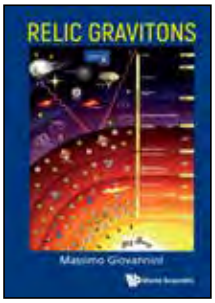
Volume 3: Transitions

by **Jean-Michel Gillet** *(Centrale Supélec, Paris-Saclay University, France & Centrale Pékin, Beihang University, China)*

340pp	**Jul 2020**	
978-1-78634-801-2(pbk)	**US$48**	**£45**
978-1-78634-788-6	**US$98**	**£90**
978-1-78634-789-3(ebook)	**US$157**	**£145**

RELATIVITY AND GRAVITATION

Relic Gravitons

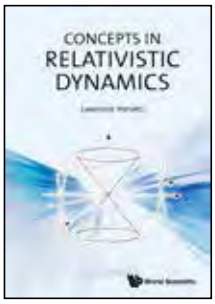


by **Massimo Giovannini** *(INFN, Milan-Bicocca, Italy & CERN, Switzerland)*

The book delves into the cosmic backgrounds of stochastic gravitational waves, exploring their potential as a unique source of information on the early physical conditions of the Universe close to the Planck epoch. Drawing on various lecture notes, articles, and reviews since the early 1990s, the monograph presents a topical account of the subject. The aim is to offer students and practitioners a useful tool for understanding the most recent developments of a lively field that is now thriving also thanks to forthcoming observational data.

780pp	**Jan 2024**	
978-981-127-885-3	**US$178**	**£165**
978-981-127-886-0(ebook)	**US$285**	**£260**

Concepts in Relativistic Dynamics



by **Lawrence Horwitz** *(Tel Aviv University, Israel)*

The mechanics of Newton and Galileo is based on the postulate of a universal time which plays the role of an evolution parameter as well as establishing dynamical correlations between interacting systems. The Michelson – Morley experiment, explained by Einstein in terms of Lorentz transformations, appeared to imply that the time is not absolute, but rather suffers from changes when a system is in motion. Einstein's thought experiment involving a moving system and a laboratory frame of observation, however, indicates that the action of the Lorentz transformation corresponds to an observed effect recorded in the laboratory on a clock that must be running in precise synchronization with that of the observed system. This book describes the effect this observation had on the development of the theory of Stueckelberg, Horwitz and Piron, and the corresponding conceptual basis for many phenomena which can be described in a relativistically covariant framework.

232pp	**Jun 2023**	
978-981-120-731-0	**US$88**	**£80**
978-981-120-732-7(ebook)	**US$141**	**£130**

Einstein's Relativity in Great Britain

From Eddington to Hawking and Penrose. A Tale of Physicists, Astronomers, Mathematicians and Philosophers

by **José M Sánchez-Ron** *(Universidad Autónoma de Madrid, Spain)*

Soon after the publication of Einstein's special and general theories of relativity in 1905 and 1915, they received attention from a wide variety of British scholars (astronomers, physicists, mathematicians and philosophers). That reaction varied from deep acceptance (as was the case of Arthur Eddington) to straightforward opposition. This book analyzes those reactions, which involved a large number of important scientists as well as philosophers, like Bertrand Russell. The study will cover from the 1910s till the 1960s, when the work of a group of relativists centered in Cambridge (Sciama and Hawking) and London (Bondi, Pirani and Penrose) made a new, fresh approach to general relativity.

250pp	**Aug 2024**	
978-981-120-028-1	**US$98**	**£90**
978-981-120-029-8(ebook)	**US$157**	**£145**

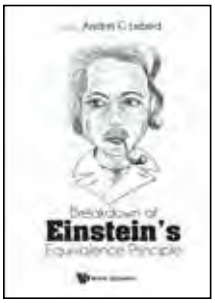
Gravitational Lensing in Cosmology

by **Toshifumi Futamase** *(Kyoto Sangyo University, Japan)*

Gravitational lensing has become an indispensable tool in observational cosmology. This book provides first the theoretical foundation of the observations based on general relativity and then the detailed explanation of gravitational lensing as well as its various applications in the field. Covers both the theory and a wide range of applications of gravitational lensing which are not available in the usual textbook of cosmology.

