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Problems and Solutions on Atomic, Nuclear and Particle Physics
 Techniques for Nuclear and Particle Physics Experiments
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Problems and Solutions on Atomic, Nuclear and Particle Physics John Wiley & Sons

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.

Techniques for Nuclear and Particle Physics Experiments S. Chand Publishing

The fourth edition includes new developments, in particular a new section on the double beta decay including a discussion of the possibility of a neutrinoless decay and its implications for the

standard model.

An Advanced Course in Computational Nuclear Physics Springer

This textbook explains the experimental basics, effects and theory of nuclear physics. It supports learning and teaching with numerous worked examples, questions and problems with answers. Numerous tables and diagrams help to better understand the explanations. A better feeling to the subject of the book is given with sketches about the historical development of nuclear physics. The main topics of this book include the phenomena associated with passage of charged particles and radiation through matter which are related to nuclear resonance fluorescence and the Moessbauer effect., Gamov's theory of alpha decay, Fermi theory of beta decay, electron capture and gamma decay. The discussion of general properties of nuclei covers nuclear sizes and nuclear force, nuclear spin, magnetic dipole moment and electric quadrupole moment. Nuclear instability against various modes of decay and Yukawa theory are explained. Nuclear models such as Fermi Gas Model, Shell Model, Liquid Drop Model, Collective Model and Optical Model are outlined to explain various experimental facts related to nuclear structure. Heavy ion reactions, including nuclear

fusion, are explained. Nuclear fission and fusion power production is treated elaborately.

Introductory Nuclear Physics John Wiley & Sons

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. **Nuclei and Particles** PHI Learning Pvt. Ltd.

This book provides an introductory course on Nuclear and Particle physics for undergraduate and early-graduate students, which the author has taught for several years at the University of Zurich. It contains fundamentals on both nuclear physics and particle physics. Emphasis is given to the discovery and history of developments in the field, and is experimentally/phenomenologically oriented. It contains detailed derivations of formulae such as 2- 3 body phase space, the Weinberg-Salam model, and neutrino scattering. Originally published in German as 'Kern- und Teilchenphysik', several sections have been added to this new English version to cover very modern topics, including updates on neutrinos, the Higgs boson, the top quark and bottom quark physics. - Prové de l'editor.

Nuclear Physics New Age International

The original edition of "Introduction to Nuclear and Particle Physics" was used with great success for single-semester courses on nuclear and particle physics offered by American and Canadian universities at the undergraduate level. It was also translated into German, and used overseas.

Experiments in Nuclear Science Springer

This textbook teaches particle physics very didactically. It supports learning and teaching with numerous worked examples, questions and problems with answers. Numerous tables and diagrams lead to a better understanding of the explanations. The content of the book covers all important topics of particle physics: Elementary particles are classified from the point of view of the four fundamental interactions. The nomenclature used in particle physics is explained. The discoveries and properties of known elementary particles and resonances are given. The particles considered are positrons, muon, pions, anti-protons, strange particles, neutrino and hadrons. The conservation laws governing the interactions of elementary particles are given. The concepts of parity, spin, charge conjugation, time reversal and gauge invariance are explained. The quark theory is introduced to explain the hadron structure and strong interactions. The solar neutrino problem is considered. Weak interactions are classified into various types, and the selection rules are stated. Non-conservation of parity and the universality of the weak interactions are discussed. Neutral and charged currents, discovery of W and Z bosons and the early universe form important topics of the electroweak interactions. The principles of high energy accelerators including colliders are elaborately explained. Additionally, in the book detectors used in nuclear and particle physics are described. This book is on the upper undergraduate level.

Fundamentals of Nuclear Physics Springer

This highly-regarded text provides a comprehensive introduction to modern particle physics. Extensively rewritten and updated, this 4th edition includes developments in elementary particle physics, as well as its connections with cosmology and astrophysics. As in previous editions, the balance between experiment and theory is continually emphasised. The stress is on the phenomenological approach and basic theoretical concepts rather than rigorous mathematical detail. Short descriptions are given of some of the key experiments in the field, and how they have influenced our thinking. Although most of the material is presented in the context of the Standard Model of quarks and leptons, the shortcomings of this model and new physics beyond its compass (such as supersymmetry, neutrino mass and oscillations, GUTs and superstrings) are also discussed. The text includes many problems and a detailed and annotated further reading list.

