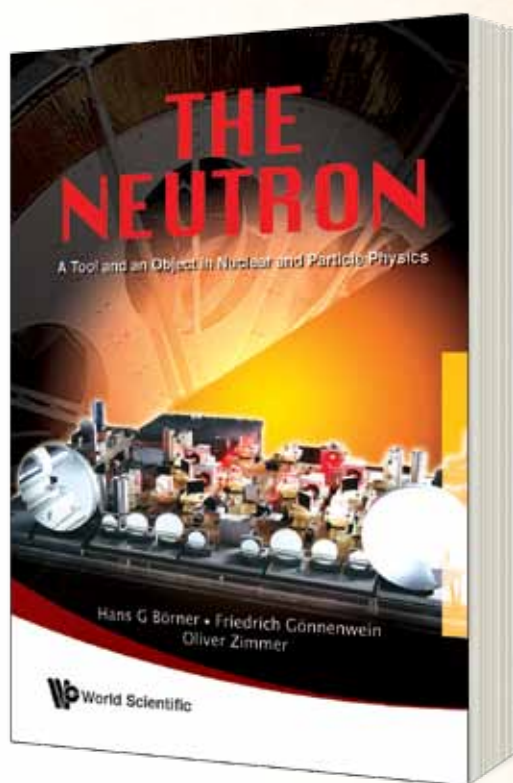
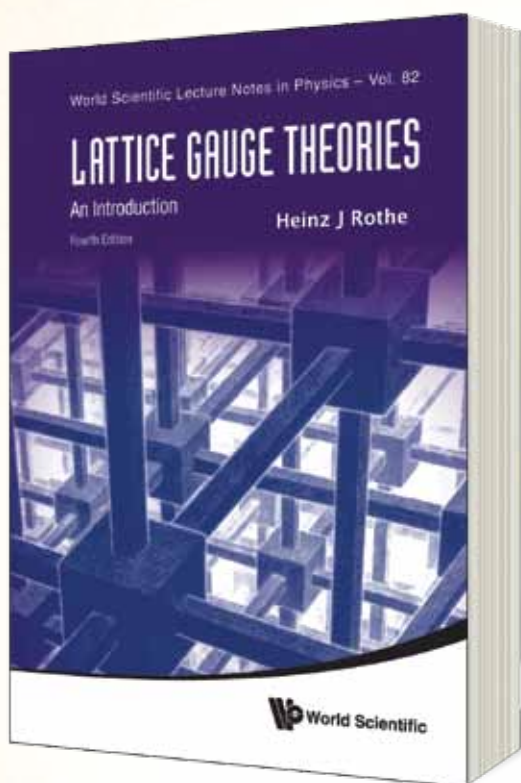


New and Notable Titles in High Energy and Particle Physics



Forthcoming Textbook

World Scientific Lecture Notes in Physics
LATTICE GAUGE THEORIES
 An Introduction
 (Fourth Edition)

by **Heinz J Rothe** (Universität Heidelberg)

“This book is clearly written and its content is explained so as to be understandable by anyone with a knowledge of the basics of quantum field theory. As an introductory text, it concentrates more on physical motivation and general principles, often avoiding more mathematically rigorous proofs where they might be confusing to the beginner ... it acts as a valuable starting point for anyone wishing to understand more about this subject.”

Mathematical Reviews

“This book is of invaluable interest for scientists working in this area (gauge theories on lattices) and it is addressed mainly at the graduate students interested in particle physics. It can be also of interest for physicists working in statistical mechanics, since the lattice formulation of field theories resembles closely that of complex mechanical systems.”

