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Physics in Nuclear Medicine - by Drs. Simon R. Cherry, James A. Sorenson, and Michael E. Phelps - provides current, comprehensive guidance on the physics underlying modern nuclear medicine and imaging using radioactively labeled tracers. This revised and updated fourth edition features a new full-color layout, as well as the latest information on instrumentation and technology. Stay current on crucial developments in hybrid imaging (PET/CT and SPECT/CT), and small animal imaging, and benefit from the new section on tracer kinetic modeling in neuroreceptor imaging. What's more, you can reinforce your understanding with graphical animations online at www.expertconsult.com, along with the fully searchable text and calculation tools. Master the physics of nuclear medicine with thorough explanations of analytic equations and illustrative graphs to make them accessible. Discover the technologies used in state-of-the-art nuclear medicine imaging systems Fully grasp the process of emission computed tomography with advanced mathematical concepts presented in the appendices. Utilize the extensive data in the day-to-day practice of nuclear medicine practice and

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research. Tap into the expertise of Dr. Simon Cherry, who contributes his cutting-edge knowledge in nuclear medicine instrumentation. Stay current on the latest developments in nuclear medicine technology and methods New sections to learn about hybrid imaging (PET/CT and SPECT/CT) and small animal imaging. View graphical animations online at www.expertconsult.com, where you can also access the fully searchable text and calculation tools. Get a better view of images and line art and find information more easily thanks to a brand-new, full-color layout. The perfect reference or textbook to comprehensively review physics principles in nuclear medicine.

Presents basic concepts in physics, covering topics such as kinematics, Newton's laws of motion, gravitation, fluids, sound, heat, thermodynamics, magnetism, nuclear physics, and more, examples, practice questions and problems.

Written by a researcher and teacher with experience at top institutes in the US and Europe, this textbook provides advanced undergraduates minoring in physics with working knowledge of the principles of nuclear physics. Simplifying models and approaches reveal the essence of the principles involved, with the mathematical and quantum mechanical background integrated in the text where it is needed and not relegated to the appendices. The practicality of the book is enhanced by numerous end-of-chapter

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problems and solutions available on the Wiley homepage.

This book, part of the seven-volume series Major American Universities PhD Qualifying Questions and Solutions contains detailed solutions to 483 questions/problems on atomic, molecular, nuclear and particle physics, as well as experimental methodology. The problems are of a standard appropriate to advanced undergraduate and graduate syllabi, and blend together two objectives — understanding of physical principles and practical application. The volume is an invaluable supplement to textbooks.

The 2006 second edition of this book develops the basic formalism and theoretical techniques for studying relativistic quantum field theory at high temperature and density. Specific physical theories treated include QED, QCD, electroweak theory, and effective nuclear field theories of hadronic and nuclear matter. Topics include: functional integral representation of the partition function, diagrammatic expansions, linear response theory, screening and plasma oscillations, spontaneous symmetry breaking, Goldstone theorem, resummation and hard thermal loops, lattice gauge theory, phase transitions, nucleation theory, quark-gluon plasma, and color superconductivity. Applications to astrophysics and cosmology cover white dwarf and neutron stars, neutrino emissivity, baryon number

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violation in the early universe, and cosmological phase transitions. Applications to relativistic nucleus-nucleus collisions are also included. The book is written for theorists in elementary particle physics, nuclear physics, astrophysics, and cosmology. Problems are given at the end of each chapter, and numerous references to the literature are included. 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.

Nuclear cardiac imaging refers to cardiac radiological diagnostic techniques performed with the aid of radiopharmaceuticals, which are perfused into the myocardium as markers. These imaging studies provide a wide range of information about the heart, including the contractility of the heart, the amount of blood supply to the heart and whether parts of the heart muscle are alive or dead. This is essential information for cardiologists, and nuclear

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imaging has become an increasingly important part of the cardiologist's armamentarium. Iskandrian's text has become a leading book in the field and the fourth edition will continue the tradition. The text is completely updated to reflect the many advances in the field, and, as a new feature, each chapter concludes with a Q&A session on important and difficult clinical issues.

