

# **Radiation Detection And Measurement Knoll 4th Edition**

**This new edition of the methods and instrumentation used in the detection of ionizing radiation has been revised and updated to reflect recent advances. It covers modern engineering practice, provides useful design information and contains an up-to-date review of the literature.**

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

**Starting from basic principles, this book describes the rapidly growing field of modern semiconductor detectors used for energy and position measurement radiation. The author, whose own contributions to these developments have been significant, explains the working principles of semiconductor radiation detectors in an intuitive way. Broad coverage is also given to electronic signal readout and to the subject of radiation damage.**

**This second open access volume of the handbook series deals with detectors, large experimental facilities and data handling, both for accelerator and non-accelerator based experiments. It also covers applications in medicine and life sciences. A joint CERN-Springer initiative, the "Particle Physics Reference Library" provides revised and updated contributions based on previously published material in the well-known Landolt-Boernstein series on particle physics, accelerators and detectors (volumes 21A,B1,B2,C), which took stock of the field approximately one decade ago. Central to this new initiative is publication under full open access.**

**Radiation Detection And Measurement:**

**Techniques for Understanding Spectroscopy, Mineralogy, and Geochemistry of Planetary Surfaces**

**Nuclear Medicine Radiation Dosimetry**

**Positron Emission Tomography**

**Radiation Detection**

*Nuclear reactor physics is the core discipline of nuclear engineering. Nuclear reactors now account for a significant portion of the electrical power generated worldwide, and new power reactors with improved fuel cycles are being developed. At the same time, the past few decades have seen an ever-increasing number of industrial, medical, military, and research applications for nuclear reactors. The second edition of this successful comprehensive textbook and reference on basic and advanced nuclear reactor physics has been completely updated, revised and enlarged to include the latest developments.*

Comprehensive overview of the spectroscopic, mineralogical, and geochemical techniques used in planetary remote sensing. This book is an essential introduction to the basic principles of radiation protection and aerosol physics, including applications within international and UK law for the protection of the public against the dangers arising from ionising radiation. The text also discusses the difficulties with the monitoring and the health detriment associated with problematic radionuclides.

This book, like the first and second editions, addresses the fundamental principles of interaction between radiation and matter and the principles of particle detection and detectors in a wide scope of fields, from low to high energy, including space physics and medical environment. It provides abundant information about the processes of electromagnetic and hadronic energy deposition in matter, detecting systems, performance of detectors and their optimization. The third edition includes additional material covering, for instance: mechanisms of energy loss like the inverse Compton scattering, corrections due to the Landau-Pomeranchuk-Migdal effect, an extended relativistic treatment of nucleus-nucleus screened Coulomb scattering, and transport of charged particles inside the heliosphere. Furthermore, the displacement damage (NIEL) in semiconductors has been revisited to account for recent experimental data and more comprehensive comparisons with results previously obtained. This book will be of great use to graduate students and final-year undergraduates as a reference and supplement for courses in particle, astroparticle, space physics and instrumentation. A part of the book is directed toward courses in medical physics. The book can also be used by researchers in experimental particle physics at low, medium, and high energy who are dealing with instrumentation. Errata(s) Errata

Contents: Electromagnetic Interaction of Radiation in Matter Nuclear Interactions in Matter Radiation Environments and Damage in Silicon Semiconductors Scintillating Media and Scintillator Detectors Solid State Detectors Displacement Damage and Particle Interactions in Silicon Devices Gas Filled Chambers Principles of Particle Energy Determination Superheated Droplet (Bubble) Detectors and CDM Search Medical Physics Applications Readership: Researchers, academics, graduate students and professionals in

*accelerator, particle, astroparticle, space, applied and medical physics. Keywords: Interactions Between Radiation/Particles and Matter; High; Intermediate and Low Energy Particle Physics; Medical Physics; Radiation/Particle Detection; Space Physics; Detectors; Semiconductors; Calorimeters; Chambers; Scintillators; Silicon Pixels; Radiation Damage; Single Event Effects; Solar Cells*

**Key Features:** Covers state-of-the-art detection techniques and underlying theories  
Addresses topics of considerable use for professionals in medical physics, nuclear engineering, and environmental studies  
Contains an updated reference table set of physical properties

*Introduction to Radiological Physics and Radiation Dosimetry  
An Introduction to the Physics of Nuclear Medicine  
Passive Nondestructive Assay of Nuclear Materials  
Advanced Detectors for Nuclear, High Energy and Astroparticle Physics  
Nuclear Reactor Physics*

This book offers readers an overview of some of the most recent advances in the field of advanced materials used for gamma and X-ray imaging. Coverage includes both technology and applications, with an in-depth review of the research topics from leading specialists in the field. Emphasis is on high-Z materials like CdTe, CZT and GaAs, as well as perovskite crystals, since they offer the best implementation possibilities for direct conversion X-ray detectors. Authors discuss material challenges, detector operation physics and technology and readout integrated circuits required to detect signals processes by high-Z sensors.

