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Department, CERN, 1211
Geneva, Switzerland In the

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history of quantum and particle physics, discrete system. In this past decade, the key player has been the B-meson system, and we also witnessed the appearance on symmetries and their violation have played an

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outstanding + ? rôle. First,
the assumption of the
conservation of P (parity),
stage of the top quark.

Thanks to thee e B factories
with C (charge conjugation),
CP and CPT (T denotes time
rever- their detectors BaBar

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(SLAC) and Belle (KEK), CP violation is now also firmly seen in B-meson decays, where the sal) helped theorists to restrict theoretical predictions, such as the "golden" decay $B \rightarrow J/\psi K$ shows CP-violating

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effects as in Fermi's 1934 seminal paper on weak interactions. In S d at the level of 70%. These effects can be translated into the 1957, the observation of P (and C) violation in weak int- angle? of the

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“unitarity triangle” (UT),
which characterizes actions
gave a new impact and led to
the conjecture that CP the
Kobayashi–Maskawa mechanism
of CP violation. S- was
still a conserved symmetry.
In 1963, one year before + ?

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eral strategies to determine the other angles of the triangle, the surprising observation of CP violation in $K \rightarrow \pi \pi$ and $B \rightarrow \pi \pi$, have been proposed and successfully applied to decays, the concept of

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quark- flavour mixing was introduced the B-factory data.

Could CERN, the creator and birthplace of the World Wide Web, be involved and even be behind the most ultimate conspiracy in all of history

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with their science,
symmetry, Satanism,
paganism, and rituals? This
book is designed as a brief
introduction into how CERN
is deeply and darkly
connected to many world
leaders, the Vatican, the

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Hollywood elites, the deep state, the Illuminati, and the New World Order. My book takes the reader on a journey through what is easily one of the most secretive organizations in all of times and is an

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accessible and very
carefully structured
introduction into how it all
started, how everything was
created with the big bang,
almost fourteen billion
years ago, and CERN's
burning desire to recreate

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those conditions through physics and by colliding particles together at almost the speed of light and attempting to be like God almighty. They have created the largest machine in the world and even discovered

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the god particle, the glue that holds the entire universe together. Why would they build their nuclear research facility upon the burial grounds of Apollyon the Destroyer? Could CERN be responsible for releasing

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the devil from the
bottomless pit, from his
prison, hell, as written in
the Bible in Revelation 9?
CERN has long been accused
of opening up black holes
that could very well swallow
the entire universe, and

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they even admitted to this Armageddon-like possibility on several occasions. Behind the scenes, CERN's insidious plans are to open up wormholes, Stargates, and portals to other dimensions, not to enter through, but

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more so to let something
evil into our world. What or
who they intend to welcome
is known to have many names,
such as the horned god,
Abaddon, Apollyon, the
Beast, Lucifer, Satan, or as
many of us would know to be,

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the devil. Will CERN share its dangerous dark matter with a government or military that is dead set on war, world domination, and destruction? Will CERN create a black hole that swallows the world, or will

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they release Satan and his legion of demons, locusts, and armies upon the world as the last days predict and approach?

The recent observation of the Higgs boson has been hailed as the scientific

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discovery of the century and led to the 2013 Nobel Prize in physics. This book describes the detailed science behind the decades-long search for this elusive particle at the Large Electron Positron Collider

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at CERN and at the Tevatron at Fermilab and its subsequent discovery and characterization at the Large Hadron Collider at CERN. Written by physicists who played leading roles in this epic search and

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discovery, this book is an authoritative and pedagogical exposition of the portrait of the Higgs boson that has emerged from a large number of experimental measurements. As the first of its kind,

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this book should be of interest to graduate students and researchers in particle physics.