This is the eBook of the printed book and may not include any media, website access codes, or print supplements that may come packaged with the bound book. Elegant, engaging, exacting, and concise, Giancoli's *Physics: Principles with Applications*, Seventh Edition, helps you view the world through eyes that know physics. Giancoli's text is a trusted classic, known for its elegant writing, clear presentation, and quality of content. Using concrete observations and experiences you can relate to, the text features an approach that reflects how science is actually practiced: it starts with the specifics, then moves to the great generalizations and the more formal aspects of a topic to show you why we believe what we believe. Written with the goal of giving you a thorough understanding of the basic concepts of physics in all its aspects, the text uses interesting applications to biology, medicine, architecture, and digital technology to show you how useful physics is to your everyday life and in your future profession.

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This second edition represents an extensive revision of the first edition, - though the motivation for the book and the intended audiences, as described in the previous preface, remain the same.

The overall length has been increased substantially, with revised or expanded discussions of a number of topics, - cluding Yucca Mountain repository plans, new reactor designs, health effects of radiation, costs of electricity, and dangers from terrorism and weapons proliferation. The overall status of nuclear power has changed rather little over the past eight years. Nuclear reactor construction remains at a very low ebb in much of the world, with the exception of Asia, while nuclear power's share of the electricity supply continues to be about 75% in France and 20% in the United States. However, there is a sign of a heightened interest in considering possible nuclear growth. In the late 1990s, the U. S. Department of Energy began new programs to stimulate research and planning for future reactors, and many candidate designs are now contending—at least on paper—to be the next generation leaders. Outside the United States, the commercial development of the Pebble Bed Modular Reactor is being pursued in South Africa, a French-German consortium has won an order from Finland for the long-planned EPR (European Pressurized Water Reactor), and new reactors have been built or planned in Asia. In an unanticipated positive development for nuclear energy, the

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capacity factor of U. S. reactors has increased dramatically in recent years, and most operating reactors now appear headed for 20-year license renewals.

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

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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 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

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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

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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

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be recommended to those who find elementary particle physics of absorbing interest.”

Contemporary Physics '

Probing and controlling electrons and nuclei in matter at the attosecond timescale became possible with the generation of attosecond pulses by few-cycle intense lasers, and has revolutionized our understanding of atomic structure and molecular processes. This book provides an intuitive approach to this emerging field, utilizing simplified models to develop a clear understanding of how matter interacts with attosecond pulses of light. An introductory chapter outlines the structure of atoms and molecules and the properties of a focused laser beam. Detailed discussion of the fundamental theory of attosecond and strong-field physics follows, including the molecular tunnelling ionization model (MO-ADK theory), the quantitative rescattering (QRS) model, and the laser induced electronic diffraction (LIED) theory for probing the change of atomic configurations in a molecule. Highlighting the cutting-edge developments in attosecond and strong field physics, and identifying future opportunities and challenges, this self-contained text is invaluable for students and researchers in the field.

"A first-principles discussion of the fundamental neutron interactions . . . the writing is clear, and the explanations stress essential physical principles . . . an excellent survey."—Physics Today "A must for

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libraries of all universities and laboratories that are engaged in nuclear physics, particle physics, nuclear energy, astrophysics or condensed matter research . . . an outstanding multidisciplinary introduction to the physics and applications of cold neutrons."—Physics World "So many tables, facts and figures . . . the coverage is remarkable."—American Scientist This encyclopedic reference work covers nearly every conceivable aspect of neutron physics. Assembled by an expert in the field, it ranges from the neutron's role as a major element in tests of the standard model of astro-particle physics to its use in nuclear energy generation and the study of condensed matter systems. The multidisciplinary approach includes detailed treatment of strong, weak, and electromagnetic properties of the neutron as well as parallel developments in cosmology and astrophysics. Each subject is placed within its scientific context and receives considerable attention to historical detail.

