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Gauge Theories in Particle Physics: A Practical Introduction, Volume 1
Fundamentals in Nuclear Physics
Practical Statecharts in C/C++
Gauge Theories in Particle Physics: A Practical Introduction, Fourth Edition - 2 Volume set
Nuclear and Particle Physics
Gauge Fields
Gauge Field Theories
An Introduction to Gauge Theories and Modern Particle Physics
Introduction to High Energy Physics
Quantum Fields on a Lattice
Introduction to Elementary Particles
Theory and Design of Charged Particle Beams
Gauge Theories in Particle Physics, Third Edition - 2 volume set
Quantum Field Theory and the Standard Model
Introduction to Nuclear and Particle Physics
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Introduction to the Physics of Massive and Mixed Neutrinos
Computing for Scientists
A Tour of the Subatomic Zoo
Many-body Theory Exposed!
Quarks, Leptons and The Big Bang, Second Edition
Mathematics of Classical and Quantum Physics
The Physics of Neutrinos
A Guide to Physics Problems
Relativistic Quantum Physics
Symmetries and Group Theory in Particle Physics
Introduction To Nuclear And Particle Physics (2nd Edition)
Neutrinos in Particle Physics, Astronomy and Cosmology
Modern Particle Physics
The Electroweak Unification Theory
An Introduction to Particle Physics and the Standard Model
Vibrations and Waves
Quantum Field Theory for the Gifted Amateur
Particle Physics
A Guide to Physics Problems
Introduction to Particle and Astroparticle Physics

QUARK & LEPTONS: AN INTRODUCTORY COURSE IN MODERN PARTICLE PHYSICS
The Telescope in the Ice
Physics from Symmetry
Modern Elementary Particle Physics

PITTS HUNTER

Gauge Theories in Particle Physics: A Practical Introduction, Volume 1 Princeton University Press An accessible introduction to nuclear and particle physics with equal coverage of both topics, this text covers all the standard topics in particle and nuclear physics thoroughly and provides a few extras, including chapters on experimental methods; applications of nuclear physics including fission, fusion and biomedical applications; and unsolved problems for the future. It includes basic concepts and theory combined with current and future applications. An excellent resource for physics and astronomy undergraduates in higher-level courses, this text also serves well as a general reference for graduate studies. Fundamentals in Nuclear Physics World Scientific "Neutrinos in Particle Physics, Astronomy and Cosmology" provides a comprehensive and up-to-date introduction to neutrino physics, neutrino astronomy and neutrino cosmology. The intrinsic

properties and fundamental interactions of neutrinos are described, as is the phenomenology of lepton flavor mixing, seesaw mechanisms and neutrino oscillations. The cosmic neutrino background, stellar neutrinos, supernova neutrinos and ultrahigh-energy cosmic neutrinos, together with the cosmological matter-antimatter asymmetry and other roles of massive neutrinos in cosmology, are discussed in detail. This book is intended for researchers and graduate students in the fields of particle physics, particle astrophysics and cosmology. Dr. Zhizhong Xing is a professor at the Institute of High Energy Physics, Chinese Academy of Sciences, China; Dr. Shun Zhou is currently a postdoctoral fellow at the Max Planck Institute for Physics, Germany.

Practical Statecharts in C/C++ Cambridge University Press

An essential introduction to particle physics, with coverage ranging from the basics through to the very latest developments, in an accessible and carefully structured text. Particle Physics: Third Edition is a revision of a highly regarded introduction to particle physics. In its two previous editions this book has proved to be an accessible and balanced introduction to modern particle physics, suitable for those students needed a more comprehensive introduction to the subject than provided by the ‘compendium’ style physics books. In the Third Edition the standard model of particle physics

is carefully developed whilst unnecessary mathematical formalism is avoided where possible. Emphasis is placed on the interpretation of experimental data in terms of the basic properties of quarks and leptons. One of the major developments of the past decade has been the establishing of the existence of neutrino oscillations. This will have a profound effect on the plans of experimentalists. This latest edition brings the text fully up-to-date, and includes new sections on neutrino physics, as well as expanded coverage of detectors, such as the LHC detector. End of chapter problems with a full set of hints for their solutions provided at the end of the book. An accessible and carefully structured introduction to this demanding subject. Includes more advanced material in optional 'starred' sections. Coverage of the foundations of the subject, as well as the very latest developments.
Gauge Theories in Particle Physics: A Practical Introduction, Fourth Edition - 2 Volume set John Wiley & Sons
Presents a comprehensive and coherent account of the theory of quantum fields on a lattice.
Nuclear and Particle Physics IOP Publishing Limited
"Unique in its coverage of all aspects of modern particle physics, this textbook provides a clear connection between the theory and recent experimental results, including the discovery of the Higgs boson at CERN. It provides a