This volume presents a snapshot of the state-of-the-art in loop quantum gravity from the perspective of

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younger leading researchers. It takes the reader from the basics to recent advances, thereby bridging an important gap. The aim is two-fold — to provide a contemporary introduction to the entire field for

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students and post-docs, and to present an overview of the current status for more senior researchers. The contributions include the latest developments that are not discussed in existing books, particularly recent

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advances in quantum dynamics
both in the Hamiltonian and
sum over histories
approaches; and applications
to cosmology of the early
universe and to the quantum
aspects of black holes.

Higgs Boson Quantum Physics

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Alice in Quantumland

**In this "provocative" book
(New York Times), a contrarian
physicist argues that her
field's modern obsession with**

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**beauty has given us wonderful
math but bad science.**

**Whether pondering black holes
or predicting discoveries at
CERN, physicists believe the
best theories are beautiful,
natural, and elegant, and this**

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standard separates popular theories from disposable ones. This is why, Sabine Hossenfelder argues, we have not seen a major breakthrough in the foundations of physics for more than four decades.

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The belief in beauty has become so dogmatic that it now conflicts with scientific objectivity: observation has been unable to confirm mindboggling theories, like supersymmetry or grand

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unification, invented by physicists based on aesthetic criteria. Worse, these "too good to not be true" theories are actually untestable and they have left the field in a cul-de-sac. To escape, physicists

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**must rethink their methods.
Only by embracing reality as it
is can science discover the
truth.**

**The evolution of quantum field
theory from QED to grand
unification / Gerard 't Hooft --**

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**fundamentals of this
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numbers Details on the Dirac equation, the Feynman rules, and the Higgs mechanism A time-saving approach to performing better on an exam or at work Simple enough for a beginner, but challenging

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enough for an advanced student, Quantum Field Theory Demystified is your shortcut to understanding this fascinating area of physics.

We are living in a Golden Age of Physics. Forty or so years

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ago, three brilliant, yet little-known scientists - an American, a Dutchman, and an Englishman - made breakthroughs which later inspired the construction of the Large Hadron Collider at

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CERN in Geneva: a 27 kilometre-long machine that cost ten billion dollars, took twenty years to build, and finally discovered a particle consistent with the Higgs boson. The Infinity Puzzle is

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the inside story of those forty years of research, breakthrough, and endeavour. Peter Higgs, Gerard 't Hooft and James Bjorken were the three scientists whose work is explored here, played out

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across the decades against a backdrop of high politics, low behaviour, and billion dollar budgets. Written by Frank Close, the eminent physicist and award-winning writer, The Infinity Puzzle also draws upon

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the author's close friendships with those involved. In July 2012, in the days leading up to the momentous announcement that the Higgs boson had indeed been discovered, Frank Close and Peter Higgs were

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together at a conference in Sicily. In this paperback edition, Close includes a substantial epilogue reflecting on the announcement, its implications, and the impact on Peter Higgs and others.

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**Quantum Mechanics:
Fundamentals
Discovering the Higgs Boson
The Global Approach to
Quantum Field Theory
An Outsider's Guide to the
Future of Physics**

Page 53/203

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**Lecture Notes of the Les
Houches Summer School:
Volume 97, August 2011
Lectures Given at CERN in
1958 and 1959
The Global Quest for the
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This book provides a comprehensive and instructive coverage of particle physics in the early universe, in a logical way. It starts from the thermal history of the universe by investigating some of the main arguments such as Big Bang

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nucleosynthesis, the cosmic microwave background (CMB) and the inflation, before treating in details the direct and indirect detection of dark matter and then some aspects of the physics of neutrino. Following, it describes possible candidates for

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dark matter and its interactions. The book is targeted at theoretical physicists who deal with particle physics in the universe, dark matter detection and astrophysical constraints, and at particle physicists who are interested in models of inflation

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or reheating. This book offers also material for astrophysicists who work with quantum field theory computations. All that is useful to compute any physical process is included: mathematical tables, all the needed functions for the

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thermodynamics of early universe and Feynman rules. In light of this, this book acts as a crossroad between astrophysics, particle physics and cosmology. Quantum Physics is the biggest mystery in science today, but its clues do not have to remain with