Nuclear Physics John Wiley & Sons

A treatment of the experimental techniques and instrumentation most often used in nuclear and particle physics experiments as well as in various other experiments, providing useful results and formulae, technical know-how and informative details. This second edition has been revised, while sections on Cherenkov radiation and radiation protection have been updated and extended.

Introduction To Nuclear And Particle Physics (2nd Edition) Springer

Modern Nuclear Chemistry provides up-to-date coverage of the latest research as well as examinations of the theoretical and practical aspects of nuclear and radiochemistry. Includes worked examples and solved problems. Provides comprehensive information as a practical reference. Presents fundamental physical principles, in brief, of nuclear and radiochemistry.

Research Projects in the Physical Sciences HarperCollins Publishers

This textbook is a unique and ambitious primer of nuclear physics, which introduces recent theoretical and experimental progresses starting from basics in fundamental quantum mechanics. The highlight is to offer an overview of nuclear structure phenomena relevant to recent key findings such as unstable halo nuclei, superheavy elements, neutron stars, nucleosynthesis, the standard model, lattice quantum chromodynamics (LQCD), and chiral effective theory. An additional attraction is that general properties of nuclei are comprehensively explained from both the theoretical and experimental viewpoints. The book begins with the conceptual and mathematical basics of quantum mechanics, and goes into the main point of nuclear physics – nuclear structure, radioactive ion beam physics, and nuclear reactions. The last chapters devote interdisciplinary topics in association with astrophysics and particle physics. A number of illustrations and exercises with complete solutions are given. Each chapter is comprehensively written starting from fundamentals to gradually reach modern aspects of nuclear physics with the objective to provide an effective description of the cutting edge in the field.

Elementary Nuclear Theory Springer Science & Business Media

This well-known introductory textbook gives a uniform presentation of nuclear and particle physics from an experimental point of view. The first part, Analysis, is devoted to disentangling the substructure of matter. This part shows that experiments designed to uncover the substructures of nuclei and nucleons have a similar conceptual basis, and lead to the present picture of all matter being constructed from a small number of elementary building blocks and a small number of fundamental interactions. The second part, Synthesis, shows how the elementary particles may be combined to build hadrons and nuclei. The fundamental interactions, which are responsible for the forces in all systems, become less and less evident in increasingly complex systems. Such systems are in fact dominated by many-body phenomena. A section on neutrino oscillations and one on nuclear matter at high temperatures bridge the field of "nuclear and particle physics" and "modern astrophysics and cosmology. The seventh revised and extended edition includes new material, in particular the experimental verification of the Higgs particle at the LHC, recent results in neutrino physics, the violation of CP-symmetry in the decay of neutral B-mesons, the experimental investigations of the nucleon's spin structure and outstanding results of the HERA experiments in deep-inelastic electron- and positron-proton scattering. The concise text is based on lectures held at the University of Heidelberg and includes numerous exercises with worked answers. It has been translated into several languages and has become a standard reference for advanced undergraduate and graduate courses.

Problems and Solutions in Nuclear Physics Addison Wesley Publishing Company

Nuclear Physics has been occupying continuously an important place in any University course in physics at the graduate and PG levels in India. The main purpose of A Text Book on Nuclear Physics is to give a concise account of the fundamentals of the physics of the nuclei and particles and applications of nuclear energy. Its coverage extends the conventional aspects of the subject, because it has become very evident in recent years that much of the great body of knowledge of nuclei, acquired several decades ago, is highly relevant to other field such as solid state, modern spectroscopy, chemistry, biological / medical physics and technology of power production. In a book of moderate size it is not possible to give a comprehensive treatment, in depth, of the whole of subatomic physics, for the student community at the degree level. However, I have tried to add my experience of teaching, 4 credit semester courses, on the subject a few years during my tenure (1971 - 2000) to the M.Sc. students at the Department of Physics of the University of Kerala, Kariavattom campus, Thiruvananthapuram. My experience in research in the field of Mossbauer spectroscopy has certainly an impact in the quality of the contents of the book. Further, as an author of four books, I could prepare this book in its own uniqueness for instance providing student friendly features. I have incorporated a good deal of Worked out Examples with solutions at appropriate places and Review Questions including their answers at the end of each Chapter. Outline solutions are deliberately avoided so as to reduce the volume of the book. I have kept the mathematics as simple as possible. I assume knowledge of the basics of special relativity and basic quantum mechanics. The many bibliographic references have been arranged in alphabetical list to enable students as well as faculty, for their academic references. The present book is designed rather to meet the needs of the academic community who wishes to adopt the whole or parts of the book as a text for the prescribed syllabus of any course containing nuclear physics. It is hoped that the book will be of interest to those whose work lies inter-disciplinary fields, for example health physics, industrial physics, and related fields.