comprehensive and self-contained description of the Standard Model of particle physics suitable for upper-level undergraduate students and graduate students studying experimental particle physics. Physical theory is introduced in a straightforward manner with full mathematical derivations throughout. Fully-worked examples enable students to link the mathematical theory to results from modern particle physics experiments. End-of-chapter exercises, graded by difficulty, provide students with a deeper understanding of the subject. Online resources available at www.cambridge.org/MPP feature password-protected fully-worked solutions to problems for instructors, numerical solutions and hints to the problems for students and PowerPoint slides and JPEGs of figures from the book"--

Gauge Fields Cambridge University Press

Symmetries, coupled with the mathematical concept of group theory, are an essential conceptual backbone in the formulation of quantum field theories capable of describing the world of elementary particles. This primer is an introduction to and survey of the underlying concepts and structures needed in order to understand and handle these powerful tools. Specifically, in Part I of the book the symmetries and related group theoretical structures of the Minkowskian space-time manifold are analyzed, while Part II examines the

internal symmetries and their related unitary groups, where the interactions between fundamental particles are encoded as we know them from the present standard model of particle physics. This book, based on several courses given by the authors, addresses advanced graduate students and non-specialist researchers wishing to enter active research in the field, and having a working knowledge of classical field theory and relativistic quantum mechanics. Numerous end-of-chapter problems and their solutions will facilitate the use of this book as self-study guide or as course book for topical lectures.

Gauge Field Theories

Springer

For many years neutrino was considered a massless particle. The theory of a two-componentneutrino,which playedacrucialroleinthecreationofthetheoryof theweakinteraction,isbasedontheassumptionthatthe neutrinomassisequalto zero. We now know that neutrinos have nonzero, small masses. In numerous exp- iments with solar, atmospheric, reactor and accelerator neutrinos a new p-nomenon, neutrino oscillations, was observed. Neutrino oscillations (periodic transitionsbetweendifferent?avorneutrinos? ,? ,?)arepossibleonlyifneutrino e ? ? mass-squareddifferencesarediffe rentfromzeroandsmallan d?avorneutrinosare “mixed”. The discovery of neutrino oscillations opened a new era in

neutrino physics: an era of investigation of neutrino masses, mixing, magnetic moments and other neutrino properties. After the establishment of the Standard Model of the el- troweak interaction at the end of the seventies, the discovery of neutrino masses was the most important discovery in particle physics. Small neutrino masses cannot be explained by the standard Higgs mechanism of mass generation. For their explanation a new mechanism is needed. Thus, small neutrino masses is the ?rst signature in particle physics of a new beyond the Standard Model physics. It took many years of heroic efforts by many physicists to discover n- trino oscillations. After the ?rst period of investigation of neutrino oscillations, manychallengingproblems remainedunsolved.Oneoft hemostimportantisthe problem of the nature of neutrinos with de?nite masses. Are they Dirac n- trinos possessing a conserved lepton number which distinguish neutrinos and antineutrinos or Majorana neutrinos with identical neutrinos and antineutrinos? Many experiments of the next generation and new neutrino facilities are now under preparation and investigation. There is no doubt that exciting results are ahead.

An Introduction to Gauge Theories and Modern Particle Physics Springer Science & Business Media

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Taylor & Francis, an Informa company.
Introduction to High Energy Physics World Scientific
· A Preview of Particle Physics· Symmetries and Quarks· Antiparticles· Electrodynamics of Spinless Particles· The Dirac Equation· Electrodynamics of Spin-1/2 Particles· Loops, Renormalization, Running Coupling Constants, and All That· The Structure of Hadrons· Partons· Quantum Chromodynamics· Annihilation and QCD· Weak Interactions· Electroweak Interactions· Gauge Symmetries· The Weinberg-Salam Model and Beyond
Quantum Fields on a Lattice CRC Press
This textbook provides an up-to-date introduction to nuclear and particle physics and is aimed at upper-level undergraduate students with a basic knowledge of quantum mechanics.
Introduction to Elementary Particles Springer Science & Business Media
The IceCube Observatory has been called the "weirdest" of the seven wonders of modern astronomy by Scientific American. In The Telescope in the Ice, Mark Bowen tells the amazing story of the people who built the instrument and the science involved. Located near the U.S. Amundsen-Scott Research Station at the geographic South Pole, IceCube is unlike most telescopes in that it is not designed to detect light. It employs a cubic kilometer of diamond-clear ice, more than a mile beneath the

