Nuclear Reactor Physics Cern

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Atomic Adventures: Secret Islands, Forgotten N-Rays, and Isotopic Murder: A Journey into the Wild World of Nuclear Science National Academies Press
This manual is a MUST for students who are preparing to take examinations on introductory electromagnetism, especially at the end of such a course. It elucidates concepts by summarizing the physics of electric and magnetic phenomena in parallel in order to emphasize the similarities between the two. At the end of a course, the number of topics that students must comprehend often seems overwhelming. To make matters worse, the topics are embedded within hundreds of pages of narrative and examples, thus sometimes making it difficult to know what is most crucial to understand. Therefore, this manual summarizes the most important concepts of introductory electromagnetism and constitutes an abridged version of the author's full book of lectures entitled, Introductory Physics II: On the Duality of Electric and Magnetic Phenomena.
Highlights of Introductory Electromagnetism Bookbaby
This textbook fills the gap between the very basic and the highly advanced volumes that are widely available on the subject. It offers a concise but comprehensive overview of a number of topics, like general relativity, fission and fusion, which are otherwise only available with much more detail in other textbooks. Providing a general introduction to the underlying concepts (relativity, fission and fusion, fundamental forces), it allows readers to develop an idea of what these two research fields really involve. The book uses real-world examples to make the subject more attractive and encourage the use of mathematical formulae. Besides short scientists' biographies, diagrams, end-of-chapter problems and worked solutions are also included. Intended mainly for students of scientific disciplines such as physics and chemistry who want to learn about the subject and/or the related techniques, it is also useful to high school teachers wanting to refresh or update their knowledge and to interested non-experts.
A World List of Institutions Concerned Springer
The neutrino is the most fascinating elementary particle due to its elusive nature and outstanding properties that have attracted the interest of generations of physicists since 1930, when it was first postulated by Wolfgang Pauli as a "desperate remedy" to explain the apparent energy violation in the beta decay. Many fundamental discoveries in particle physics had the neutrino involved in one way or another. To date, neutrino physics is still one of the hottest topics of modern particle physics. Key experiments and significant theoretical developments have contributed in building up what we can call now the Standard Model of Neutrino Physics. The aim of the book is to provide graduate students and young researchers a comprehensive tutorial in modern neutrino physics, specially tailored with emphasis on the educational aspects. It provides an overview of the basics and of recent achievements in the field, from both experimental and theoretical points of view. Contents: Preface A Brief History of Neutrino (A Bettini) Introduction to the Formalism of Neutrino Oscillations (G Fantini, A G Rosso, V Zema and F Vissani) Neutrino Oscillation Detectors and Methods (D Autiero) Solar Neutrinos and Matter Effects (A Y Smirnov) Atmospheric Neutrinos (K Okumura) Probing the Atmospheric Sector with Accelerator Experiments (C Pistillo and C Wilkinson) The Measurement of θ_{13} with Reactors and Accelerators (F Di Lodovico) Neutrinos from Supernovae and Other Astrophysical

Sources (K Scholberg) High-Energy Astrophysical Neutrinos (F Halzen) Sterile Neutrinos: An Introduction to Experiments (J Conrad and M Shaevitz) Dirac and Majorana Neutrinos, Double Beta Decay (J-L Vuilleumier) Low-Energy Neutrino Interactions (A M Szelc) Theory and Phenomenology of Mass Ordering and CP Violation (P Coloma and S Pascoli) Beyond the Neutrino Standard Model (J D Lykken) Readership: Students and researchers interested in high energy physics and/or astrophysics. Keywords: Neutrino;Neutrino Masses;Neutrino Oscillations;Neutrino Properties;Neutrino Sources;Neutrino Detectors;Massive NeutrinosReview: Key Features: Mix of tutorial and review articles Comprehensive review of the main aspects in one single book The various topical chapters are written by experts in the field

Sources of Information on Atomic Energy Cambridge University Press

A highly practical reference for health physicists and other professionals, addressing practical problems in radiation protection, this new edition has been completely revised, updated and supplemented by such new sections as log-normal distribution and digital radiography, as well as new chapters on internal radiation dose and the environmental transport of radionuclides. Designed for readers with limited as well as basic science backgrounds, the handbook presents clear, thorough and up-to-date explanations of the basic physics necessary. It provides an overview of the major discoveries in radiation physics, plus extensive discussion of radioactivity, including sources and materials, as well as calculational methods for radiation exposure, comprehensive appendices and more than 400 figures. The text draws substantially on current resource data available, which is cross-referenced to standard compendiums, providing decay schemes and emission energies for approximately 100 of the most common radionuclides encountered by practitioners. Excerpts from the Chart of the Nuclides, activation cross sections, fission yields, fission-product chains, photon attenuation coefficients, and nuclear masses are also provided. Throughout, the author emphasizes applied concepts and carefully illustrates all topics using real-world examples as well as exercises. A much-needed working resource for health physicists and other radiation protection professionals.