200pp	**Aug 2024**	
978-981-3276-78-9	**US$98**	**£90**
978-981-3276-79-6(ebook)	**US$157**	**£145**

Breakdown of Einstein's Equivalence Principle



edited by **Andrei G Lebed**
(University of Arizona, USA)

An equality between inertial and gravitational masses was established by Galileo Galilei more than 400 years ago and was accepted by Albert Einstein as a key point of his theory of gravitation — General Relativity. The above mentioned equality is called the Equivalence Principle. In this pioneering book, some unusual situations are described, where the Equivalence Principle is theoretically broken, and the possible experiments, where such breakdowns can be observed, are discussed in a brief. It is known that, in standard situations, the Equivalence Principle is extremely well established on Earth and in space in numerous experiments, including experiments during the recent space mission MICROSCOPE. Therefore, this book suggests a real breakthrough in the better understanding of Einstein's gravitational theory and its relation to quantum mechanics, which is a definite step towards the so-called "Theory of Everything". This book is recommended for all readers who are interested in gravitation and General Relativity.

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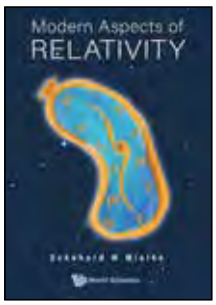

by **Eckehard W Mielke** *(Universidad Autónoma Metropolitana, Mexico)*

Computer programs, such as "ray tracing" methods, are enhanced to simulate objects in relativistic motion, which now offer us relativistic visualizations of accretion disks around compact, astrophysical objects like Black Holes. This book takes on a practical and intuitive approach in introducing the Lorentz invariance of light propagation and space-time concepts. The book begins with simple mathematics, like the classical Pythagoras formula for energy-momentum "triangles". Later, readers will find the intuitive vector calculus reemerging in the expansion of full relativistic expressions. Prepared with instructive diagrams of recent experiments, even the layperson can grasp the essential study of Relativity and marvel at its applications within this book.

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Replica Symmetry Breaking After 40 Years
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"The Parisi solution of the Spin Glass model, the Replica Symmetry Breaking, opened a new way to look at complexity in many different scientific fields from physics to biology, social sciences and optimisation procedures. This book aims at providing an in-depth and systematic review of the amazing results developed over the last few decades and it provides a source of inspiration to both young researchers approaching the field as well as to senior scientists challenging open questions and new possible insights."

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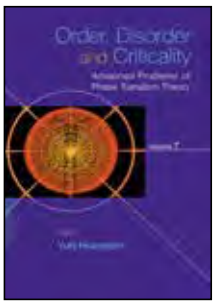

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(National Academy of Sciences, Ukraine)

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Dedicated to the Memory of Michael E Fisher
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The contributions in the book are devoted to the memory of Michael E Fisher, and hence include many personal memories from people whose work was influenced by him. Also, the book is a collection of articles from leaders in the field of phase transitions and critical phenomena, to celebrate 50 years of the renormalization group and the 1972 paper by Wilson and Fisher. Many of the articles review, in tutorial form, the progress in the fields of phase transitions and the renormalization group.

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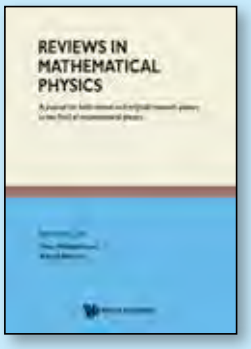

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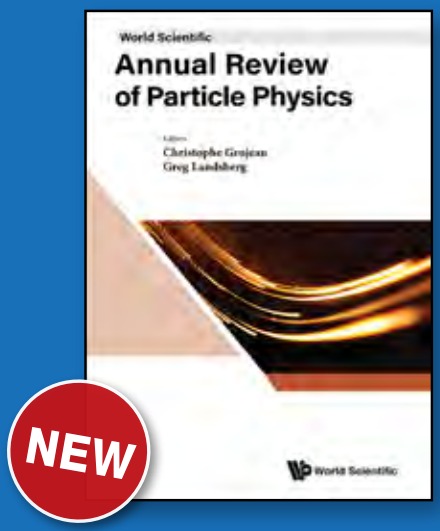

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In nearly 15 years of operation, the Large Hadron Collider at CERN has confirmed the Standard Model of particle physics as the current best description of the building blocks of matter at the shortest quantum distances. More and more refined measurements come in great agreement with elaborated and rapidly improving theoretical predictions. To properly document the landmark achievements in both experimental and theoretical high-energy physics, this issue of the Annual Review of Particle Physics aims to invite pioneers and experts at the forefront of research as contributors. The main goal of the Annual Review of Particle Physics issue is to document and keep the audience updated on the story of this remarkable scientific success and to prepare for the next steps forward with the high-luminosity phase of the LHC to possible future colliders. Additionally, we will cover the exploration of the intensity frontier, and the neighboring field of astroparticle physics and cosmology to enlarge our model of the Universe at different length scales.