surface, to detect an elementary particle known as the neutrino. In 2010, it detected the first extraterrestrial high-energy neutrinos and thus gave birth to a new field of astronomy. IceCube is also the largest particle physics detector ever built. Its scientific goals span not only astrophysics and cosmology but also pure particle physics. And since the neutrino is one of the strangest and least understood of the known elementary particles, this is fertile ground. Neutrino physics is perhaps the most active field in particle physics today, and IceCube is at the forefront. The Telescope in the Ice is, ultimately, a book about people and the thrill of the chase: the struggle to understand the neutrino and the pioneers and inventors of neutrino astronomy.

Theory and Design of Charged Particle Beams

John Wiley & Sons

An Introduction to the Standard Model of Particle Physics familiarizes readers with what is considered tested and accepted and in so doing, gives them a grounding in particle physics in general. Whenever possible, Dr. Mann takes an historical approach showing how the model is linked to the physics that most of us have learned in less challenging areas. Dr. Mann reviews special relativity and classical mechanics, symmetries, conservation laws, and particle classification; then working from the tested paradigm of the model itself, he: Describes the Standard Model in terms of its

electromagnetic, strong, and weak components Explores the experimental tools and methods of particle physics Introduces Feynman diagrams, wave equations, and gauge invariance, building up to the theory of Quantum Electrodynamics Describes the theories of the Strong and Electroweak interactions Uncovers frontier areas and explores what might lie beyond our current concepts of the subatomic world Those who work through the material will develop a solid command of the basics of particle physics. The book does require a knowledge of special relativity, quantum mechanics, and electromagnetism, but most importantly it requires a hunger to understand at the most fundamental level: why things exist and how it is that anything happens. This book will prepare students and others for further study, but most importantly it will prepare them to open their minds to the mysteries that lie ahead. Ultimately, the Large Hadron Collider may prove the model correct, helping so many realize their greatest dreams ... or it might poke holes in the model, leaving us to wonder an even more exciting possibility: that the answers lie in possibilities so unique that we have not even dreamt of them.

Gauge Theories in Particle Physics, Third Edition - 2 volume set

HarperCollins Publishers

The fourth edition of this well-established, highly regarded two-volume set continues to provide a

fundamental introduction to advanced particle physics while incorporating substantial new experimental results, especially in the areas of CP violation and neutrino oscillations. It offers an accessible and practical introduction to the three gauge theories included in the Standard Model of particle physics: quantum electrodynamics (QED), quantum chromodynamics (QCD), and the Glashow-Salam-Weinberg (GSW) electroweak theory. In the first volume, a new chapter on Lorentz transformations and discrete symmetries presents a simple treatment of Lorentz transformations of Dirac spinors. Along with updating experimental results, this edition also introduces Majorana fermions at an early stage, making the material suitable for a first course in relativistic quantum mechanics. Covering much of the experimental progress made in the last ten years, the second volume remains focused on the two non-Abelian quantum gauge field theories of the Standard Model: QCD and the GSW electroweak theory. A new chapter on CP violation and oscillation phenomena describes CP violation in B-meson decays as well as the main experiments that have led to our current knowledge of mass-squared differences and mixing angles for neutrinos. Exploring a new era in particle physics, this edition discusses the exciting discovery of a boson with properties consistent with

those of the Standard Model Higgs boson. It also updates many other topics, including jet algorithms, lattice QCD, effective Lagrangians, and three-generation quark mixing and the CKM matrix. This revised and updated edition provides a self-contained pedagogical treatment of the subject, from relativistic quantum mechanics to the frontiers of the Standard Model. For each theory, the authors discuss the main conceptual points, detail many practical calculations of physical quantities from first principles, and compare these quantitative predictions with experimental results, helping readers improve both their calculation skills and physical insight.