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the scientists alone. If you have always been absolutely baffled by anything related to Quantum Physics then this book is for you. My writing mission is to engage with a new audience that has no previous knowledge of science, and I go to great lengths to make

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sure that everybody can fully understand my explanations. The first half of the book lists all of the facts behind Quantum Physics and I will also encourage you to participate in the scientific process. Unfortunately, Quantum Physics has a

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reputation for being difficult. The first thing I will do is show that this claim is false. In this book nothing is too hard to understand. I am confident that a careful reader will be able to comprehend all of the explanations given. However, like

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***the rest of the science
community you will still have
problems understanding the
implications of what you will
learn and that is why so many
people remain fascinated by this
subject.***

This book comprises the second

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half of a quantum field theory (QFT) course for graduate students. It gives a concise introduction to advanced concepts that are important for research in elementary particle theory. Topics include the path integral, loop expansion,

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***Feynman rules, various
regularization methods,
renormalization, running
couplings and the
renormalization group, fixed
points and asymptotic freedom,
effective action, Coleman-
Weinberg effective potential,***

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***fermions, the axial anomaly,
QED, gauge fixing, nonabelian
gauge theories, unitarity, optical
theorem, Slavnov-Taylor
identities, beta function of Yang-
Mills theory, a heuristic
derivation of asymptotic
freedom, instantons in $SU(N)$***

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gauge theory, theta vacua and the strong CP problem. Exercises are included and are intended for advanced graduate students or postdocs seeking to deepen their understanding of QFT.

Written by two of the world's leading experts on particle

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physics and the standard model - including an award-winning former Director General of CERN - this textbook provides a completely up-to-date account of relativistic quantum mechanics and quantum field theory. It describes the formal and

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phenomenological aspects of the standard model of particle physics, and is suitable for advanced undergraduate and graduate students studying both theoretical and experimental physics.

How Beauty Leads Physics Astray

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***Essays to Celebrate CERN's 60th
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Volume 2: Detectors for Particles
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Particles, Fields, Quanta
Science Notebook
Flavor in the Era of the LHC
How We Found the Higgs Boson***

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The God Particle
If the Universe is the Answer, what is the Question?
Houghton Mifflin Harcourt
This book provides an introduction to the current state of our knowledge about the structure of matter.
Gerhard Ecker describes the development of modern physics from

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the beginning of the quantum age to the standard model of particle physics, the fundamental theory of interactions of the microcosm. The focus lies on the most important discoveries and developments, e.g. of quantum field theory, gauge theories and the future of particle physics. The

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author also emphasizes the interplay between theory and experiment, which helps us to explore the deepest mysteries of nature. "Particles, Fields, Quanta" is written for everyone who enjoys physics. It offers high school graduates and students of physics in the first semesters an encouragement

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to understand physics more deeply. Teachers and others interested in physics will find useful insights into the world of particle physics. For advanced students, the book can serve as a comprehensive preparation for lectures on particle physics and quantum field theory. A brief outline

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of the mathematical structures, an index of persons with research focuses and a glossary for quick reference of important terms such as gauge theory, spin and symmetry complete the book. From the foreword by Michael Springer: “ The great successes and the many open

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questions this book describes illustrate how immensely complicated nature is and nevertheless how much we already understand of it. ” The author Gerhard Ecker studied theoretical physics with Walter Thirring at the University of Vienna. His research

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focus has been on theoretical particle physics, in particular during several long-term visits at CERN, the European Organisation for Nuclear Research in Geneva. In 1986 he was promoted to Professor of Theoretical Physics at the University of Vienna. Since 1977 he has given both basic

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lectures in theoretical physics and advanced courses on different topics in particle physics, e.g., quantum field theory, symmetry groups in particle physics and renormalisation in quantum field theory.

