
Roy And Nigam Nuclear Physics

An Introduction

Particle Physics

Nuclear Physics: Experimental And Theoretical

Nuclear Physics

Nuclear Physics

Basic Ideas and Concepts in Nuclear Physics, An Introductory Approach

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Second Edition

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TOMMY RIVAS

An Introduction PHI Learning Pvt. Ltd.

Bright gamma-ray flares observed from sources far beyond our Milky Way Galaxy are best explained if enormous amounts of energy are liberated by black holes.

The highest- energy particles in nature-- the ultra-high-energy cosmic rays-- cannot be confined by the Milky Way's magnetic field, and must originate from sources outside our Galaxy.

Understanding these energetic radiations requires an extensive theoretical framework involving the

radiation physics and strong-field gravity of black holes. In High Energy Radiation from Black Holes, Charles Dermer and Govind Menon present a systematic exposition of black-hole astrophysics and general relativity in order to understand how gamma rays, cosmic rays, and neutrinos are produced by black holes. Beginning with Einstein's special and general theories of relativity, the authors give a detailed mathematical description of fundamental astrophysical radiation processes, including Compton scattering of electrons and photons, synchrotron radiation of particles in magnetic fields, photohadronic interactions of cosmic rays with photons, gamma-ray

attenuation, Fermi acceleration, and the Blandford-Znajek mechanism for energy extraction from rotating black holes. The book provides a basis for graduate students and researchers in the field to interpret the latest results from high-energy observatories, and helps resolve whether energy released by rotating black holes powers the highest-energy radiations in nature. The wide range of detail will make High Energy Radiation from Black Holes a standard reference for black-hole research.

Particle Physics Alpha Science Int'l Ltd. 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.

Nuclear Physics: Experimental And Theoretical Courier Corporation

This book is intended to give a clear and concise introductory account of the basic ideas underlying nuclear and elementary particle physics. The attempt throughout

is to convey a sound physical understanding of the structures and processes encountered. It assumes some knowledge of elementary quantum mechanics, particularly the treatment of angular momentum, and the rudiments of special relativity. In addition to 'standard' calculations based on this knowledge, frequent use is made of 'order-of-magnitude' and 'dimensional' arguments. In this way it has been possible to give some discussion of quite advanced topics and recent developments. Although reference is made from time to time to the apparatus of nuclear and particle physics no technical detail is given. My basic hope is that students using this book will acquire a sound understanding of what nuclear and particle physics is about and

will wish to learn more. I am indebted to Dr David Bailin and various (nameless) referees for penetrating and helpful comments on parts of the text.

Nuclear Physics World Scientific

Intended to serve as a textbook for honours and postgraduate students of physics, this book provides a comprehensive introduction to the fundamental concepts, mathematical formalism and methodology of quantum mechanics.

Nuclear Physics S. Chand Publishing

This Comprehensive Text Presents Not Only A Detailed Exposition Of The Basic Principles Of Nuclear Physics But Also Provides A Contemporary Flavour Of The Subject By Covering The Recent Developments. Starting With A Synoptic View Of The Subject, The Book Explains

Various Physical Phenomena In Nuclear Physics Alongwith The Experimental Methods Of Measurement. Nuclear Forces As Encountered In Two-Body Problems Are Detailed Next Followed By The Problems Of Radioactive Decay. Nuclear Reactions Are Then Comprehensively Explained Alongwith The Various Models Of Reaction Mechanism. This Is Followed By Recent Developments Like The Pre-Equilibrium Model And Heavy Ions Induced Reaction. The Book Would Serve As A Contemporary Text For Senior Undergraduate As Well As Post Graduate Students Of Physics. Practising Scientists And Researchers In The Area Would Also Find The Book To Be A Useful Reference Source.

