

Book Knoll Radiation Detection And Measurement 4th Edition

Physical Methods, Instruments and Measurements theme is a component of the Encyclopedia of Physical Sciences, Engineering and Technology Resources which is part of the global Encyclopedia of Life Support Systems (EOLSS), an integrated compendium of twenty Encyclopedias. The Theme provides a complete survey of the present status of our knowledge of modern physical instruments and measurements. It is organized in the following main topics: Measurements and Measurement Standards; Sources of Particles and Radiation, Detectors and Sensors; Imaging and Characterizing – Trace Element Analysis; Technology of Physical Experiments; Applications of Measurements and Instrumentation which are then expanded into multiple subtopics, each as a chapter. These four volumes are aimed at the following five major target audiences: University and College Students, Educators, Professional Practitioners, Research Personnel and Policy Analysts, Managers, and Decision Makers and NGOs.

Electronics Engineer's Reference Book, Sixth Edition is a five-part book that

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begins with a synopsis of mathematical and electrical techniques used in the analysis of electronic systems. Part II covers physical phenomena, such as electricity, light, and radiation, often met with in electronic systems. Part III contains chapters on basic electronic components and materials, the building blocks of any electronic design. Part IV highlights electronic circuit design and instrumentation. The last part shows the application areas of electronics such as radar and computers.

This revised and extended second edition treats the experimental techniques and instrumentation most often used in nuclear and particle physics experiments as well as in various other experiments. It provides useful results and formulae, technical know-how and informative details in a very practical, hands-on style. This special volume of *Advances in Imaging and Electron Physics* details the current theory, experiments, and applications of neutron and x-ray optics and microscopy for an international readership across varying backgrounds and disciplines. Edited by Dr. Ted Cremer, these volumes attempt to provide rapid assimilation of the presented topics that include neutron and x-ray scatter, refraction, diffraction, and reflection and their potential application. Contributions from leading authorities Informs and updates on all the latest developments in the field

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The discipline of instrumentation has grown appreciably in recent years because of advances in sensor technology and in the interconnectivity of sensors, computers and control systems. This 4e of the Instrumentation Reference Book embraces the equipment and systems used to detect, track and store data related to physical, chemical, electrical, thermal and mechanical properties of materials, systems and operations. While traditionally a key area within mechanical and industrial engineering, understanding this greater and more complex use of sensing and monitoring controls and systems is essential for a wide variety of engineering areas--from manufacturing to chemical processing to aerospace operations to even the everyday automobile. In turn, this has meant that the automation of manufacturing, process industries, and even building and infrastructure construction has been improved dramatically. And now with remote wireless instrumentation, heretofore inaccessible or widely dispersed operations and procedures can be automatically monitored and controlled. This already well-established reference work will reflect these dramatic changes with improved and expanded coverage of the traditional domains of instrumentation as well as the cutting-edge areas of digital integration of complex sensor/control systems. Thoroughly revised, with up-to-date coverage of wireless sensors and systems, as well as nanotechnologies role in the evolution of sensor technology Latest

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information on new sensor equipment, new measurement standards, and new software for embedded control systems, networking and automated control Three entirely new sections on Controllers, Actuators and Final Control Elements; Manufacturing Execution Systems; and Automation Knowledge Base Up-dated and expanded references and critical standards

This book provides readers with comprehensive details on the management and measures to protect health against risks to people and environments generated by the use of ionizing and non-ionizing radiation. This book is divided into three sections, namely, Radiation Protection and Measurement; Radiation Therapy; and Radioactivity. The first section covers ionizing radiation protection; population exposure to non-ionizing density; and the system of dosimetry quantities for use in emergency preparedness and response to nuclear or radiological accidents. The second section covers various planning techniques for spinal stereotactic body radiotherapy and the application of radiation technology in the development of a malaria vaccine. The third section discusses environmental radioactivity monitoring using efficient measurements and the assessment of radiation exposure to humans. Also in this section is the evaluation of the effects of chronic radiation exposure on the testes of mice after a nuclear power plant accident.

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Written at the technologist level, Nuclear Medicine Instrumentation focuses on instruments essential to the practice of nuclear medicine. Covering everything from Geiger counters to positron emission tomography systems, this text provides students with an understanding of the practical aspects of these instruments and their uses in nuclear medicine. By concentrating on the operation of these instruments and the potential pitfalls that they are subject to, students will be better prepared for what they may encounter during their career. Chapters include: Detectors Gas-Filled, Scintillation and Semiconductor; Image Characteristics SPECT, PET; Collimators; Radiation Measurements; and more. This new fifth edition of Information Resources in Toxicology offers a consolidated entry portal for the study, research, and practice of toxicology. Both volumes represents a unique, wide-ranging, curated, international, annotated bibliography, and directory of major resources in toxicology and allied fields such as environmental and occupational health, chemical safety, and risk assessment. The editors and authors are among the leaders of the profession sharing their cumulative wisdom in toxicology's subdisciplines. This edition keeps pace with the digital world in directing and linking readers to relevant websites and other online tools. Due to the increasing size of the hardcopy publication, the current edition has been divided into two volumes to make it easier to handle and