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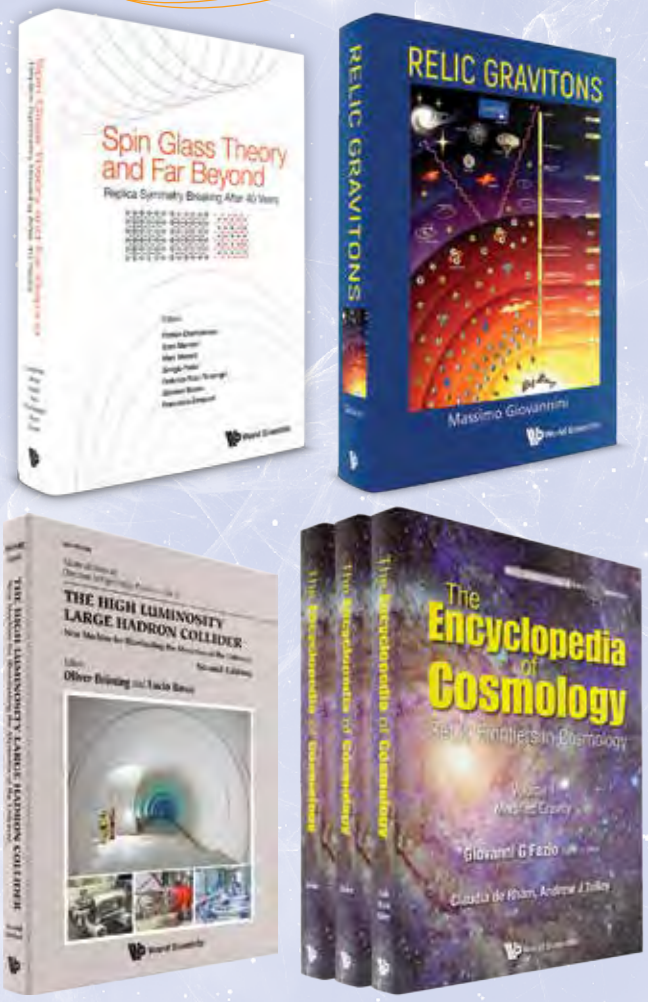

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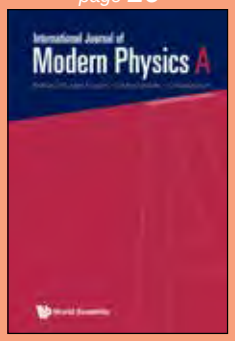

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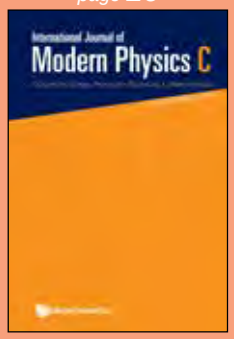

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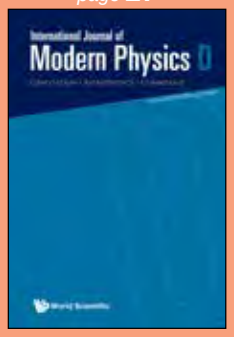

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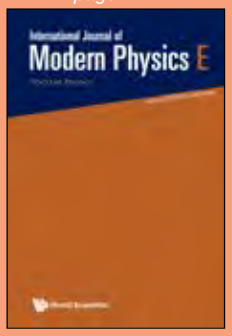

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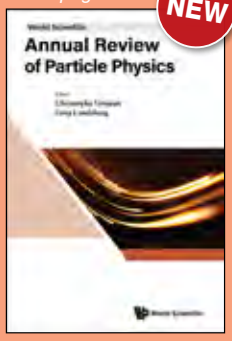

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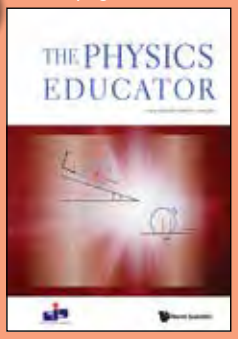

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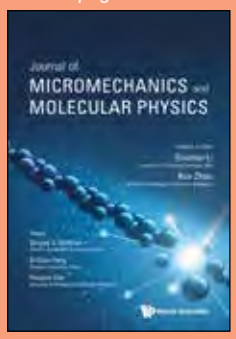

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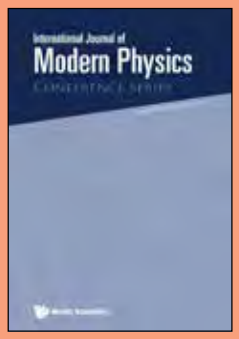

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