Basic Ideas and Concepts in Nuclear Physics, An Introductory Approach

Tata McGraw-Hill Education
Hyperspherical harmonics are extremely useful in nuclear physics and reactive scattering theory. However, their use has been confined to specialists with very strong backgrounds in mathematics. This book aims to change the theory of hyperspherical harmonics from an esoteric field, mastered by specialists, into an easily-used tool with a place in the working kit of all theoretical physicists, theoretical chemists and mathematicians. The theory presented here is accessible without the knowledge of Lie-groups and representation theory, and can be understood with an ordinary knowledge of calculus. The book is accompanied by programs and exercises designed for teaching and practical use. Contents:

Preface
Harmonic Functions
Generalized Angular Momentum
Gegenbauer Polynomials
Fourier Transforms in d Dimensions
Fock's Treatment of Hydrogenlike Atoms and Its Generalization
D-Dimensional Hydrogenlike Orbitals in Direct Space
Generalized Sturmians
Choosing Appropriate Hyperspherical Representations
Molecular Integrals from Hyperspherical Harmonics
Lagrangians for Particles and Fields
Coordinate Transformations for N Bodies
Some Illustrative Examples
Appendices: The D-Dimensional Harmonic Oscillator
Molecular Integrals for Slatertype Orbitals
Bibliography
Index
Readership: Scientists and researchers in theoretical physics, theoretical chemistry, and mathematics. Keywords:

Harmonic Functions; Reactive Scattering Theory; Nuclear Physics; Gegenbauer Polynomials; Generalized Sturmians; Slater type Orbitals Review: Key Features: Exercises are included at the end of each chapter The e-version of the exercises and solutions can be found in the supplementary tab

Nuclear Spectroscopy and Reactions 40-D Springer Nature

This book "Nuclear Physics" has been written for Physics major students of all Indian universities. The subject matter has been thoroughly revised in accordance with the recent UGC syllabus meant for all Indian universities. In preparing the text, special care has been taken to present the topics in a coherent, simple and straightforward manner. SI units have been used throughout this

book. Numerical problems are solved in each chapter wherever necessary for the better understanding of the subject. Exercises including problems have been given at the end of each chapter. Special care has been taken to explain the chapters on theory of relativity and quantum mechanics with illustrations, suitable examples and problems so that the students can understand relativity and quantum mechanics without difficulty.

An Introduction To Engineering Aspects Of Nuclear Physics Elsevier

Compact and precise coverage of the electrostatic field in vacuum; general methods for solution of potential problems; radiation reaction and covariant formulation of conservation laws of electrodynamics; much more.

1962 edition.

Nuclear Spectroscopy and Reactions 40-
A S. Chand Publishing

Nuclear Spectroscopy and Reactions, Part A covers information regarding the development of nuclear spectroscopy and its reactions, while emphasizing in-beam spectroscopy. This part specifically covers concerns regarding accelerators, specialized auxiliary equipment, and measurement techniques for charged particles and gamma rays. Organized into three major sections, this book first discusses accelerators in low- and intermediate-energy nuclear physics, and then covers electrostatic accelerators, cyclotron, and specialized accelerators. The second section covers polarized beam and targets, as well as on-line mass separations. The last

section discusses the measurement of charged particle and gamma ray spectra including the detection of semiconductor radiation, large NaI, and charged particles. This book is written to primarily benefit graduate students who are engaged in research that concerns nuclear spectroscopy.

High Energy Radiation from Black Holes John Wiley & Sons

In This edition of the book, only minor changes have been made in some chapters. In the chapter on Nuclear Models (Ch. IX), the discussions on the individual particle model has been shortened to some extent and the relevant reference have been added where the readers can get the details.

Theory and Experiment World Scientific

The present edition is brought up to incorporate the useful suggestions from a number of readers and teachers for the benefit of students. A topic on common-collector configuration is added to the chapter XIII. A new chapter on logic gates is introduced at the end. Keeping in view the present style of university Question papers, a number of very short, short and long thoroughly revised and corrected to remove the errors which crept into earlier editions.

Nuclear Physics Wiley

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.