Zentralblatt MATH

600pp	Mar 2012	
978-981-4365-85-7	US\$140	£92
978-981-4365-86-4 (pbk)	US\$76	£50

Forthcoming

THE NEUTRON

A Tool and an Object in Nuclear and Particle Physics

by **Hans G Börner** (Institut Laue Langevin) & **Friedrich Gönnewein** (University Tübingen, Germany)

The reactor-based laboratory at the Institut Laue Langevin is recognized as the world's most intense and reliable source of slow neutrons for investigations in low energy particle and nuclear physics. This book highlights for the first time the impact of about 600 very diverse publications, produced in these fields at this institute during the past 30 years. On one hand neutrons are used as a tool to generate nuclei in excited states for studying nuclear structure and fission phenomena. On the other hand neutrons are directly used as the objects of investigation. Altogether the uniquely sensitive experiments tell us a great deal about the symmetry characteristics of nuclei, particles and interactions. Complementary to studies at high energy particle accelerators, subtle and precise experiments at very low energies contribute to elucidate questions about the building blocks of the Universe.

200pp	Jan 2012	
978-981-4273-08-4	US\$73	£51
978-981-4277-00-6 (ebook)	US\$95	

Forthcoming**NEW PERSPECTIVES IN HEAVY FLAVOR PHYSICS**by Marina Artuso (*Syracuse University*)

This book takes a critical look at heavy flavor phenomenology at a critical juncture of its history. We are at a transition period when the focus of this field is evolving from a precise and exhaustive exploration of the Standard Model — which is our current theory of fundamental particles and interactions — to a search for evidence of new physics. An underlying theme of this monograph is the search for connections between different fields of experimental physics. Written from the perspective of a curious experimentalist with a keen interest to develop a deep understanding of the phenomenology explored in recent and future data, this book introduces widely accessible formulations of the theory tools needed to relate the experimental data to fundamental theory parameters.

400pp **June 2012**
978-981-4289-46-7 **US\$113** **£78**
978-981-4289-47-4(ebook) **US\$147**

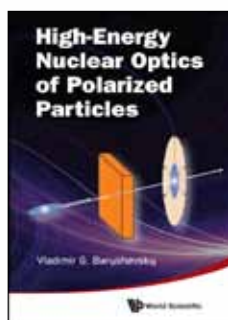
New**HIGH-ENERGY NUCLEAR OPTICS OF POLARIZED PARTICLES**

by Vladimir G Baryshevsky

(Research Institute for Nuclear Problems, Belarus)

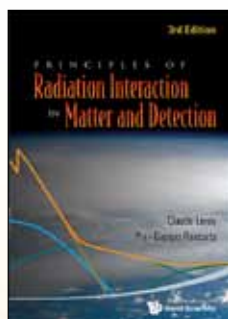
The various phenomena caused by refraction and diffraction of polarized elementary particles in matter have opened up a new research area in the particle physics: nuclear optics of polarized particles. Effects similar to the well-known optical phenomena such as birefringence and Faraday effects, exist also in particle physics, though the particle wavelength is much less than the distance between atoms of matter. Current knowledge of the quasi-optical effects, which exist for all particles in any wavelength range (and energies from low to extremely high), will enable us to investigate different properties of interacting particles (nuclei) in a new aspect.

600pp **Dec 2011**
978-981-4324-83-0 **US\$148** **£92**
978-981-4324-84-7(ebook) **US\$192**

**PRINCIPLES OF RADIATION INTERACTION IN MATTER AND DETECTION****3rd Edition**by Claude Leroy (*Université de Montréal*) & Pier-Giorgio Rancoita (*Istituto Nazionale di Fisica Nucleare, Milan*)

This book, like the first and second editions, addresses the fundamental principles of interaction between radiation and matter and the principles of particle detection and detectors in a wide scope of fields, from low to high energy, including space physics and medical environment. It provides abundant information about the processes of electromagnetic and hadronic energy deposition in matter, detecting systems, performance of detectors and their optimization. The third edition includes additional material covering, for instance: mechanisms of energy loss like the inverse Compton scattering, corrections due to the Landau–Pomeranchuk–Migdal effect, an extended relativistic treatment of nucleus–nucleus screened Coulomb scattering, and transport of charged particles inside the heliosphere. Furthermore, the displacement damage (NIEL) in semiconductors has been revisited to account for recent experimental data and more comprehensive comparisons with results previously obtained.