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consult. Volume 1: Background, Resources, and Tools, arranged in 5 parts, begins with chapters on the science of toxicology, its history, and informatics framework in Part 1. Part 2 continues with chapters organized by more specific subject such as cancer, clinical toxicology, genetic toxicology, etc. The categorization of chapters by resource format, for example, journals and newsletters, technical reports, organizations constitutes Part 3. Part 4 further considers toxicology's presence via the Internet, databases, and software tools. Among the miscellaneous topics in the concluding Part 5 are laws and regulations, professional education, grants and funding, and patents. Volume 2: The Global Arena offers contributed chapters focusing on the toxicology contributions of over 40 countries, followed by a glossary of toxicological terms and an appendix of popular quotations related to the field. The book, offered in both print and electronic formats, is carefully structured, indexed, and cross-referenced to enable users to easily find answers to their questions or serendipitously locate useful knowledge they were not originally aware they needed. Among the many timely topics receiving increased emphasis are disaster preparedness, nanotechnology, -omics, risk assessment, societal implications such as ethics and the precautionary principle, climate change, and children's environmental health. Introductory chapters provide a backdrop to the

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science of toxicology, its history, the origin and status of toxicoinformatics, and starting points for identifying resources. Offers an extensive array of chapters organized by subject, each highlighting resources such as journals, databases, organizations, and review articles. Includes chapters with an emphasis on format such as government reports, general interest publications, blogs, and audiovisuals. Explores recent internet trends, web-based databases, and software tools in a section on the online environment. Concludes with a miscellany of special topics such as laws and regulations, chemical hazard communication resources, careers and professional education, K-12 resources, funding, poison control centers, and patents. Paired with Volume Two, which focuses on global resources, this set offers the most comprehensive compendium of print, digital, and organizational resources in the toxicological sciences with over 120 chapters contributions by experts and leaders in the field. Building on the traditional concept of nuclear medicine, this textbook presents cutting-edge concepts of hybrid imaging and discusses the close interactions between nuclear medicine and other clinical specialties, in order to achieve the best possible outcomes for patients. Today the diagnostic applications of nuclear medicine are no longer stand-alone procedures, separate from other diagnostic imaging modalities. This is especially true for hybrid imaging guided

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interventional radiology or surgical procedures. Accordingly, today's nuclear medicine specialists are actually specialists in multimodality imaging (in addition to their expertise in the diagnostic and therapeutic uses of radionuclides). This new role requires a new core curriculum for training nuclear medicine specialists. This textbook is designed to meet these new educational needs, and to prepare nuclear physicians and technologists for careers in this exciting specialty.

Contents: 1. Power reactors.--2. Research and test reactors.--3. Fuels and materials facilities.--4. Environmental and siting.--5. Materials and plant protection.--6. Products.--7. Transportation.--8. Occupational health.--9. Antitrust reviews.--10. General.

Nuclear Energy is one of the most popular texts ever published on basic nuclear physics, systems, and applications of nuclear energy. This newest edition continues the tradition of offering a holistic treatment of everything the undergraduate engineering student needs to know in a clear and accessible way. Presented is a comprehensive overview of radioactivity, radiation protection, nuclear reactors, waste disposal, and nuclear medicine. • New coverage on nuclear safety concerns following 9/11, including radiation and terrorism, nuclear plant security, and use of nuclear techniques to detect weapons materials • New facts on nuclear waste management, including the Yucca Mountain repository •

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New developments in the use of nuclear-powered systems for generating cheap and abundant hydrogen from water using nuclear technology • New information on prospects for new nuclear power reactors and their applications for electricity and desalination • New end-of-chapter Exercises and Answers, lists of Internet resources, and updated references. • New instructor web site including Solutions to Exercises and PowerPoint slides • New student web site containing computer programs for use with Computer Exercises

A Sound Introduction to Radiation Detection and Measurement for Newcomers to Nuclear Science and Engineering Since the publication of the bestselling third edition, there have been advances in the field of radiation detection, most notably in practical applications. Incorporating these important developments, Measurement and Detection of Radiation, Fourth Edition provides the most up-to-date and accessible introduction to radiation detector materials, systems, and applications. New to the Fourth Edition New chapters on nuclear forensics and nuclear medicine instrumentation, covering basic principles and applications as well as open-ended problems that encourage more in-depth research Updated references and bibliographies New and expanded problems As useful to students and nuclear professionals as its popular predecessors, this fourth edition continues to carefully explain the latest radiation detector technology and