Atomic Physics MJP Publisher

This is the second edition of an established textbook on nuclear physics for senior undergraduates and postgraduate students. Professor Heyde has taken the opportunity to make the book more useful for students and teachers by adding an extensive set of problems. To bring the book up to date, he has revised several chapters and

added a new chapter on nuclei at the extremes of stability. The book has evolved from a course taught by the author and gives a balanced account of both theoretical and experimental nuclear physics. It is also ideal for researchers wanting an accessible introduction to the subject. Emphasis is given to depth of treatment rather than skimming over topics and there are many diagrams as well as box inserts illustrating particular topics.

Subatomic Physics: An Introduction To Nuclear And Particle Physics, And Astrophysics Springer

Nuclear isomers are the long-lived excited states of nuclei. Therefore, they constitute the meta-stable landscape of nuclei. The first isomer was probably identified as early as 1921. Since then,

the number of isomers has been growing steadily picking up pace in recent times. Interest in nuclear isomers has grown in recent years for many reasons. The experimental capabilities to observe isomers have been expanding to cover a wider time scale. This has opened up new windows to observe and decipher the underlying nuclear structure and interactions. Further, the isomers are beginning to be seen as potential energy storage devices and nuclear clocks with a host of applications. Possible discovery of a gamma ray laser has also ignited many researches in this area. Isomers now cover the full nuclear landscape with structural peculiarities specific to each region of the nuclear chart. Exploring the nuclear isomers, therefore, provides a novel insight into the nuclear

structure properties of that region. There could be many different reasons for the long lives of excited nuclear states, which lead to the classification of isomers. Isomers are broadly classified into four classes: Spin isomers, shape isomers, fission isomers and K-isomers. Seniority isomers have also been identified which are often clubbed with the spin isomers. We discuss this classification and the underlying causes in detail. Many examples are considered to highlight the large variety of isomers. The range of half-lives covered by the isomers varies from billions of years to nano-seconds and even smaller. To understand this vast variation is a fascinating endeavor in itself. The angular momentum couplings, nuclear shapes, pairing etc. conspire together to

give this vast range of half-lives. We go through these aspects in detail, highlighting the various selection rules at work. It is interesting that the nuclear shapes play an important role in many types of isomers. The spin isomers, which occur in spherical or, near-spherical nuclei, are generally confined to the magic numbers. Seniority isomers are largely found in semi-magic nuclei and should be explored in conjunction with the spin isomers. New developments in seniority and generalized seniority isomers are discussed in detail. As the nuclei deform; the nature of isomers changes. We take a close look into the decay properties of isomers in deformed nuclei, particularly the K isomers, the shape isomers and the fission isomers. While doing so, the

theoretical and experimental developments of isomers are also addressed. A number of open questions are posed for possible new experiments and better understanding of the isomers.

Nuclear Physics Springer Science & Business Media

This Book Describes Topics In Nuclear Reactions At The Level Of Postgraduate Nuclear Physics Course And Should Also Be Useful To Research Workers Both In Theoretical And Experimental Areas Of The Subject. It Also Covers Topics Like Electron Induced Reactions And Computational Methods In Nuclear Reactions Which Are Often Not Included In The Books On Nuclear Reactions. Low Energy Heavy Ion Reactions Have Been Discussed In Detail.

Introductory Nuclear Physics S.

Chand Publishing

This book is meant for those opting for courses where knowledge of applications of nuclear physics is required and also to the people involved in application oriented fields of nuclear physics. This book includes major applications of nuclear physics, such as detector technology, nuclear power, activation analysis, and applications to biology. Students, learning engineering aspects of physics, which is an upcoming course of study in various institutes, will find the book useful.

Elsevier

Principles of Modern Physics covers important developments in physics during the twentieth century. Beginning with the development of the quantum concept and radiation laws, followed by

Einstein's special relativity, it covers atomic structure, basics of spectra, basic (non relativistic) quantum mechanics with an introduction to Dirac's relativistic wave equation and the problem of hydrogen atom. This follows the statistical distribution laws, X-rays and physics of solids, their imperfections, magnetic properties and superconductivity (including newly discovered high T_c superconductors), Zeeman and Stark effects, Lasers, nuclear physics, radio-activity, nuclear fission and fusion, particle accelerators and detectors. It features a discussion on Universe (including stellar evolution Chandrasekhar limit, black holes and big-bang theory), elementary particles (including tau-theta puzzle, $SU(2)$ and $SU(3)$ symmetry, the Eightfold- way, ...