1040pp **Sep 2011**
978-981-4360-51-7 **US\$232** **£153**
978-981-4360-52-4(ebook) **US\$302**

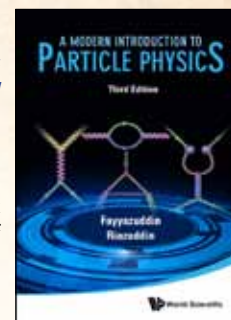
**Textbook****A MODERN INTRODUCTION TO PARTICLE PHYSICS****Third Edition**by Fayyazuddin & Riazuddin (*National Centre for Physics, Pakistan*)

“It is well written and up to date ... I can recommend this book to those aiming for a broad working knowledge of the essentials of particle theory. It is a book to which I shall continue to refer for a long time.”

Contemporary Physics

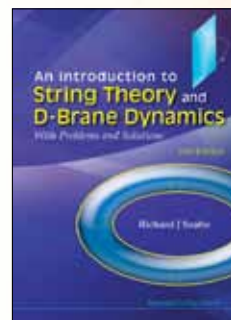
The book provides a comprehensive account of particle physics linking various aspects of particle physics in a coherent manner. This self-contained book not only cover basic concepts and recent developments but also overlaps between Astrophysics, Cosmology and Particle Physics, known as astroparticle physics. Several appendices are included to make the book self-contained.

680pp **Sep 2011**
978-981-4338-83-7 **US\$82** **£54**

**AN INTRODUCTION TO STRING THEORY AND D-BRANE DYNAMICS****With Problems and Solutions (2nd Edition)**by Richard J Szabo (*Heriot-Watt University, UK*)

This invaluable book provides a quick introduction to the rudiments of perturbative string theory and a detailed introduction to the more current topic of D-brane dynamics. The presentation is very pedagogical, with much of the technical detail streamlined. The rapid but highly coherent introduction to the subject is perhaps what distinguishes this book from other string theory or D-brane books. This second edition includes an additional appendix with solutions to the exercises, thus expanding on some of the technical material and making the book more appealing for use in lecture courses.

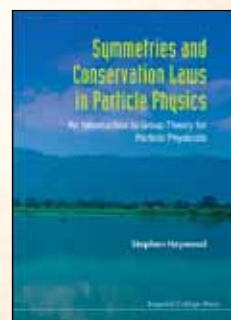
164pp **Jan 2011**
978-1-84816-622-6 **US\$68** **£42**

**Textbook****SYMMETRIES AND CONSERVATION LAWS IN PARTICLE PHYSICS****An Introduction to Group Theory for Particle Physicists**by Stephen Haywood (*Rutherford Appleton Laboratory*)

This book will explain how group theory underpins some of the key features of particle physics. It will examine symmetries and conservation laws in quantum mechanics and relate these to groups of transformations. Group theory provides the language for describing how particles (and in particular, their quantum numbers) combine. This provides understanding of hadronic physics as well as physics beyond the Standard Model. The symmetries of the Standard Model associated with the Electroweak and Strong (QCD) forces are described by the groups $U(1)$, $SU(2)$ and $SU(3)$. The properties of these groups are examined and the relevance to particle physics is discussed.

Contents: Symmetries and Conservation Laws; Introduction to Group Theory; The Unitary Group $U(1)$; The Special Unitary Group $SU(2)$; Combining Fermions; The Special Unitary Group $SU(3)$; Hadron States; The Standard Model and Beyond.

168pp **Oct 2010**
978-1-84816-659-2 **US\$58** **£36**
978-1-84816-703-2(pbk) **US\$28** **£17**



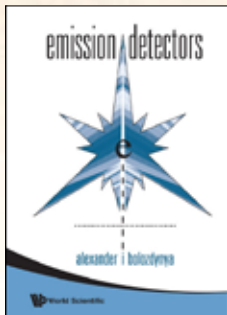
EMISSION DETECTORS

by **Alexander I Bolozdynya**

(National Research Nuclear University "MEPhI", Russia)

This book is the first monograph exclusively dedicated to emission detectors. Properties of two-phase working media based on noble gases, saturated hydrocarbon, ion crystals and semiconductors are reviewed.