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measurement techniques. It also discusses the correct ways to perform measurements and analyze results following current health physics procedures. Synchrotron radiation has been a revolutionary and invaluable research tool for a wide range of scientists, including chemists, biologists, physicists, materials scientists, geophysicists. It has also found multidisciplinary applications with problems ranging from archeology through cultural heritage to paleontology. The subject of this book is x-ray spectroscopy using synchrotron radiation, and the target audience is both current and potential users of synchrotron facilities. The first half of the book introduces readers to the fundamentals of storage ring operations, the qualities of the synchrotron radiation produced, the x-ray optics required to transport this radiation, and the detectors used for measurements. The second half of the book describes the important spectroscopic techniques that use synchrotron x-rays, including chapters on x-ray absorption, x-ray fluorescence, resonant and non-resonant inelastic x-ray scattering, nuclear spectroscopies, and x-ray photoemission. A final chapter surveys the exciting developments of free electron laser sources, which promise a second revolution in x-ray science. Thanks to the detailed descriptions in the book, prospective users will be able to quickly begin working with these techniques. Experienced users will find useful summaries, key equations, and exhaustive references to

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key papers in the field, as well as outlines of the historical developments in the field. Along with plentiful illustrations, this work includes access to supplemental Mathematica notebooks, which can be used for some of the more complex calculations and as a teaching aid. This book should appeal to graduate students, postdoctoral researchers, and senior scientists alike.

I have been teaching courses on experimental techniques in nuclear and particle physics to master students in physics and in engineering for many years. This book grew out of the lecture notes I made for these students. The physics and engineering students have rather different expectations of what such a course should be like. I hope that I have nevertheless managed to write a book that can satisfy the needs of these different target audiences. The lectures themselves, of course, need to be adapted to the needs of each group of students. An engineering student will not question a statement like “the velocity of the electrons in atoms is $\approx 1\%$ of the velocity of light”, a physics student will. Regarding units, I have written factors h and c explicitly in all equations throughout the book. For physics students it would be preferable to use the convention that is common in physics and omit these constants in the equations, but that would probably be confusing for the engineering students. Physics students tend to be more interested in theoretical physics courses. However, physics is an experimental

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science and physics students should understand how experiments work, and be able to make experiments work.

Gamma ray detection techniques for radioisotope imaging purposes are quickly evolving. Monte Carlo simulations show the possibility of achieving an outstanding image spatial resolution in the images obtained with techniques using electronic collimation. The great advantage of using electronic collimation is the increased efficiency of the gamma camera with respect to the usage of the mechanical collimation technique. These new imaging techniques require radiation detectors with very specific features, such as low noise, desired stooping power and compactness. In this thesis project, an apparatus for detection of a Compton deposition of gamma rays, capable of differentiating the position of interaction of the gamma ray in the active volume of the detector, has been developed. The design and manufacture of such an apparatus implies the selection and characterization of the radiation sensitive material and its calibration, as well as its associated electronics, in order to achieve the critical requirements to be used as part of the electronic collimated gamma camera. Along with the detector development, the electronic collimation requires a very specific control system. The required logic system that makes possible the usage of the apparatus as part of the the electronic collimation set-up, has also been developed as part of this thesis work. This electronic system is meant to work in coordination with other sensors, and its final output is to give exact information of the photon-electron interaction points, in order for an image to be deduced. The result of this thesis work is a radiation detector ready to be used as the tracker component in the application of the electronic collimation technique. Its control system allows it

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to be used to build a Compton camera by simply removing the mechanical collimator of a regular gamma-camera, and arranging both detectors in the desired radioisotope imaging electronic collimation scenario.

Master the latest imaging procedures and technologies in Nuclear Medicine! *Medicine and PET/CT: Technology and Techniques, 8th Edition* provides comprehensive, state-of-the-art information on all aspects of nuclear medicine. Coverage of body systems includes anatomy and physiology along with details on how to perform and interpret related diagnostic procedures. The leading technologies — SPECT, PET, CT, MRI, and PET/CT — are presented, and radiation safety and patient care are emphasized. Edited by nuclear imaging and PET/CT educator Kristen M. Waterstram-Rich and written by a team of expert contributors, this reference features new information on conducting research and managing clinical trials. Complete coverage of nuclear medicine eliminates the need to search for information in other sources. Foundations chapters cover basic math, statistics, physics and instrumentation, computers, lab science, radiochemistry, and pharmacology, allowing you to understand how and why procedures are performed. PET/CT focus with hybrid PET/CT studies provides information that is especially beneficial to working technologists. Accessible writing style and approach to basic science subjects simplifies topics, first introducing fundamentals and progressing to more complex concepts. Procedure boxes provide step-by-step instructions for clinical procedures and protocols, so you can perform each with confidence. CT Physics and Instrumentation chapter provides the knowledge needed for clinical success by introducing CT as it is applied to PET imaging for combined PET/CT studies. Key terms, chapter outlines, learning objectives, and suggested readings help you organize your study. Table of

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Radionuclides used in nuclear medicine and PET is provided in the appendix for quick reference. More than 50 practice problems in the Mathematic and Statistics chapter let you brush up on basic math skills, with answers provided in the back of the book. 12-page, full-color insert includes clear PET/CT scans showing realistic scans found in practice. A glossary provides definitions of key terms and important concepts. UPDATED content reflects the latest advances and provides the information you need to pass the boards. NEW information on conducting research and managing clinical trials prepares you more fully for clinical success. New information on administrative procedures includes coverage of coding and reimbursement. NEW practice tests on the Evolve companion website help you apply your knowledge. NEW! A second color in the design highlights the most important material for easier study and understanding.