"The rabbit hole gets wrestled here.
An old school saying applies: the

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more you know, the more you don ' t know. Dance along this read into the unknown and find out that this book may be the best ever answer to ' What is soul?' —Chuck D, rapper and co-founder of Public Enemy
Starred Reviews from Kirkus and Publishers Weekly! Named a Best

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Book of 2021 by Library Journal, Kirkus, and symmetry Magazine In this important guide to science and society, a cosmologist argues that physics must embrace the excluded, listen to the unheard, and be unafraid of being wrong. Years ago, cosmologist Stephon Alexander

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received life-changing advice: to discover real physics, he needed to stop memorizing and start taking risks. In *Fear of a Black Universe*, Alexander shows that great physics requires us to think outside the mainstream -- to improvise and rely on intuition. His approach leads him

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to three principles that shape all theories of the universe: the principle of invariance, the quantum principle, and the principle of emergence.

Alexander uses them to explore some of physics' greatest mysteries, from what happened before the big bang to how the universe makes

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consciousness possible. Drawing on his experience as a Black physicist, he makes a powerful case for diversifying our scientific communities. Compelling and empowering, *Fear of a Black Universe* offers remarkable insight into the art of physics.

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Quantum mechanics was already an old and solidly established subject when the first edition of this book appeared in 1966. The context in which a graduate text on quantum mechanics is studied today has changed a good deal, however. In 1966, most entering physics graduate

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students had a quite limited exposure to quantum mechanics in the form of wave mechanics. Today the standard undergraduate curriculum contains a large dose of elementary quantum mechanics, and often introduces the abstract formalism due to Dirac. Back then, the study of the foundations by

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theorists and experimenters was close to dormant, and very few courses spent any time whatever on this topic. At that very time, however, John Bell's famous theorem broke the ice, and there has been a great flowering ever since, especially in the laboratory thanks to the

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development of quantum optics, and more recently because of the interest in quantum computing. And back then, the Feynman path integral was seen by most as a very imaginative but rather useless formulation of quantum mechanics, whereas it now plays a large role in statistical physics

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and quantum field theory, especially in computational work. For these and other reasons, this book is not just a revision of the 1966 edition. It has been rewritten throughout, is differently organized, and goes into greater depth on many topics that were in the old edition.

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Reports of the CERN Working Groups
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The Anomalous Magnetic Moment of
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Geometric Formulation of Classical
and Quantum Mechanics

This book provides an introduction
to Quantum Field Theory (QFT) at
an elementary level—with only

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special relativity, electromagnetism and quantum mechanics as prerequisites. For this fresh approach to teaching QFT, based on numerous lectures and courses given by the authors, a representative sample of topics has

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been selected containing some of the more innovative, challenging or subtle concepts. They are presented with a minimum of technical details, the discussion of the main ideas being more important than the presentation of

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the typically very technical mathematical details necessary to obtain the final results. Special attention is given to the realization of symmetries in particle physics: global and local symmetries, explicit, spontaneously broken, and

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anomalous continuous symmetries, as well as discrete symmetries. Beyond providing an overview of the standard model of the strong, weak and electromagnetic interactions and the current understanding of the origin of mass,

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the text enumerates the general features of renormalization theory as well as providing a cursory description of effective field theories and the problem of naturalness in physics. Among the more advanced topics the reader will find are an

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outline of the first principles derivation of the CPT theorem and the spin-statistics connection. As indicated by the title, the main aim of this text is to motivate the reader to study QFT by providing a self-contained and approachable

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introduction to the most exciting and challenging aspects of this successful theoretical framework. This second open access volume of the handbook series deals with detectors, large experimental facilities and data handling, both for

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accelerator and non-accelerator based experiments. It also covers applications in medicine and life sciences. A joint CERN-Springer initiative, the "Particle Physics Reference Library" provides revised and updated contributions based on

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previously published material in the well-known Landolt-Boernstein series on particle physics, accelerators and detectors (volumes 21A,B1,B2,C), which took stock of the field approximately one decade ago. Central to this new

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initiative is publication under full open access.

This book is the most complete collection of John S Bell's research papers, review articles and lecture notes on the foundations of quantum mechanics. Some of this

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material has hitherto been difficult to access. The book also appears in a paperback edition, aimed at students and young researchers. This volume will be very useful to researchers in the foundations and applications of

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quantum mechanics.