Fundamentals of Nuclear Reactor Physics offers a one-semester treatment of the essentials of how the fission nuclear reactor works, the various approaches to the design of reactors, and their safe and efficient operation . It provides a clear, general overview of atomic physics from the standpoint of reactor functionality and design, including the sequence of fission reactions and their energy release. It provides in-depth discussion of neutron

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reactions, including neutron kinetics and the neutron energy spectrum, as well as neutron spatial distribution. It includes ample worked-out examples and over 100 end-of-chapter problems. Engineering students will find this applications-oriented approach, with many worked-out examples, more accessible and more meaningful as they aspire to become future nuclear engineers. A clear, general overview of atomic physics from the standpoint of reactor functionality and design, including the sequence of fission reactions and their energy release In-depth discussion of neutron reactions, including neutron kinetics and the neutron energy spectrum, as well as neutron spatial distribution Ample worked-out examples and over 100 end-of-chapter problems Full Solutions Manual

Combines clear and concise discussions of key NMR concepts with succinct and illustrative examples Designed to cover a full course in Nuclear Magnetic Resonance (NMR) Spectroscopy, this text offers complete coverage of classic (one-dimensional) NMR as well as up-to-date coverage of two-dimensional NMR and other modern methods. It contains practical advice, theory, illustrated applications, and classroom-tested problems; looks at such important ideas as relaxation, NOEs, phase cycling, and processing parameters; and provides brief, yet fully comprehensible, examples. It also uniquely lists all of the general parameters for many

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experiments including mixing times, number of scans, relaxation times, and more. Nuclear Magnetic Resonance Spectroscopy: An Introduction to Principles, Applications, and Experimental Methods, 2nd Edition begins by introducing readers to NMR spectroscopy - an analytical technique used in modern chemistry, biochemistry, and biology that allows identification and characterization of organic, and some inorganic, compounds. It offers chapters covering: Experimental Methods; The Chemical Shift; The Coupling Constant; Further Topics in One-Dimensional NMR Spectroscopy; Two-Dimensional NMR Spectroscopy; Advanced Experimental Methods; and Structural Elucidation. Features classical analysis of chemical shifts and coupling constants for both protons and other nuclei, as well as modern multi-pulse and multi-dimensional methods Contains experimental procedures and practical advice relative to the execution of NMR experiments Includes a chapter-long, worked-out problem that illustrates the application of nearly all current methods Offers appendices containing the theoretical basis of NMR, including the most modern approach that uses product operators and coherence-level diagrams By offering a balance between volumes aimed at NMR specialists and the structure-determination-only books that focus on synthetic organic chemists, Nuclear Magnetic Resonance Spectroscopy: An Introduction to

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Principles, Applications, and Experimental Methods, 2nd Edition is an excellent text for students and post-graduate students working in analytical and bio-sciences, as well as scientists who use NMR spectroscopy as a primary tool in their work.

"The textbook itself is the culmination of the authors' many years of teaching and research in atomic physics, nuclear and particle physics, and modern physics. It is also a crystallization of their intense passion and strong interest in the history of physics and the philosophy of science. Together with the solution manual which presents solutions to many end-of-chapter problems in the textbook, they are a valuable resource to the instructors and students working in the modern atomic field."--Publisher's website.

Principles of Nuclear Magnetism has, over the years, established itself as the classic single volume treatise which gives a comprehensive account of all the concepts, theories, and results associated with the study of nuclear magnetism.

This book provides a comprehensive introduction to the growing field of nuclear solid state physics with synchrotron radiation, a technique that is finding a number of unique applications in fields such as magnetism, surface science, and lattice dynamics. Due to the remarkable brilliance of modern synchrotron radiation sources, the method is particularly suited for the study of thin films, nanoparticles and clusters. Its high isotopic specificity can be employed to measure

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magnetic or vibrational properties with very high spatial resolution. The book is written on an introductory level and is thus suited for newcomers to the field. Many examples are presented to illustrate the unique experimental possibilities.