Semiconductor sensors patterned at the micron scale combined with custom-designed integrated circuits have revolutionized semiconductor radiation detector systems. Designs covering many square meters with millions of signal channels are now commonplace in high-energy physics and the technology is finding its way into many other fields, ranging from astrophysics to experiments at synchrotron light sources and medical imaging. This book is the first to present a comprehensive discussion of the many facets of highly integrated semiconductor detector systems, covering sensors, signal processing, transistors and circuits, low-noise electronics, and radiation effects. The diversity of design approaches is illustrated in a chapter describing systems in high-energy physics, astronomy, and astrophysics. Finally a chapter "Why things don't work" discusses common pitfalls. Profusely illustrated, this book provides a unique reference in a key area of modern science.

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Radiation Detection and Measurement John Wiley & Sons

This volume constitutes the state-of-the-art in active interrogation, widely recognized as indispensable methods for addressing current and future nuclear security needs. Written by a leading group of science and technology experts, this comprehensive reference presents technologies and systems in the context of the fundamental physics challenges and practical requirements. It compares the features, limitations, technologies, and impact of passive and active measurement techniques; describes radiation sources for active interrogation including electron and ion accelerators, intense lasers, and radioisotope-based sources; and it describes radiation detectors used for active interrogation. Entire chapters are devoted to data acquisition and processing systems, modeling and simulation, data interpretation and algorithms, and a survey of working active measurement systems. Active Interrogation in Nuclear Security is structured to appeal to a range of audiences, including graduate students, active researchers in the field, and policy analysts. The first book devoted entirely to active interrogation Presents a focused review of the relevant physics Surveys available technology Analyzes scientific and technology trends Provides historical and policy context Igor Jovanovic is a Professor of Nuclear Engineering and Radiological Sciences at the University of Michigan and has previously also taught at Penn State University and Purdue University. He received his Ph.D. from University of California, Berkeley and worked as physicist at Lawrence Livermore National Laboratory. Dr. Jovanovic has made numerous contributions to the science and technology of radiation detection, as well as the radiation sources for use in active interrogation in nuclear security. He has taught numerous undergraduate and graduate courses in areas that include radiation detection, nuclear physics, and nuclear security. At University of Michigan Dr.

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Jovanovic is the director of Neutron Science Laboratory and is also associated with the Center for Ultrafast Optical Science. Anna Erickson is an Assistant Professor in the Nuclear and Radiological Engineering Program of the G.W. Woodruff School of Mechanical Engineering at Georgia Institute of Technology. Previously, she was a postdoctoral researcher in the Advanced Detectors Group at Lawrence Livermore National Laboratory. Dr. Erickson received her PhD from Massachusetts Institute of Technology with a focus on radiation detection for active interrogation applications. Her research interests focus on nuclear non-proliferation including antineutrino analysis and non-traditional detector design and characterization. She teaches courses in advanced experimental detection for reactor and nuclear nonproliferation applications, radiation dosimetry and fast reactor analysis.

A Classic Text on Radiation Detection and Measurement Now Updated and Expanded Building on the proven success of this widely-used text, the Third Edition will provide you with a clear understanding of the methods and instrumentation used in the detection and measurement of ionizing radiation. It provides in-depth coverage of the basic principles of radiation detection as well as illustrating their application in a full set of modern instruments. In addition to a complete description of well-established detection and spectroscopic methods, many recently developed approaches are also explored. These include extensive new discussions of semiconductor detectors with unique properties, recently developed scintillation materials and photomultiplier tubes, and several gas-filled detectors of new design. Many other updates and additions have been made throughout the text and two appendices have been added. Over 100 new figures and tables have been included. Key Features of the Third Edition * Every chapter has been updated with extensive addition of new references to relevant articles in the scientific literature.

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* A number of new detection techniques have been added, strengthening the status of the text as the most comprehensive coverage of the topic to be found in any single book. * The writing style has maintained the readability that has attracted favorable response from readers and reviewers of the earlier editions. * The author uses his extensive research experience in radiation measurements, nuclear instrumentation, and radiation imaging to provide you with an invaluable resource.

The Second Edition of Practical Gamma-Ray Spectrometry has been completely revised and updated, providing comprehensive coverage of the whole gamma-ray detection and spectrum analysis processes. Drawn on many years of teaching experience to produce this uniquely practical volume, issues discussed include the origin of gamma-rays and the issue of quality assurance in gamma-ray spectrometry. This new edition also covers the analysis of decommissioned nuclear plants, computer modelling systems for calibration, uncertainty measurements in QA, and many more topics.