Contents: Hetero-phase Detectors and History of Development of Emission Detectors; Emission of Charge Carriers from Working Media of Emission Detectors; Generation of Signals in Massive Emission Detectors; Emission Ionization Chambers; Emission Detectors with Physical Amplification of Signals; Imaging Emission Detectors; Emission Detectors for Low-background Experiments; Applications of Emission Detectors.



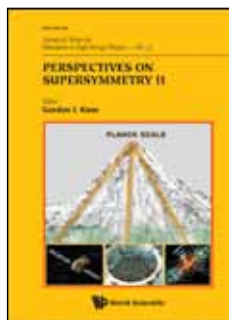
224pp Jul 2010
978-981-283-405-8 US\$60 £37
978-981-283-406-5(ebook) US\$78

Advanced Series on Directions in High Energy Physics - Vol. 21

PERSPECTIVES ON SUPERSYMMETRY II

edited by **Gordon L Kane** (University of Michigan)

This volume begins with an excellent pedagogical introduction to the physics and methods and formalism of supersymmetry which is accessible to anyone with a basic knowledge of the Standard Model of particle physics. Next is an overview of open questions, followed by chapters on topics such as how to detect superpartners and tools for studying them, the current limits on superpartner masses as we enter the LHC era, the lightest superpartner as a dark matter candidate in thermal and non-thermal cosmological histories, and associated Z' physics. Most chapters have been extended and updated from the earlier edition and some are new.



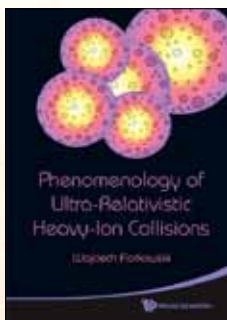
604pp Apr 2010
978-981-4307-48-2 US\$141 £97
978-981-4307-49-9(pbk) US\$65 £45

Textbook

PHENOMENOLOGY OF ULTRA-RELATIVISTIC HEAVY-ION COLLISIONS

by **Wojciech Florkowski** (Jan Kochanowski University, Kielce & Institute of Nuclear Physics, Polish Academy of Sciences)

"It gives an excellent introduction to and an in-depth review of the standard theoretical framework that is used to interpret the heavy-ion data. It provides a clear, logical and unified description of statistical, hydrodynamical and kinetic models ... there are various exercises in each chapter for use as a textbook in a graduate course. All in all, this book is highly recommendable both for heavy-ion and non-heavy-ion physicists."



CERN Courier

436pp Mar 2010
978-981-4280-66-2 US\$108 £72
978-981-4280-68-6(ebook) US\$140

AT THE LEADING EDGE

The ATLAS and CMS LHC Experiments

edited by **Dan Green** (Fermi National Accelerator Laboratory)

"This book follows a new concept, which makes it unique and interesting to read ... The actual technological choices made by the collaborations to address the physics at the LHC are outlined by subsequent well-written and illustrated contributions from 22 prominent scientists, engineers, experts and leaders responsible for the detector subsystems of ATLAS and CMS. The book contributes in an impressive way towards understanding the motivation behind specific choices, and towards learning about the risks and the courage required to tackle necessary technological developments ... this book should be on the shelf of all friends of the LHC. It represents a nicely balanced record of the historical developments, technical challenges and scientific background, and packed with photos of the LHC machine and its two major general-purpose detectors, ATLAS and CMS, taken during construction and assembly."



CERN Courier

448pp Feb 2010
978-981-4277-61-7 US\$120 £79
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World Scientific Series in 20th Century Physics - Vol. 40

MURRAY GELL-MANN

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edited by **Harald Fritzsch** (University of Munich)

"As an admirer of Murray Gell-Mann, I can only applaud the initiative of Harald Fritzsch to publish a selection of Gell-Mann's papers. What interested me most in the collection were not the papers published in journals, but rather, the contributions to conferences, talks and so on."