Covering both fundamental and advanced aspects in an accessible way, this textbook begins with an overview of nuclear reactor systems, helping readers to familiarize themselves with the varied designs. Then the readers are introduced to different possibilities for materials applications in the various sections of nuclear energy systems. Materials selection and life prediction methodologies for nuclear reactors are also presented in relation to creep, corrosion and other degradation mechanisms. An appendix compiles useful property data relevant for nuclear reactor applications. Throughout the book, there is a thorough coverage of various materials science principles, such as physical and mechanical metallurgy, defects and diffusion and radiation effects on materials, with serious efforts made to establish structure-property correlations wherever possible. With its emphasis on the latest developments and outstanding problems in the field, this is both a valuable introduction and a ready reference for beginners and experienced practitioners alike.

NUCLEAR PHYSICS: PRINCIPLES AND APPLICATIONS
John Wiley & Sons

Nuclear engineering could be viewed as the engineering field that ensures optimum and sustainable technological applications of natural and induced radioactive materials in different industrial sectors. This book presents some

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advanced applications in radiation effects, thermal hydraulics, and radionuclide migration in the environment. These scientific contributions from esteemed experts introduce some nuclear safety principals, current knowledge about radiation types, sources and applications, thermal properties of heat transfer media, and the role of sorption in retarding radionuclide migration in the environment. This book also covers the advances in identifying radiation effects in dense gas-metal systems, application of dense granular materials as high power targets in accelerator driven systems and irradiation facilities, evaluation of boiling heat transfer in narrow channels, and application of fluorescence quenching techniques to monitor uranium migration.

The application of nuclear physics methods is now widespread throughout physics, chemistry, metallurgy, biology, clinical medicine, geology, and archaeology. Accelerators, reactors, and various instruments that have developed together with nuclear physics have often been found to offer the basis for increasingly productive and more sensitive analytical techniques. Nuclear Methods in Science and Technology provides scientists and engineers with a clear understanding of the basic principles of nuclear methods and their potential for applications in a wide range of disciplines. The first part of the book covers the major points of basic theory and experimental methods of nuclear physics, emphasizing concepts and simple models that give a feel for the behavior of real systems. Using many examples, the second part illustrates the extraordinary possibilities

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offered by nuclear methods. It covers the Mossbauer effect, slow neutron physics, activation analysis, radiography, nuclear geochronology, channeling effects, nuclear microprobe, and numerous other topics in modern applied nuclear physics. The book explores applications such as tomography, the use of short-lived isotopes in clinical diagnoses, and nuclear physics in ecology and agriculture. Where alternative nonnuclear analytical techniques are available, the author compares the relevant nuclear method, enabling readers to judge which technique may be most useful for them. Complete with a bibliography and extensive reference list for readers who want to delve deeper into a particular topic, this book applies various methods of nuclear physics to a wide range of disciplines.

Nuclear engineering plays an important role in various industrial, health care, and energy processes. Modern physics has generated its fundamental principles. A growing number of students and practicing engineers need updated material to access the technical language and content of nuclear principles. "Nuclear Principles in Engineering, Second Edition" is written for students, engineers, physicians and scientists who need up-to-date information in basic nuclear concepts and calculation methods using numerous examples and illustrative computer application areas. This new edition features a modern graphical interpretation of the phenomena described in the book fused with the results from research and new applications of nuclear engineering, including but not limited to nuclear engineering, power engineering, homeland security,

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health physics, radiation treatment and imaging, radiation shielding systems, aerospace and propulsion engineering, and power production propulsion. The third, revised edition of this popular textbook and reference, which has been translated into Russian and Chinese, expands the comprehensive and balanced coverage of nuclear reactor physics to include recent advances in understanding of this topic. The first part of the book covers basic reactor physics, including, but not limited to nuclear reaction data, neutron diffusion theory, reactor criticality and dynamics, neutron energy distribution, fuel burnup, reactor types and reactor safety. The second part then deals with such physically and mathematically more advanced topics as neutron transport theory, neutron slowing down, resonance absorption, neutron thermalization, perturbation and variational methods, homogenization, nodal and synthesis methods, and space-time neutron dynamics. For ease of reference, the detailed appendices contain nuclear data, useful mathematical formulas, an overview of special functions as well as introductions to matrix algebra and Laplace transforms. With its focus on conveying the in-depth knowledge needed by advanced student and professional nuclear engineers, this text is ideal for use in numerous courses and for self-study by professionals in basic nuclear reactor physics, advanced nuclear reactor physics, neutron transport theory, nuclear reactor dynamics and stability, nuclear reactor fuel cycle physics and other important topics in the field of nuclear reactor physics.