Over 19,000 total pages ... Public Domain U.S. Government published manual: Numerous illustrations and matrices. Published in the 1990s and after 2000. TITLES and CONTENTS: ELECTRICAL SCIENCES - Contains the following manuals: Electrical Science, Vol 1 - Electrical Science, Vol 2 - Electrical Science, Vol 3 - Electrical Science, Vol 4 - Thermodynamics, Heat Transfer, And Fluid Flow, Vol 1 - Thermodynamics, Heat Transfer, And Fluid Flow, Vol 2 - Thermodynamics, Heat Transfer, And Fluid Flow, Vol 3 - Instrumentation And Control, Vol 1 - Instrumentation And Control, Vol 2 Mathematics, Vol 1 - Mathematics, Vol 2 - Chemistry, Vol 1 - Chemistry, Vol 2 - Engineering Symbology, Prints, And Drawings, Vol 1 - Engineering Symbology, Prints, And Drawings, Vol 2 - Material Science, Vol 1 - Material

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Science, Vol 2 - Mechanical Science, Vol 1 - Mechanical Science, Vol 2 - Nuclear Physics And Reactor Theory, Vol 1 - Nuclear Physics And Reactor Theory, Vol 2. CLASSICAL PHYSICS - The Classical Physics Fundamentals includes information on the units used to measure physical properties; vectors, and how they are used to show the net effect of various forces; Newton's Laws of motion, and how to use these laws in force and motion applications; and the concepts of energy, work, and power, and how to measure and calculate the energy involved in various applications. * Scalar And Vector Quantities * Vector Identification * Vectors: Resultants And Components * Graphic Method Of Vector Addition * Component Addition Method * Analytical Method Of Vector Addition * Newton's Laws Of Motion * Momentum Principles * Force And Weight * Free-Body Diagrams * Force Equilibrium * Types Of Force * Energy And Work * Law Of Conservation Of Energy * Power – ELECTRICAL SCIENCE: The Electrical Science Fundamentals Handbook includes information on alternating current (AC) and direct current (DC) theory, circuits, motors, and generators; AC power and reactive components; batteries; AC and DC voltage regulators; transformers; and electrical test instruments and measuring devices. * Atom And Its Forces * Electrical Terminology * Units Of Electrical Measurement * Methods Of Producing Voltage (Electricity) * Magnetism * Magnetic Circuits * Electrical Symbols * DC Sources * DC Circuit Terminology * Basic DC Circuit Calculations * Voltage Polarity And Current Direction * Kirchoff's Laws * DC Circuit Analysis * DC Circuit Faults * Inductance * Capacitance * Battery Terminology * Battery Theory * Battery Operations * Types Of Batteries * Battery Hazards * DC Equipment Terminology * DC Equipment Construction * DC Generator Theory * DC Generator Construction * DC Motor Theory * Types Of DC Motors * DC Motor Operation * AC Generation * AC Generation

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Analysis * Inductance * Capacitance * Impedance * Resonance * Power Triangle * Three-Phase Circuits * AC Generator Components * AC Generator Theory * AC Generator Operation * Voltage Regulators * AC Motor Theory * AC Motor Types * Transformer Theory * Transformer Types * Meter Movements * Voltmeters * Ammeters * Ohm Meters * Wattmeters * Other Electrical Measuring Devices * Test Equipment * System Components And Protection Devices * Circuit Breakers * Motor Controllers * Wiring Schemes And Grounding

THERMODYNAMICS, HEAT TRANSFER AND FLUID FUNDAMENTALS. The Thermodynamics, Heat Transfer, and Fluid Flow Fundamentals Handbook includes information on thermodynamics and the properties of fluids; the three modes of heat transfer - conduction, convection, and radiation; and fluid flow, and the energy relationships in fluid systems. * Thermodynamic Properties * Temperature And Pressure Measurements * Energy, Work, And Heat * Thermodynamic Systems And Processes * Change Of Phase * Property Diagrams And Steam Tables * First Law Of Thermodynamics * Second Law Of Thermodynamics * Compression Processes * Heat Transfer Terminology * Conduction Heat Transfer * Convection Heat Transfer * Radiant Heat Transfer * Heat Exchangers * Boiling Heat Transfer * Heat Generation * Decay Heat * Continuity Equation * Laminar And Turbulent Flow * Bernoulli's Equation * Head Loss * Natural Circulation * Two-Phase Fluid Flow * Centrifugal Pumps

INSTRUMENTATION AND CONTROL. The Instrumentation and Control Fundamentals Handbook includes information on temperature, pressure, flow, and level detection systems; position indication systems; process control systems; and radiation detection principles. * Resistance Temperature Detectors (Rtds) * Thermocouples * Functional Uses Of Temperature Detectors * Temperature Detection Circuitry * Pressure Detectors * Pressure Detector