Understanding Our Universe Infobase Publishing

Nuclear physics began long before the identification of fundamental particles, with J. J. Thomson's discovery of the electron at the end of the 19th century, which implied the existence of a positive charge in the atom to make it neutral. In this Very Short Introduction Frank Close gives an account of how this area of physics has progressed, including the recognition of how heavy nuclei are built up in the cores of stars and in supernovae, the identification of quarks and gluons, and the development of quantum chromodynamics (QCD). Exploring key concepts such as the stability of different configurations of protons and neutrons in nuclei, Frank Close shows how nuclear physics brings the physics of the stars to Earth and provides us with important applications, particularly in medicine. ABOUT THE SERIES: The Very Short Introductions series from Oxford University Press contains hundreds of titles in almost every subject area. These pocket-sized books are the perfect way to get ahead in a new subject quickly. Our expert authors combine facts, analysis, perspective, new ideas, and enthusiasm to make interesting and challenging topics highly readable.

The God Particle CRC Press

Explores the future of nuclear power as a source of energy, discussing the pros and cons of its use, how it works, the history of its use, and new developments.

Accessions of Unlimited Distribution Reports John Wiley & Sons

INTRODUCTION TO NUCLEAR REACTOR PHYSICS is the most comprehensive, modern and readable textbook for this course/module. It explains reactors, fuel cycles, radioisotopes, radioactive materials, design, and operation. Chain reaction and fission reactor concepts are presented, plus advanced coverage including neutron diffusion theory. The diffusion equation, Fisk’s Law, and steady state/time-dependent reactor behavior. Numerical and analytical solutions are also covered. The text has full color illustrations throughout, and a wide range of student learning features.

Proceedings of the ThEC13 Conference, CERN, Globe of Science and Innovation, Geneva, Switzerland, October 27-31, 2013 Springer Science & Business Media

The lectures reported in these proceedings were given in the Workshop on Nuclear Reactors — Physics, Design and Safety held at the International Centre for Theoretical Physics in Trieste in 1994 by experts from leading international research institutions and industries. They have been organized in a self-consistent form with the objective of giving basic, up-dated information to scientists and engineers from developing countries in modern methods for the computation and analysis of nuclear reactors, with particular emphasis on reactor physics, design and safety.

International Series of Monographs in Library and Information Science EPFL Press

Describes the technology 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 by the head scientists involved, placed into the context of the scientific goals and principles.

Megawatts and Megatons PHI Learning Pvt. Ltd.

In Megawatts and Megatons, world-renowned physicists Richard L. Garwin and Georges Charpak offer an accessible, eminently well-informed primer on two of the most important issues of our time: nuclear weapons and nuclear power. They begin by explaining clearly and concisely how nuclear fission and fusion work in both warheads and reactors, and how they can impact human health. Making a strong and eloquent argument in favor of arms control, Garwin and Charpak outline specific strategies for achieving this goal worldwide. But they also demonstrate how nuclear power can provide an assured, economically feasible, and environmentally responsible source of energy—in a way that avoids the hazards of weapons proliferation. Numerous figures enliven the text, including cartoons by Sempé.

Nuclear Science and Safety in Europe World Scientific

On September 27 – October 3, 2008 the NATO Advanced Research Workshop (ARW) on progress in high-energy physics and nuclear safety was held in Yalta, Crimea (see: http://crimea.bitp.kiev.ua and http://arw.bitp.kiev.ua). Nearly 50 leading experts in high-energy and nuclear physics from Eastern and Western Europe as well as from North America participated at the Workshop. The topics of the ARW covered recent results of theoretical and experimental studies in high-energy physics, accelerator, detection and nuclear technologies, as well as problems of nuclear safety in high-energy experimentation and in nuclear - dustry. The forthcoming experiments at the Large Hadron Collider (LHC) at CERN and cosmic-ray experiments were among the topics of the ARW. An important aspect of the Workshop was the scienti?c collaboration between nuclear physicists from East and West, especially in the ?eld of nuclear safety. The present book contains a selection of invited talks presented at the ARW. The papers are grouped in two parts.

Nuclear Physics Simon and Schuster

The Bulletin of the Atomic Scientists is the premier public resource on scientific and technological developments that impact global security. Founded by Manhattan Project Scientists, the Bulletin's iconic "Doomsday Clock" stimulates solutions for a safer world.