CERN Courier

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464pp Feb 2010
978-981-283-684-7 US\$105 £69
978-981-4261-62-3(pbk) US\$48 £32

Textbook

World Scientific Lecture Notes in Physics - Vol. 80

INTRODUCTION TO SUPERSYMMETRY

(Second Edition)

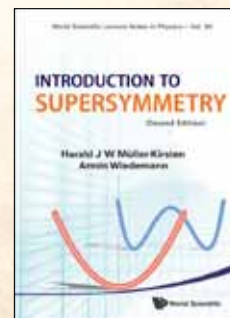
by **Harald J W Müller-Kirsten** (University of Kaiserslautern) & **Armin Wiedemann** (Baden-Württemberg Cooperative State University Mannheim)

"... a very careful and thorough discussion of supersymmetry culminating in supersymmetric gauge field theories ... a valuable book for those hoping to learn supersymmetry in first year postgraduate courses."

J G Taylor
Contemporary Physics

This revised edition of the highly successful text of 20 years ago provides an introduction to supersymmetry, and thus begins with a substantial chapter on spacetime symmetries and spinors.

452pp Jan 2010
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New Textbook

ACCELERATOR PHYSICS

Third Edition

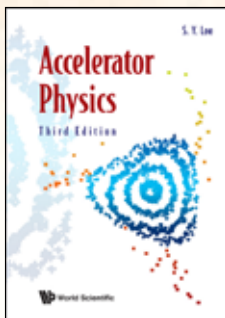
by S Y Lee (Indiana University)

“The large number of formulas and the excellent table of contents and index make the book a very useful addition to the library of a scientist or engineer already in the field.”

Physics Today

This book is intended to be used as a graduate or senior undergraduate textbook in accelerator physics and science. It can be used as preparatory course material in graduate accelerator physics thesis research. The text covers historical accelerator development, transverse betatron motion, synchrotron motion, an introduction to linear accelerators, and synchrotron radiation phenomena in low emittance electron storage rings, introduction to special topics such as the free electron laser and the beam-beam interaction.

550pp Nov 2011
978-981-4374-94-1(pbk) US\$68 £45



Recommended Textbook

INTRODUCTION TO THE THEORY OF THE EARLY UNIVERSE

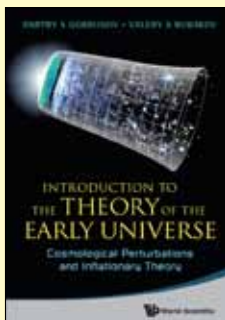
Cosmological Perturbations and Inflationary Theory

by Dmitry S Gorbunov (Russian Academy of Sciences) &

Valery A Rubakov (Russian Academy of Sciences & Moscow State University)

This book accompanies another book by the same authors, *Introduction to the Theory of the Early Universe: Hot Big Bang Theory* and presents the theory of the evolution of density perturbations and relic gravity waves, theory of cosmological inflation and post-inflationary reheating. Written in a pedagogical style, the main chapters give a detailed account of the established theory, with derivation of formulas. Being self-contained, it is a useful textbook for advanced undergraduate students and graduate students. Essential materials from General Relativity, theory of Gaussian random fields and quantum field theory are collected in the appendices.