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Functional Uses * Pressure Detection Circuitry * Level Detectors * Density Compensation * Level Detection Circuitry * Head Flow Meters * Other Flow Meters * Steam Flow Detection * Flow Circuitry * Synchro Equipment * Switches * Variable Output Devices * Position Indication Circuitry * Radiation Detection Terminology * Radiation Types * Gas-Filled Detector * Detector Voltage * Proportional Counter * Proportional Counter Circuitry * Ionization Chamber * Compensated Ion Chamber * Electroscopie Ionization Chamber * Geiger-Müller Detector * Scintillation Counter * Gamma Spectroscopy * Miscellaneous Detectors * Circuitry And Circuit Elements * Source Range Nuclear Instrumentation * Intermediate Range Nuclear Instrumentation * Power Range Nuclear Instrumentation * Principles Of Control Systems * Control Loop Diagrams * Two Position Control Systems * Proportional Control Systems * Reset (Integral) Control Systems * Proportional Plus Reset Control Systems * Proportional Plus Rate Control Systems * Proportional-Integral-Derivative Control Systems * Controllers * Valve Actuators

MATHEMATICS The Mathematics Fundamentals Handbook includes a review of introductory mathematics and the concepts and functional use of algebra, geometry, trigonometry, and calculus. Word problems, equations, calculations, and practical exercises that require the use of each of the mathematical concepts are also presented. * Calculator Operations * Four Basic Arithmetic Operations * Averages * Fractions * Decimals * Signed Numbers * Significant Digits * Percentages * Exponents * Scientific Notation * Radicals * Algebraic Laws * Linear Equations * Quadratic Equations * Simultaneous Equations * Word Problems * Graphing * Slopes * Interpolation And Extrapolation * Basic Concepts Of Geometry * Shapes And Figures Of Plane Geometry * Solid Geometric Figures * Pythagorean Theorem * Trigonometric Functions * Radians * Statistics * Imaginary And Complex Numbers * Matrices

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And Determinants * Calculus CHEMISTRY The Chemistry Handbook includes information on the atomic structure of matter; chemical bonding; chemical equations; chemical interactions involved with corrosion processes; water chemistry control, including the principles of water treatment; the hazards of chemicals and gases, and basic gaseous diffusion processes. * Characteristics Of Atoms * The Periodic Table * Chemical Bonding * Chemical Equations * Acids, Bases, Salts, And Ph * Converters * Corrosion Theory * General Corrosion * Crud And Galvanic Corrosion * Specialized Corrosion * Effects Of Radiation On Water Chemistry (Synthesis) * Chemistry Parameters * Purpose Of Water Treatment * Water Treatment Processes * Dissolved Gases, Suspended Solids, And Ph Control * Water Purity * Corrosives (Acids And Alkalies) * Toxic Compound * Compressed Gases * Flammable And Combustible Liquids ENGINEERING SYMBOLOGY. The Engineering Symbology, Prints, and Drawings Handbook includes information on engineering fluid drawings and prints; piping and instrument drawings; major symbols and conventions; electronic diagrams and schematics; logic circuits and diagrams; and fabrication, construction, and architectural drawings. * Introduction To Print Reading * Introduction To The Types Of Drawings, Views, And Perspectives * Engineering Fluids Diagrams And Prints * Reading Engineering P&IDs * P&ID Print Reading Example * Fluid Power P&IDs * Electrical Diagrams And Schematics * Electrical Wiring And Schematic Diagram Reading Examples * Electronic Diagrams And Schematics * Examples * Engineering Logic Diagrams * Truth Tables And Exercises * Engineering Fabrication, Construction, And Architectural Drawings * Engineering Fabrication, Construction, And Architectural Drawing, Examples MATERIAL SCIENCE. The Material Science Handbook includes information on the structure and properties of metals, stress mechanisms in metals, failure modes, and the

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characteristics of metals that are commonly used in DOE nuclear facilities. * Bonding * Common Lattice Types * Grain Structure And Boundary * Polymorphism * Alloys * Imperfections In Metals * Stress * Strain * Young's Modulus * Stress-Strain Relationship * Physical Properties * Working Of Metals * Corrosion * Hydrogen Embrittlement * Tritium/Material Compatibility * Thermal Stress * Pressurized Thermal Shock * Brittle Fracture Mechanism * Minimum Pressurization-Temperature Curves * Heatup And Cooldown Rate Limits * Properties Considered * When Selecting Materials * Fuel Materials * Cladding And Reflectors * Control Materials * Shielding Materials * Nuclear Reactor Core Problems * Plant Material Problems * Atomic Displacement Due To Irradiation * Thermal And Displacement Spikes * Due To Irradiation * Effect Due To Neutron Capture * Radiation Effects In Organic Compounds * Reactor Use Of Aluminum