An Essential Review for Exams World Scientific

Enrico Fermi is unquestionably among the greats of the world's physicists, the most famous Italian scientist since Galileo. Called the Pope by his peers, he was regarded as infallible in his instincts and research. His discoveries changed our world; they led to weapons of mass destruction and conversely to life-saving medical interventions. This unassuming man struggled with issues relevant today, such as the threat of nuclear annihilation and the relationship of science to politics. Fleeing Fascism and anti-Semitism, Fermi became a leading figure in America's most secret project: building the atomic bomb. The last physicist who mastered all branches of the discipline, Fermi was a rare mixture of theorist and experimentalist. His rich legacy encompasses key advances in fields as diverse as comic rays, nuclear technology, and early computers. In their revealing book, The Pope of Physics, Gino Segré and Bettina Hoerlin bring this scientific visionary to life. An examination of the human dramas that touched Fermi’s life as well as a thrilling history of scientific innovation in the twentieth century, this is the comprehensive biography that Fermi deserves.

Exploring the Heart of Matter Nuclear Reactor Physics

This book covers introductory subjects including fundamental principles of nuclear reactions with neutrons, fundamentals of nuclear fission chain reactions, basic concepts of criticality, and static characteristics based on diffusion approximation in neutron transport. The chapters address topics ranging from neutron moderation from fission to thermal energy ranges and heterogeneity effects in neutronics. Readers will find elementary and qualitative descriptions and also mathematical expressions including approximations, derivations and analytical solutions for an understanding of the basic principles of nuclear reactor physics. This book is part of a series entitled An Advanced Course in Nuclear Engineering and provides an accessible introduction to the core discipline of nuclear engineering: nuclear reactor physics. It will therefore appeal to engineers in nuclear engineering as well as to university students and others seeking to learn entry-level reactor physics.

A Handbook Springer Nature

The principal goals of the study were to articulate the scientific rationale and objectives of the field and then to take a long-term strategic view of U.S. nuclear science in the global context for setting future directions for the field. Nuclear Physics: Exploring the Heart of Matter provides a long-term assessment of an outlook for nuclear physics. The first phase of the report articulates the scientific rationale and objectives of the field, while the second phase provides a global context for the field and its long-term priorities and proposes a framework for progress through 2020 and beyond. In the second phase of the study, also developing a framework for progress through 2020 and beyond, the committee carefully considered the balance between universities and government facilities in terms of research and workforce development and the role of international collaborations in leveraging future investments. Nuclear physics today is a diverse field, encompassing research that spans dimensions from a tiny fraction of the volume of the individual particles (neutrons and protons) in the atomic nucleus to the enormous scales of astrophysical objects in the cosmos. Nuclear Physics: Exploring the Heart of Matter explains the research objectives, which include the desire not only to better understand the nature of matter interacting at the nuclear level, but also to describe the state of the universe that existed at the big bang. This report explains how the universe can now be studied in the most advanced colliding-beam accelerators, where strong forces are the dominant interactions, as well as the nature of neutrinos.

The Future of Nuclear Power and Nuclear Weapons University of Chicago Press

This book fills the need for a coherent work combining carefully reviewed articles into a comprehensive overview accessible to research groups and lecturers. Next to fundamental physics, contributions on topical medical and material science issues are included.

Thorium Energy for the World John Wiley & Sons

The latest investigation from acclaimed nuclear engineer and author James Mahaffey unearths forgotten nuclear endeavors throughout history that were sometimes hair-brained, often risky, and always fascinating. Whether you are a scientist or a poet, pro-nuclear energy or staunch opponent, conspiracy theorist or pragmatist, James Mahaffey's books have served to open up the world of nuclear science like never before. With clear explanations of some of the most complex scientific endeavors in history, Mahaffey's new book looks back at the atom's wild, secretive past and then toward its potentially bright future. Mahaffey unearths lost reactors on far flung Pacific islands and trees that were exposed to active fission that changed gender or bloomed in the dead of winter. He explains why we have nuclear submarines but not nuclear aircraft and why cold fusion doesn't exist. And who knew that radiation counting was once a fashionable trend? Though parts of the nuclear history might seem like a fiction mash-up, where cowboys somehow got a hold of a reactor, Mahaffey's vivid prose holds the reader in thrall of the infectious energy of scientific curiosity and ingenuity that may one day hold the key to solving our energy crisis or sending us to Mars.

CERN. OUP Oxford

Research shows that active learning supports deeper, long-term understanding. The Third Edition text and media package gives students more opportunities to interact with astronomy--both in real life and online. The new edition provides all the resources you need to make it easy to incorporate active learning into the classroom.

Introduction to Nuclear and Particle Physics Academic Press

The recent observation of the Higgs boson has been hailed as the scientific 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 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 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, this book should be of interest to graduate students and researchers in particle physics.

Particle Physics Reference Library Elsevier
Recent results on the nature of low-, intermediate- and high-energy nuclear forces as well as on the internal structure of nucleons and atomic nuclei are presented. Prospects to find a new state of the nuclear matter at extreme conditions that existed in the early Universe and the utilisation of the nuclear energy are discussed.