Quantum Field Theory and the Standard Model

Springer Science & Business Media

This introductory text emphasises physical principles, rather than the mathematics. Each topic begins with a discussion of the physical characteristics of the motion or system. The mathematics is kept as clear as possible, and includes elegant mathematical descriptions where possible. Designed to provide a logical development of the subject, the book is divided into two sections, vibrations followed by waves. A particular feature is the inclusion of many examples, frequently drawn from everyday life, along with more cutting-edge ones. Each chapter includes problems ranging in difficulty from simple to

challenging and includes hints for solving problems. Numerous worked examples included throughout the book.

Introduction to Nuclear and Particle Physics Springer Science & Business Media

Quantum physics and special relativity theory were two of the greatest breakthroughs in physics during the twentieth century and contributed to paradigm shifts in physics. This book combines these two discoveries to provide a complete description of the fundamentals of relativistic quantum physics, guiding the reader effortlessly from relativistic quantum mechanics to basic quantum field theory. The book gives a thorough and detailed treatment of the subject, beginning with the classification of particles, the Klein–Gordon equation and the Dirac equation. It then moves on to the canonical quantization procedure of the Klein–Gordon, Dirac and electromagnetic fields. Classical Yang–Mills theory, the LSZ formalism, perturbation theory, elementary processes in QED are introduced, and regularization, renormalization and radiative corrections are explored. With exercises scattered through the text and problems at the end of most chapters, the book is ideal for advanced undergraduate and graduate students in theoretical physics.

Introduction to the Physics of Nuclei and Particles John Wiley & Sons

Volume 1 of this revised and updated edition provides an accessible and practical introduction to the first gauge theory included in the Standard Model of particle physics: quantum electrodynamics (QED).The book includes self-contained presentations of electromagnetism as a gauge theory as well as relativistic quantum mechanics. It provides a uniqu

Introduction to the Physics of Massive and Mixed Neutrinos

Cambridge University Press

Quarks, Leptons and The Big Bang is a clear, readable and self-contained introduction to particle physics and related areas of cosmology. It bridges the gap between non-technical popular accounts and textbooks for advanced students. The book concentrates on presenting the subject from the modern perspective of quarks, leptons and the forces between them. This book will be of interest to students, teachers and general science readers interested in fundamental ideas of modern physics.

Computing for Scientists

Springer

Supernovae explosion, combustion of solar hydrogen to form helium, heavy quark decay, or nuclear beta radiation, all weak interaction phenomena, are not unrelated to electromagnetism, but closely linked to it through the Higgs field. This ebook contains a modern introduction to the electroweak unification theory, as part of the so

called Standard Model of particle physics. Not only some of the key theoretical ideas are exposed in a precise way, but also the experiments that revealed them. The main highlights of the theory consolidation process are examined which, concerning its experimental counterpart, span over 40 years, from the discovery of neutral currents in1973 to the Higgs boson in 2012. The reader is assumed to have been introduced to Quantum Mechanics and theories based on the gauge invariance principle, and to be familiar with Dirac's theory for the relativistic electron. The course is specially suited for undergraduate students in physics, as part of an optional subject of elementary particles. The course consists in nine lectures, that on the blackboard take about 90 minutes each. It contains a very select collection of problems and exercises, having as a connecting thread the calculation of the lifetime of elementary fermions and bosons, as well as the comprehension of some experimental results of historical relevance.

A Tour of the Subatomic Zoo Springer

This book is written for students and scientists wanting to learn about the Standard Model of particle physics. Only an introductory course knowledge about quantum theory is needed. The text provides a pedagogical description of the theory, and incorporates the recent Higgs boson and top quark discoveries. With its

clear and engaging style, this new edition retains its essential simplicity. Long and detailed calculations are replaced by simple approximate ones. It includes introductions to accelerators, colliders, and detectors, and several main experimental tests of the Standard Model are explained. Descriptions of some well-motivated extensions of the Standard Model prepare the reader for new developments. It emphasizes the concepts of gauge theories and Higgs physics, electroweak unification and symmetry breaking, and how force strengths vary with energy, providing a solid foundation for those working in the field, and for those who simply want to learn about the Standard Model.

Many-body Theory Exposed! Bernardo Adeva Quantum field theory provides the theoretical backbone to most modern physics. This book is designed to bring quantum field theory to a wider audience of physicists. It is packed with worked examples, witty diagrams, and applications intended to introduce a new audience to this revolutionary theory.