The world's foremost experimental physicist uses humor, metaphor, and storytelling to delve into the mysteries of matter, discussing the as-yet-to-be-discovered God particle.

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Theoretical Physics to Face the
Challenge of LHC
The Infinity Puzzle
Satan's Playground
Some Remarks on Self-
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Fear of a Black Universe

The God Particle

A Student's Guide to Particle
Physics and Cosmology

*This is a fascinating account of
two great scientists of the 20th
century: Einstein and*

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*Heisenberg, discoverers,
respectively, of the theory of
relativity and quantum
mechanics. It connects the
history of modern physics to the
life stories of these two
extraordinary physicists. These*

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discoveries laid the foundation of modern physics, without which our digitized world of computers, satellites, and innovative materials would not be possible. This book also describes in comprehensible

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terms the complicated science underlying the two discoveries. The twin biography highlights the parallels and differences of these two luminaries, showing how their work shaped the 20th century

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into the century of physics. This new volume takes a complete look at how classical field theory, quantum mechanics and quantum field theory are interrelated. It takes a global approach and discusses

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the importance of quantization by relating it to different theories such as tree amplitude and conservation laws. There are special chapters devoted to Euclideanization and renormalization, space and time

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inversion and the closed-time-path formalism.

This research monograph covers extensively the theory of the muon anomalous magnetic moment and provides estimates of the theoretical uncertainties.

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The muon anomalous magnetic moment is one of the most precisely measured quantities in elementary particle physics and provides one of the most stringent tests of relativistic quantum field theory as a

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*fundamental theoretical
framework. It allows for an
extremely precise check of the
standard model of elementary
particles and of its limitations.
This book reviews the present
state of knowledge of the*

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*anomalous magnetic moment
 $a=(g-2)/2$ of the muon. Recent
experiments at the Brookhaven
National Laboratory now reach
the unbelievable precision of 0.5
parts per million, improving the
accuracy of previous $g-2$*

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experiments at CERN by a factor of 14. In addition, quantum electrodynamics and electroweak and hadronic effects are reviewed. Since non-perturbative hadronic effects play a key role for the precision

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test, their evaluation is described in detail. Perspectives for future improvements of the theoretical and experimental precision are considered. The new edition features improved theoretical predictions to match

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upcoming experiments, like the one at Fermilab. Additionally the new more precise basic parameters are presented. CERN, the European Laboratory for particle physics, regularly makes the news. What kind of

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research happens at this international laboratory and how does it impact people's daily lives? Why is the discovery of the Higgs boson so important? Particle physics describes all matter found on

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Earth, in stars and all galaxies but it also tries to go beyond what is known to describe dark matter, a form of matter five times more prevalent than the known, regular matter. How do we know this mysterious dark

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matter exists and is there a chance it will be discovered soon? About sixty countries contributed to the construction of the gigantic Large Hadron Collider (LHC) at CERN and its immense detectors. Dive in to

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discover how international teams of researchers work together to push scientific knowledge forward. Here is a book written for every person who wishes to learn a little more about particle physics, without

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requiring prior scientific knowledge. It starts from the basics to build a solid understanding of current research in particle physics. A good dose of curiosity is all one will need to discover a whole

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world that spans from the infinitesimally small and stretches to the infinitely large, and where imminent discoveries could mark the dawn of a huge revolution in the current conception of the material

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The Standard Theory of Particle

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Physics

*An Invitation to Quantum Field
Theory*

*Day At Cern, A: Guided Tour
Through The Heart Of Particle
Physics*

The geometric formulation of

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autonomous Hamiltonian mechanics in the terms of symplectic and Poisson manifolds is generally accepted. This book provides the geometric formulation of non-autonomous mechanics in a general setting of time-

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*dependent coordinate and
reference frame
transformations.*

*This informative and
entertaining book provides a
broad look at the
fascinating history of CERN,
and the physicists working*