Introduction to Nuclear Physics Springer Science & Business Media

The book uses to help students that study nuclear physics. The book contains 242 tasks and solutions in different fields, involving nuclear physics such as accelerators (which accelerate the particles and calculate the relative mass and velocity of the particle), nuclear reactors, nuclear fission inside the reactor core, radioactivity, decay of the particle such as alpha and beta, and gamma decay. Many tasks that include the radiation doses. The book uses many of concepts such as: binding energy, kinetic energy and radius of nuclei, wavelength of the particle such as electron, proton and neutron. There are tasks about the density of nuclear material, heat equilibrium and collision, which occur between these particles and nuclei of the target, produce by these collision two types of scattering, they are elastic and inelastic scattering of the particle. The angle of the scattering plays an important role in the calculation of kinetic energy and momentum. The book also includes appendix with tables of physical constants related to these tasks. This is includes a table of radioactive isotopes. Student can be used this book to help him to develop his acknowledge of the many topics related to nuclear energy in general, and especially nuclear physics.

Nuclear Physics of Stars World Scientific

Study Edition

QCD as a Theory of Hadrons Springer Science & Business Media

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.

Introduction to Nuclear Physics Walter de Gruyter

INTRODUCTORY NUCLEAR PHYSICS

Introductory Nuclear Physics John Wiley & Sons

A clear and concise introduction to nuclear physics suitable for a core undergraduate physics course.

Introduction to Nuclear and Particle Physics John Wiley & Sons

Nuclear Physics, designed as a textbook for graduate students deals with the size, shape and properties of nuclei, the electric and magnetic moments, the strong nuclear force that binds nucleons, the nuclear structure, various nuclear models -- the shell model, Nilsson's model, the collective model and unified model -- radioactive decays such as the alpha, beta and gamma decays, nuclear and heavy ion reactions and synthesis of transuranic elements. The Strutinsky shell correction, the effect of parity violation in weak interaction, elementary particle interactions with nuclei and the quark structure of the nucleon are also briefly discussed. NEW TO THE SECOND EDITION: * Two Appendices G and H, one on the Evaluation of Matrix Elements and the other on the Evaluation of Transition Probability. The study of static properties of nuclei such as electric quadrupole moment, magnetic dipole moment and the calculation of energy levels involve the evaluation of matrix elements whereas the study of dynamical properties such as the nuclear transition from one state to another by interaction with an external field involves the calculation of transition probability. These appendices will help the students make a quantitative study of both the static and dynamical properties of nuclei. KEY FEATURES: * Problems with Solutions at the end of each chapter * Includes Review Questions

Geometrical Relationships of Macroscopic Nuclear Physics Alpha Science International, Limited

This undergraduate textbook breaks down the basics of Nuclear Structure and modern Particle Physics. Based on a comprehensive set of course notes, it covers all the introductory material and latest research developments required by third- and fourth-year physics students. The textbook is divided into two parts. Part I deals with Nuclear Structure, while Part II delves into Particle Physics. Each section contains the most recent science in the field, including experimental data and research on the properties of the top quark and Higgs boson. Detailed mathematical derivations are provided where necessary to help students grasp the physics at a deeper level. Many of these

have been conveniently placed in the Appendices and can be omitted if desired. Each chapter ends with a brief summary and includes a number of practice problems, the answers to which are also provided.