Hyperspherical Harmonics And Their Physical Applications New Age International

The book presents a coherent and in-depth treatment of all the important topics on nuclear physics with up-to-date notions and viewpoints. It starts with the discussion on general properties of nucleus, and then moves on to give insights into nuclear models, radioactivity and its applications, nuclear force and nuclear reactions. Readers are also introduced with the concept of interaction of radiation with matter, and detectors including particle accelerators from a practical rather a theoretical point of view. A separate chapter has been devoted to particle physics along with the latest developments. The book also presents an overview of the

applications of nuclear physics to various fields such as nuclear energy, healthcare, industry and environment. The evolution of the universe along with the primordial and the stellar nucleosynthesis has been discussed in the last chapter. The book is designed as a standard text for the undergraduate and postgraduate students of Physics. Principles of Modern 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. Being less formal but well-written, this book is a good vehicle

for learning the more intuitive rather than formal aspects of the subject. It is therefore of value to scientists with a minimal background in quantum mechanics, but is sufficiently substantive to have been recommended for graduate students interested in the fields covered in the text. In the second edition, the material begins with an exceptionally clear development of Rutherford scattering and, in the four following chapters, discusses sundry phenomenological issues concerning nuclear properties and structure, and general applications of radioactivity and of the nuclear force. This is followed by two chapters dealing with interactions of particles in matter, and how these characteristics are used to detect and identify such particles. A chapter on

accelerators rounds out the experimental aspects of the field. The final seven chapters deal with elementary-particle phenomena, both before and after the realization of the Standard Model. This is interspersed with discussion of symmetries in classical physics and in the quantum domain, bringing into full focus the issues concerning CP violation, isotopic spin, and other symmetries. The final three chapters are devoted to the Standard Model and to possibly new physics beyond it, emphasizing unification of forces, supersymmetry, and other exciting areas of current research. The book contains several appendices on related subjects, such as special relativity, the nature of symmetry groups, etc. There are also many

examples and problems in the text that are of value in gauging the reader's understanding of the material.

Contents: Rutherford Scattering Nuclear Phenomenology Nuclear Models Nuclear Radiation Applications of Nuclear Physics Energy Deposition in Media Particle Detection Accelerators Properties and Interactions of Elementary Particles Symmetries Discrete Transformations Neutral Kaons, Oscillations, and CP Violation Formulation of the Standard Model Standard Model and Confrontation with Data Beyond the Standard Model Readership: Advanced undergraduates and researchers in nuclear and particle physics.

Keywords: Rutherford Scattering; Nuclear Properties; Nuclear Structure; Elementary

Particles;Sub-Structure of Particles;Particle Detectors;Interactions in Matter;The Standard Model;Symmetries of Nature;Theories of Nuclear and Particle Structure;Radioactivity;Supersymmetry

Reviews: "The book by Das and Ferbel is particularly suited as a basis for a one-semester course on both subjects since it contains a very concise introduction to those topics and I like very much the outline and contents of this book." Kay Konigsmann Universität Freiburg, Germany "The book provides an introduction to the subject very well suited for the introductory course for physics majors. Presentation is very clear and nicely balances the issues of nuclear and particle physics, exposes both theoretical ideas and modern

experimental methods. Presentation is also very economic and one can cover most of the book in a one-semester course. In the second edition, the authors updated the contents to reflect the very recent developments in the theory and experiment. They managed to do it without substantial increase of the size of the book. I used the first edition several times to teach the course 'Introduction to Subatomic Physics' and I am looking forward to use this new edition to teach the course next year." Professor Mark Strikman Pennsylvania State University, USA "This book can be recommended to those who find elementary particle physics of absorbing interest." Contemporary Physics ' Nuclear Reactions Copyright Office, Library of Congress

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