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*in different areas at CERN
who were active in the
discovery of the Higgs
Boson. Profound and well-
structured, the contents
combine present day
interviews with the
scientists of CERN, the*

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world's largest laboratory dedicated to the pursuit of fundamental science, with important figures in the history of science (e.g., Maxwell, Faraday, Einstein), and also gives a lot of information on the history

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of quantum mechanics and the history of physics from its beginnings. It is an easy-to-read book on a complex topic, providing a very personal insight into the personalities of top scientists and the history

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of science as well. This invaluable book will capture the interest of the curious reader, telling the story of one of the greatest scientific endeavors ever.

*Contents: The History of CERN
The Practitioner: Rolf-*

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Copernicus, and Kepler***
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Rutherford – Bohr***
***The Man Who
Built The LHC: Lyn
Evans***
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Art: Tara Shears
The Theorist: John Ellis
– Ampère – Faraday –
Maxwell
The Communicator:
Rolf Landua
Albert Einstein
(1879–1955)
The Japanese Way:
Masaki Hori
The Nobel Prize
Laureate: Carlo Rubbia

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WhiteFriendly Competitors:
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De RoeckRock 'n' Roll, Beer,
Billiards, and Music:
Jonathan ButterworthThe
Higgs Boson – and Then?
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Features: Non-technical, full-bodied book jam-packed with information on the history of science and CERN which is celebrating its 60th anniversary in 2014 Personal interviews with the scientists of CERN, who made

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*the practical discovery of
the Higgs Boson possible,
which was predicted by Peter
Higgs et al., 40 years
ago*The book paints the
complete picture of the
necessary means, the
technology and the people to

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make these discoveries possible It looks at CERN and the search for the Higgs boson from a very personal angle. Going beyond science and technology, it provides a profound picture of science and its impact on

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*society at the beginning of
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CERN and the LHC are
entering into everyday
culture, and this non-
technical book shows
important aspects of the
impact of scientific*

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**Keywords: CERN; Higgs
Boson; Particle Physics; Nobel
Prize; Peter
Higgs; Physics**
**Reviews:
"Michael Krause has created
a full-bodied work that
should be on the shelf of**

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every library and individual interested in the history of science. This is a compelling text that combines interesting and key facts about the creation of CERN and the fundamental structure of matter with the

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*human quest of the search
for knowledge and the
seeking of answers as to how
the universe was created and
even why we are here. I
highly recommend this
delightful and very
informative text.” Marc J*

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***Seifer Author of "Wizard:
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CERN. The author draws an exciting picture of the people who work at CERN, and also of the ideas and visions that these top scientists really have. This inspiring book is full of stories from the scientific

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Mecca in Geneva, and it paints a portrait of life on the CERN campus that is highly recommended reading for both beginners and experts.” Ralf Krauter Deutschlandfunk, Germany

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author interviewed CERN scientists about how they have come to particle physics, and what drives them in their research: the human factor plays the key part in this rich and inspiring book. Amidst the

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*very personal and exciting
interviews we can find
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This mix of interviews and
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very well done and makes*

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this book a highly enlightening read.” Richard Kirstein Elementary Reading “This is an informative and entertaining celebration of the most remarkable thing about CERN – that such a place ever came to be in the

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first place. The interesting story of CERN, told in the first part of the book recounts a remarkable political success, largely the brainchild of physicists. The major part of the book consists of

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interviews with physicists active in different areas at CERN. The author also adds material supporting the topics under discussion, i.e. the Standard Model, or antimatter; and technologies developed at CERN. I commend

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Michael Krause on this novel approach to discussions about CERN.” Sebastian White ATLAS ZDC experiment “You do get to know some hardcore scientists at a personal level. Their answers give the reader a glimpse of the

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great endeavour that is CERN, and they also hint that the adventure is far from over – even after the Higgs discovery. With all the background information, you do not have to have a physics degree to gain a