504pp Feb 2011
978-981-4322-22-5 US\$156 £101
978-981-4343-78-7(pbk) US\$76 £49



INTRODUCTION TO THE THEORY OF THE EARLY UNIVERSE

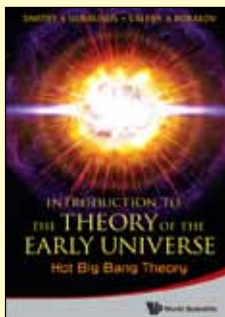
Hot Big Bang Theory

by Dmitry S Gorbunov (Russian Academy of Sciences) &

Valery A Rubakov (Russian Academy of Sciences & Moscow State University)

This book is written from the viewpoint of a deep connection between cosmology and particle physics. It presents the results and ideas on both the homogeneous and isotropic Universe at the hot stage of its evolution and in later stages. The main chapters describe in a systematic and pedagogical way established facts and concepts on the early and the present Universe. The comprehensive treatment, hence, serves as a modern introduction to this rapidly developing field of science. To help in reading the chapters without having to constantly consult other texts, essential materials from General Relativity and the theory of elementary particles are collected in the appendices. Various hypotheses dealing with unsolved problems of cosmology, and often alternative to each other, are discussed at a more advanced level. These concern dark matter, dark energy, matter-antimatter asymmetry, etc.

488pp Feb 2011
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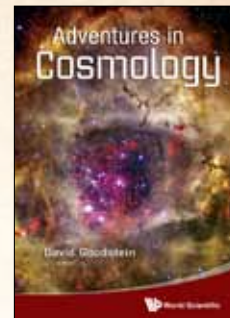
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ADVENTURES IN COSMOLOGY

edited by David Goodstein

(California Institute of Technology)

Contents: Galaxy Formation: From Start to Finish (Andrew Benson, California Institute of Technology); The Reionization of Cosmic Hydrogen by the First Galaxies (Abraham Loeb, Harvard University); Clusters of Galaxies (Elena Pierpaoli, University of Southern California); Reionizing the Universe with the First Sources of Light (Volker Bromm, University of Texas at Austin); Mapping the Cosmic Dawn (Steven Furlanetto, University of California, Los Angeles); Neutrino Masses from Cosmology (Ofer Lahav and Shaun Thomas, University College London); Measuring the Expansion Rate of the Universe (Laura Ferrarese, Herzberg Institute of Astrophysics); Particles as Dark Matter (Dan Hooper, The University of Chicago); Detection of WIMP Dark Matter (Sunil Golwala, California Institute of Technology & Dan McKinsey, Yale University); and other papers.



424pp Aug 2011
978-981-4313-85-8 US\$86 £57

Forthcoming Textbook

Particle Collisions and Quantitative Spectroscopy in Interdisciplinary Research - Vol. 1

FAST COLLISIONS OF LIGHT IONS WITH MATTER

Charge Exchange and Ionization

by Dževad Belkić (Nobel Medical University, Karolinska Institute, Sweden)

The present book is aimed to match the growing demand from theory and experiment, as motivated by high relevance for fundamental physics as well as for other fields such as fusion, medicine, etc. The overall emphasis in this book is not on compilation of cross sections, but rather on collisional mechanisms involving ions and atoms at high non-relativistic energies. The principal outlines for extensions of the analyzed theories' molecular targets (e.g. water) are also presented for the needs of hadron therapy.

375pp June 2012
978-981-4366-04-5 US\$110 £73

Forthcoming

UNDERSTANDING THE UNIVERSE

From Quarks to the Cosmos

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by Don Lincoln (Fermi National Accelerator Laboratory)

“Lincoln has an infectious love for physics ... (and) demonstrates a humorous writing style that successfully engages the reader.”

Publishers Weekly

“... Lincoln offers lay readers a complete tour of particle physics ... (he) writes very well, using a mixture of humor, history and analogies as well basic scientific explanations ... (and) does a particularly good job of covering the full gamut of particle physics.”

Choice

650pp Jan 2012
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AN INTRODUCTION TO BLACK HOLES, INFORMATION AND THE STRING THEORY REVOLUTION

The Holographic Universe

by **Leonard Susskind** (Stanford University) & **James Lindesay** (Howard University)

"A remarkable feature of this book is that relatively little specialized knowledge is required from the reader; a cursory acquaintance with quantum mechanics and relativity is sufficient. This is impressive, given that the authors cover some of the hottest topics in current research ... conceptually the book is truly challenging. It makes us think about many ideas we take for granted and shakes the foundations of our understanding of basic physics. It provides a rollercoaster ride into the treacherous and largely uncharted land of quantum gravity. This book is highly recommended for those interested in these fascinating topics."