This expanded, revised, and updated fourth edition of

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Nuclear Energy maintains the tradition of providing clear and comprehensive coverage of all aspects of the subject, with emphasis on the explanation of trends and developments. As in earlier editions, the book is divided into three parts that achieve a natural flow of ideas: Basic Concepts, including the fundamentals of energy, particle interactions, fission, and fusion; Nuclear Systems, including accelerators, isotope separators, detectors, and nuclear reactors; and Nuclear Energy and Man, covering the many applications of radionuclides, radiation, and reactors, along with a discussion of wastes and weapons. A minimum of mathematical background is required, but there is ample opportunity to learn characteristic numbers through the illustrative calculations and the exercises. An updated Solution Manual is available to the instructor. A new feature to aid the student is a set of some 50 Computer Exercises, using a diskette of personal computer programs in BASIC and spreadsheet, supplied by the author at a nominal cost. The book is of principal value as an introduction to nuclear science and technology for early college students, but can be of benefit to science teachers and lecturers, nuclear utility trainees and engineers in other fields.

Due to the rapid progress in laser technology a wealth of novel fundamental and applied applications of lasers in atomic and plasma physics have become possible. This book focuses on the interaction of high intensity lasers with matter. It reviews the state of the art of high power laser sources, intensity laser-atom and laser-plasma interactions, laser matter interaction at relativistic

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intensities, and QED with intense lasers.

NUCLEAR AND PARTICLE PHYSICS discusses the Characteristics of Nucleus, Nuclear Forces, Nuclear Models, Nuclear Reactions, Fission and Fusion, Radioactive Decay, Detectors, Accelerators, Reactors, and Elementary Particles. Each topic is explained with the help of simple exercises using simple language. Dramatic progress has been made in all branches of physics since the National Research Council's 1986 decadal survey of the field. The Physics in a New Era series explores these advances and looks ahead to future goals. The series includes assessments of the major subfields and reports on several smaller subfields, and preparation has begun on an overview volume on the unity of physics, its relationships to other fields, and its contributions to national needs. Nuclear Physics is the latest volume of the series. The book describes current activity in understanding nuclear structure and symmetries, the behavior of matter at extreme densities, the role of nuclear physics in astrophysics and cosmology, and the instrumentation and facilities used by the field. It makes recommendations on the resources needed for experimental and theoretical advances in the coming decade.

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,

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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.

Physics of Nuclear Radiations: Concepts, Techniques and Applications makes the physics of nuclear radiations accessible to students with a basic background in physics and mathematics. Rather than convince students one way or the other about the hazards of nuclear radiations, the text empowers them with tools to calculate and assess nuclear radiations and their impact. It discusses the meaning behind mathematical formulae as well as the areas in which the equations can be applied. After reviewing the physics preliminaries, the author addresses the growth and decay of nuclear radiations, the stability of nuclei or particles against radioactive transformations, and the behavior of heavy charged particles, electrons, photons, and neutrons. He then presents the nomenclature and physics reasoning of dosimetry, covers typical nuclear facilities (such as medical x-ray machines and particle accelerators), and describes the physics principles of diverse detectors. The book also discusses methods for measuring energy

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and time spectroscopies before concluding with applications in agriculture, medicine, industry, and art. Solid State Nuclear Track Detection: Principles, Methods and Applications is the second book written by the authors after Nuclear Tracks in Solids: Principles and Applications. The book is meant as an introduction to the subject solid state of nuclear track detection. The text covers the interactions of charged particles with matter; the nature of the charged-particle track; the methodology and geometry of track etching; thermal fading of latent damage trails on tracks; the use of dielectric track recorders in particle identification; radiation dosimetry; and solid state nuclear track detection instrumentation. The book also covers fission track dating, and the application of track detectors and its future direction. The selection is recommended for newcomers to the field of solid state nuclear track detection and its research, those who wish to acquire a basic knowledge of the techniques of the discipline, and those who wish to gain a general view of the present status of the subject.