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*basic understanding of the science.” CERN Courier
The Higgs boson is the rock star of fundamental particles, catapulting CERN, the laboratory where it was found, into the global spotlight. But what is it,*

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why does it matter, and what exactly is CERN? In the late 1940s, a handful of visionaries were working to steer Europe towards a more peaceful future through science, and CERN, the European particle physics

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laboratory, was duly born. James Gillies tells the gripping story of particle physics, from the original atomists of ancient Greece, through the people who made the crucial breakthroughs, to CERN itself, one of the

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most ambitious scientific undertakings of our time, and its eventual confirmation of the Higgs boson. Weaving together the scientific and political stories of CERN's development, the book

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reveals how particle physics has evolved from being the realm of solitary genius to a global field of human endeavour, with CERN's Large Hadron Collider as its frontier research tool. The Large Hadron Collider is

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the biggest, and by far the most powerful, machine ever built. A project of CERN, the European Organization for Nuclear Research, its audacious purpose is to recreate, in a 16.5-mile-long circular tunnel under the

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French-Swiss countryside, the immensely hot and dense conditions that existed some 13.7 billion years ago within the first trillionth of a second after the fiery birth of our universe. The collider is now crashing

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protons at record energy levels never created by scientists before, and it will reach even higher levels by 2013. Its superconducting magnets guide two beams of protons in opposite directions

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around the track. After accelerating the beams to 99.9999991 percent of the speed of light, it collides the protons head-on, annihilating them in a flash of energy sufficient—in accordance with Einstein's

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elegant statement of mass-energy equivalence, $E=mc^2$ —to coalesce into a shower of particles and phenomena that have not existed since the first moments of creation. Within the LHC's detectors, scientists hope to see

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*empirical confirmation of
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in the scientific concepts we will need to appreciate the discoveries that will almost certainly spring forth when the full power of this great machine is finally unleashed. Will the Higgs boson make its

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*breathlessly awaited
appearance, confirming at
last the Standard Model of
particles and their
interactions that is among
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*God's thoughts—the rest is
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*An Introduction to
Relativistic Quantum Fields
John S. Bell on the
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Primer of Quantum Mechanics
Malargüe, Argentina, 27
February-12 March 2005 :
Proceedings
Quantum Field Theory and the
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and engineering of the Large Hadron collider (LHC), one of the greatest scientific marvels of this young 21st century. This book traces the feat of its construction, written

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by the head scientists
involved, placed into the
context of the scientific
goals and principles.
The book gathers the
lecture notes of the Les
Houches Summer School that

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was held in August 2011
for an audience of
advanced graduate students
and post-doctoral fellows
in particle physics,
theoretical physics, and
cosmology, areas where new

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experimental results were on the verge of being discovered at CERN. Every Les Houches School has its own distinct character. This one was held during a summer of great

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anticipation that at any moment contact might be made with the most recent theories of the nature of the fundamental forces and the structure of space-time. In fact, during the

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session, the long anticipated discovery of the Higgs particle was announced. The book vividly describes the fruitful and healthy "schizophrenia" that is

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the rule among the community of theoreticians who have split into several components: those doing phenomenology, and those dealing with highly theoretical problems, with

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a few trying to bridge both domains. The lectures by theoreticians covered many directions in the theory of elementary particles, from classics such as the Supersymmetric

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Standard Model to very recent ideas such as the relation between black holes, hydrodynamics, and gauge-gravity duality. The lectures by experimentalists explained

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in detail how intensively
and how precisely the LHC
collider has verified the
theoretical predictions of
the Standard Model,
predictions that were at
the front lines of

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experimental discovery during the 70's, 80's and 90's, and how the LHC is ready to make new discoveries. They described many of the ingenious and pioneering

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techniques developed at CERN for the detection and the data analysis of billions of billions of proton-proton collisions. In this cleverly conceived book, physicist Robert

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Gilmore makes accessible some complex concepts in quantum mechanics by sending Alice to Quantumland—a whole new Wonderland, smaller than an atom, where each

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