CERN Courier

"The authors, both established researchers, present a review of black hole physics in one of the simplest and most efficient ways ... The book will be useful for students of physics and for everyone interested in understanding ways in which knowledge is generated theoretically."

Mathematical Reviews

200pp	Dec 2004	
978-981-256-083-4	US\$39	£22
978-981-256-131-2(pbk)	US\$19	£10

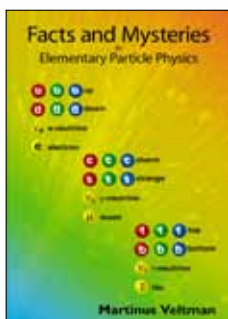
FACTS AND MYSTERIES IN ELEMENTARY PARTICLE PHYSICS

by **Martinus J G Veltman** (University of Michigan & NIKHEF, The Netherlands)

"... the wonderful feature of the book is that it should be extremely useful to almost anyone with an interest in this field, ranging from high school students and interested laypersons to physicists in other fields. Enthusiastically recommended as an addition to any library."

Choice

"I greatly enjoyed finally reading a book that goes into the details I always wanted ... Veltman has the courage to try a deeper level about what we understand and what is simply fact ... Even if you have read books popularizing physics before, you have to read this one ..."



CERN Courier

348pp	Apr 2003	
978-981-238-148-4	US\$65	£45
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FUNDAMENTAL FORCES OF NATURE

The Story of Gauge Fields

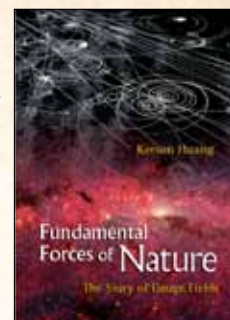
by **Kerson Huang** (MIT)

"The book delivers what it implicitly promises: an instructive and thoughtful tour of 20th century physics, with special emphasis on the theory of the fundamental constituents of matter and forces among them."

Physics Today

"This volume is an excellent survey on gauge fields, which presents the relevant facts, people and events of the subjacent theory."

Zentralblatt MATH



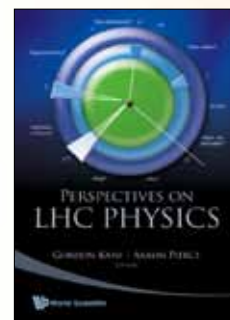
284pp	May 2007	
978-981-270-644-7	US\$93	£61
978-981-270-645-4(pbk)	US\$51	£34

PERSPECTIVES ON LHC PHYSICS

edited by **Gordon Kane** & **Aaron Pierce** (University of Michigan)

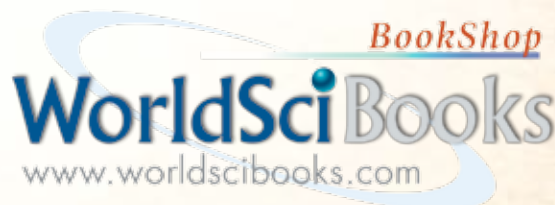
"... is a timely, heterogeneous offering, with some interesting gems and informative parts ... there should be sections of it to interest most readers in the physical sciences."

CERN Courier



This book provides an overview on the techniques that will be crucial for finding new physics at the LHC, as well as perspectives on the importance and implications of the discoveries. Among the accomplished contributors to this book are leaders and visionaries in the field of particle physics beyond the Standard Model, including two Nobel Laureates (Steven Weinberg and Frank Wilczek), and presumably some future Nobel Laureates, plus top younger theorists and experimenters. With its blend of popular and technical contents, the book will have wide appeal, not only to physical scientists but also to those in related fields.

352pp	Jun 2008	
978-981-277-975-5	US\$99	£55
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