MECHANICAL SCIENCE. The Mechanical Science Handbook includes information on diesel engines, heat exchangers, pumps, valves, and miscellaneous mechanical components. * Diesel Engines * Fundamentals Of The Diesel Cycle * Diesel Engine Speed, Fuel Controls, And Protection * Types Of Heat Exchangers * Heat Exchanger Applications * Centrifugal Pumps * Centrifugal Pump Operation * Positive Displacement Pumps * Valve Functions And Basic Parts * Types Of Valves * Valve Actuators * Air Compressors * Hydraulics * Boilers * Cooling Towers * Demineralizers * Pressurizers * Steam Traps * Filters And Strainers

NUCLEAR PHYSICS AND REACTOR THEORY. The Nuclear Physics and Reactor Theory Handbook includes information on atomic and nuclear physics; neutron characteristics; reactor theory and nuclear parameters; and the theory of reactor operation. * Atomic Nature Of Matter * Chart Of The Nuclides * Mass Defect And Binding Energy * Modes Of Radioactive Decay * Radioactivity * Neutron Interactions * Nuclear

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Fission * Energy Release From Fission * Interaction Of Radiation With Matter * Neutron Sources * Nuclear Cross Sections And Neutron Flux * Reaction Rates * Neutron Moderation * Prompt And Delayed Neutrons * Neutron Flux Spectrum * Neutron Life Cycle * Reactivity * Reactivity Coefficients * Neutron Poisons * Xenon * Samarium And Other Fission Product Poisons * Control Rods * Subcritical Multiplication * Reactor Kinetics * Reactor

This text on radiation detection and measurement is a response to numerous requests expressed by students at various universities, in which the most popularly used books do not provide adequate background material, nor explain matters in understandable terms. This work provides a modern overview of radiation detection devices and radiation measurement methods. The topics selected in the book have been selected on the basis of the author's many years of experience designing radiation detectors and teaching radiation detection and measurement in a classroom environment.

Cardiovascular Imaging, a title in the Expert Radiology Series, edited by Drs. Vincent Ho and Gautham P. Reddy, is a comprehensive 2-volume reference that covers the latest advances in this specialty. It provides richly illustrated, advanced guidance to help you overcome the full range of diagnostic, therapeutic, and interventional challenges in cardiovascular imaging and combines an image-rich, easy-to-use format with the greater depth that experienced practitioners need. Online access at www.expertconsult.com allows you to rapidly search for images and quickly locate the answers to any questions. Access the fully searchable text online at www.expertconsult.com, along with downloadable images. View 5000 full-color digital images of both radiographic images and cutting-edge modalities—MR, multislice CT, ultrasonography, and nuclear medicine. Tap into comprehensive coverage that includes

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diagnostic and therapeutic options, with an emphasis on cost-effective imaging. Consult the experience of a diverse group of experts on cardiovascular imaging from around the globe. Find information quickly and easily thanks to consistent and tightly focused chapters, a full-color design, and key points boxes.

Radiochemistry and Nuclear Chemistry theme is a component of Encyclopedia of Chemical Sciences, Engineering and Technology Resources in the global Encyclopedia of Life Support Systems (EOLSS), which is an integrated compendium of twenty one Encyclopedias. The content of the Theme on Radiochemistry and Nuclear Chemistry provides the essential aspects and a myriad of issues of great relevance to our world such as: Isotope Effects, Isotope Separation and Isotope Fractionation; Radiometric Dating and Tracing; Radiochemical Techniques; Radionuclides in Chemical Research; Nuclear Methods in Material Research; Radiation Chemistry; Radiation Biology and Radiation Protection; Radiochemistry and Radiopharmaceutical Chemistry for Medicine; Chemistry of the Actinide Elements; Production And Chemistry Of Transactinide Elements; Nuclear Waste Management and the Nuclear Fuel Cycle; High-intensity Lasers in Nuclear Science; Nuclear Forensics; Nuclear Processes in Nature; Subatomic Particles, Nuclear Structure and Stability. These two volumes are aimed at the following five major target audiences: University and College students Educators, Professional practitioners, Research personnel and Policy analysts, managers, and decision makers and NGOs.

A comprehensive guide to procedures and technologies, Nuclear Medicine and PET/CT: Technology and Techniques provides a single source for state-of-the-art information on all aspects of nuclear medicine. Coverage includes relevant anatomy and physiology and