Market_Desc: This text is aimed at undergraduates in science and engineering who require knowledge of the fundamental principles of nuclear physics and its applications. **Special Features:** The book offers numerous practical examples and problems to enhance the material. It avoids complex and extensive mathematical treatments. It covers the basic theory but emphasizes the applications **About The Book:** This title provides the latest information on applications of Nuclear Physics. Written from an experimental point of view this text is broadly divided into two parts, firstly a general

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introduction to Nuclear Physics and secondly its applications. The book also includes chapters on practical examples and problems. It also contains hints to solving problems which are included in the appendix.

The Physics of Stars, Second Edition, is a concise introduction to the properties of stellar interiors and consequently the structure and evolution of stars. Strongly emphasising the basic physics, simple and uncomplicated theoretical models are used to illustrate clearly the connections between fundamental physics and stellar properties. This text does not intend to be encyclopaedic, rather it tends to focus on the most interesting and important aspects of stellar structure, evolution and nucleosynthesis. In the Second Edition, a new chapter on Helioseismology has been added, along with a list of physical constants and extra student problems. There is also new material on the Hertzsprung-Russell diagram, as well as a general updating of the entire text. It includes numerous problems at the end of each chapter aimed at both testing and extending student's knowledge.

The main purpose of this book 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 as 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.

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Physics of Nuclear Reactors presents a comprehensive analysis of nuclear reactor physics. Editors P. Mohanakrishnan, Om Pal Singh, and Kannan Umasankari and a team of expert contributors combine their knowledge to guide the reader through a toolkit of methods for solving transport equations, understanding the physics of reactor design principles, and developing reactor safety strategies. The inclusion of experimental and operational reactor physics makes this a unique reference for those working and researching nuclear power and the fuel cycle in existing power generation sites and experimental facilities. The book also includes radiation physics, shielding techniques and an analysis of shield design, neutron monitoring and core operations. Those involved in the development and operation of nuclear reactors and the fuel cycle will gain a thorough understanding of all elements of nuclear reactor physics, thus enabling them to apply the analysis and solution methods provided to their own work and research. This book looks to future reactors in development and analyzes their status and challenges before providing possible worked-through solutions. Cover image: Kaiga Atomic Power Station Units 1 – 4, Karnataka, India. In 2018, Unit 1 of the Kaiga Station surpassed the world record of continuous operation, at 962 days. Image courtesy of DAE, India. Includes methods for solving neutron transport problems, nuclear cross-section data and solutions of transport theory Dedicates a chapter to reactor safety that covers mitigation, probabilistic safety assessment and uncertainty analysis Covers experimental and operational physics with details on

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noise analysis and failed fuel detection

This volume covers invited papers presented during the La Rábida 2015 International Scientific Meeting on Nuclear Physics, which can be considered heir of a well known series of triennial international summer schools on Nuclear Physics organized from 1982 till 2003 by the Basic Nuclear Physics group in the University of Sevilla. The La Rábida 2015 meeting offered to graduate students and young researchers a broad view of the field of Nuclear Physics. The first invited speaker presented the state-of-the-art of Relativistic Mean Field calculations. The second set of notes covers selected topics in gamma ray spectroscopy with exotic nuclei. The third speaker presented an introduction to the subject of severe accidents in nuclear power plants. In the fourth set of notes, the author illustrated how to use laser spectroscopy to determine very important observables of atomic nuclei. The fifth speaker devoted its notes to explain several aspects of neutrino physics. Finally, the sixth speaker presented an overview of nuclear medicine and radiodiagnostic. In addition to this, the inclusion of the posters and seminars presented by the students gives a fresh and ample perspective on the many different problems of interest nowadays for the Nuclear Physics community.

Describes how the processes in stars which produce the chemical elements for planets and life may be reproduced in laboratories.

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