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discusses each procedure in relation to the specific use of radiopharmaceuticals and the instruments required. Edited by experts in nuclear imaging and PET/CT, Paul E. Christian and Kristen M. Waterstram-Rich, this edition has a new chapter on MRI as it relates to nuclear medicine and includes practical, step-by-step instructions for procedures. PET/CT focus with hybrid PET/CT studies in several chapters provides cutting-edge information that is especially beneficial to working technologists. CT Physics and Instrumentation chapter introduces CT as it is applied to PET imaging for combined PET/CT studies. Authoritative, comprehensive resource conveys state-of-the-art information, eliminating the need to search for information in other sources. Foundation chapters cover basic math, statistics, physics, instrumentation, computers, lab science, radiochemistry, and pharmacology, allowing you to understand how and why procedures are performed. Accessible writing style and approach to basic science subjects simplifies topics, progressing from fundamentals to more complex concepts. More than 50 practice problems in the math and statistics chapter let you brush up on basic math skills, with answers provided in the back of the book. Key terms, chapter outlines, learning objectives, and suggested readings help you organize your study. A table of radionuclides used in nuclear medicine and PET is provided in the appendix for quick reference. A glossary provides definitions of key terms and important concepts. High-profile editors and contributors come from a variety of educational and clinical settings, providing a broad philosophic and geographic perspective. New MRI Physics, Instrumentation and Clinical Introduction chapter provides important background on MRI and its relationship with nuclear medicine. Procedures boxes in body systems chapters provide step-by-step descriptions of clinical procedures. Updates and revisions keep you current with the latest advances. Expanded 16-page color

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insert includes more diagnostic images demonstrating realistic scans found in practice. 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 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.

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Choice Recommended Title, July 2020 Bringing together material scattered across many disciplines, Semiconductor Radiation Detectors provides readers with a consolidated source of information on the properties of a wide range of semiconductors; their growth, characterization and the fabrication of radiation sensors with emphasis on the X- and gamma-ray regimes. It explores the promise and limitations of both the traditional and new generation of semiconductors and discusses where the future in semiconductor development and radiation detection may lie. The purpose of this book is two-fold; firstly to serve as a text book for those new to the field of semiconductors and radiation detection and measurement, and secondly as a reference book for established researchers working in related disciplines within physics and engineering. Features: The only comprehensive book covering this topic Fully up-to-date with new developments in the field Provides a wide-ranging source of further reference material This is the resource that engineers turn to in the study of radiation detection. The fourth edition takes into account the technical developments that continue to enhance the instruments and techniques available for the detection and spectroscopy of ionizing radiation. New coverage is presented on ROC curves, micropattern gas detectors, new sensors for scintillation light, and the excess noise factor. Revised discussions are also included on TLDs and cryogenic spectrometers, radiation backgrounds, and the VME standard. Engineers will gain a strong understanding of the field with this updated book.

The Instrument and Automation Engineers' Handbook (IAEH) is the #1 process automation handbook in the world. Volume one of the Fifth Edition, Measurement and Safety, covers safety sensors and the detectors of physical properties. Measurement and Safety is an invaluable resource that: Describes the detectors used in the measurement of process

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variables Offers application- and method-specific guidance for choosing the best measurement device Provides tables of detector capabilities and other practical information at a glance Contains detailed descriptions of domestic and overseas products, their features, capabilities, and suppliers, including suppliers' web addresses Complete with 163 alphabetized chapters and a thorough index for quick access to specific information, Measurement and Safety is a must-have reference for instrument and automation engineers working in the chemical, oil/gas, pharmaceutical, pollution, energy, plastics, paper, wastewater, food, etc. industries. About the eBook The most important new feature of the IAEH, Fifth Edition is its availability as an eBook. The eBook provides the same content as the print edition, with the addition of thousands of web addresses so that readers can reach suppliers or reference books and articles on the hundreds of topics covered in the handbook. This feature includes a complete bidders' list that allows readers to issue their specifications for competitive bids from any or all potential product suppliers.

This first dedicated overview for beam's eye view (BEV) covers instrumentation, methods, and clinical use of this exciting technology, which enables real-time anatomical imaging. It highlights how the information collected (e.g., the shape and size of the beam aperture and intensity of the beam) is used in the clinic for treatment verification, adaptive radiotherapy, and in-treatment interventions. The chapters cover detector construction and components, common imaging procedures, and state of the art applications. The reader will also be presented with emerging innovations, including target modifications, real-time tracking, reconstructing delivered dose, and in vivo portal dosimetry. Ross I. Berbeco, PhD, is a board-certified medical physicist and Associate Professor of Radiation Oncology at the Dana-Farber Cancer Institute,

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Brigham and Women's Hospital and Harvard Medical School.

This latest version of Information Resources in Toxicology (IRT) continues a tradition established in 1982 with the publication of the first edition in presenting an extensive itemization, review, and commentary on the information infrastructure of the field. This book is a unique wide-ranging, international, annotated bibliography and compendium of major resources in toxicology and allied fields such as environmental and occupational health, chemical safety, and risk assessment. Thoroughly updated, the current edition analyzes technological changes and is rife with online tools and links to Web sites. IRT-IV is highly structured, providing easy access to its information. Among the "hot topics covered are Disaster Preparedness and Management, Nanotechnology, Omics, the Precautionary Principle, Risk Assessment, and Biological, Chemical and Radioactive Terrorism and Warfare are among the designated. • International in scope, with contributions from over 30 countries • Numerous key references and relevant Web links • Concise narratives about toxicologic sub-disciplines • Valuable appendices such as the IUPAC Glossary of Terms in Toxicology • Authored by experts in their respective sub-disciplines within toxicology

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