**Radiation Detection: Concepts, Methods, and Devices** provides a modern overview of radiation detection devices and radiation measurement methods. The book topics have been selected on the basis of the authors' many years of experience designing radiation detectors and teaching radiation detection and measurement in a classroom environment. This book is designed to give the reader more than a glimpse at radiation detection devices and a few packaged equations. Rather it seeks to provide an understanding that allows the reader to choose the appropriate detection technology for a particular application, to design detectors, and to competently perform radiation measurements. The authors describe assumptions used to derive frequently encountered equations used in radiation detection and measurement, thereby providing insight when and when not to apply the many approaches used in different aspects of radiation detection. Detailed in many of the chapters are specific aspects of radiation detectors, including comprehensive reviews of the historical development and current state of each topic. Such a review necessarily entails citations to many of the important discoveries, providing a resource to find quickly additional and more detailed information. This book generally has five main themes: Physics and Electrostatics needed to Design Radiation Detectors Properties and Design of Common Radiation Detectors Description and Modeling of the Different Types of Radiation Detectors Radiation Measurements and Subsequent Analysis Introductory Electronics Used for Radiation Detectors Topics covered include atomic and nuclear physics, radiation interactions, sources of radiation, and background radiation. Detector operation is addressed with chapters on radiation counting statistics, radiation source and detector effects, electrostatics for signal generation, solid-state and semiconductor physics, background radiations, and radiation

counting and spectroscopy. Detectors for gamma-rays, charged-particles, and neutrons are detailed in chapters on gas-filled, scintillator, semiconductor, thermoluminescence and optically stimulated luminescence, photographic film, and a variety of other detection devices.

This book presents an overview of the physics of radiation detection and its applications. It covers the origins and properties of different kinds of ionizing radiation, their detection and measurement, and the procedures used to protect people and the environment from their potentially harmful effects. It details the experimental techniques and instrumentation used in different detection systems in a very practical way without sacrificing the physics content. It provides useful formulae and explains methodologies to solve problems related to radiation measurements. With abundance of worked-out examples and end-of-chapter problems, this book enables the reader to understand the underlying physical principles and their applications. Detailed discussions on different detection media, such as gases, liquids, liquefied gases, semiconductors, and scintillators make this book an excellent source of information for students as well as professionals working in related fields. Chapters on statistics, data analysis techniques, software for data analysis, and data acquisition systems provide the reader with necessary skills to design and build practical systems and perform data analysis. \* Covers the modern techniques involved in detection and measurement of radiation and the underlying physical principles \* Illustrates theoretical and practical details with an abundance of practical, worked-out examples \* Provides practice problems at the end of each chapter

Begins with a description of the discovery of radioactivity and the historic research of such pioneers as the Curies and Rutherford. After a discussion of the interactions of  $\alpha$ ,  $\beta$ , and  $\gamma$  rays with matter, the energetics of the different modes of nuclear disintegration are considered in relation to the Einstein mass-energy relationship as applied to radioactive transformations. Radiation detectors and radioactivity measurements are also discussed

Remote Compositional Analysis

Radiation and Detectors

Radiation, Ionization, and Detection in Nuclear Medicine

Volume 2: Detectors for Particles and Radiation

Radiation Oncology Physics

This book will serve as the definitive source of detailed information on radiation, ionization, and detection in nuclear medicine. It opens by considering fundamental aspects of nuclear radiation, including dose and energy, sources, and shielding. Subsequent chapters cover the full range of relevant topics, including the detection and measurement of radiation exposure (with detailed information on mathematical modelling); medical imaging; the different types of radiation detector and their working principles; basic principles of and experimental techniques for deposition of scintillating materials; device fabrication; the optical and electrical behaviors of radiation detectors; and the instrumentation used in nuclear medicine and its application. The book will be an invaluable source of information for academia, industry, practitioners, and researchers.

The complexity and vulnerability of the human body has driven the development of a diverse range of diagnostic and therapeutic techniques in modern medicine. The Nuclear Medicine procedures of Positron Emission Tomography (PET), Single Photon Emission Computed Tomography (SPECT) and Radionuclide Therapy are well-established in clinical practice and are founded upon the principles of radiation

physics. This book will offer an insight into the physics of nuclear medicine by explaining the principles of radioactivity, how radionuclides are produced and administered as radiopharmaceuticals to the body and how radiation can be detected and used to produce images for diagnosis. The treatment of diseases such as thyroid cancer, hyperthyroidism and lymphoma by radionuclide therapy will also be explored.

This is the 20th Volume in the series Memorial Tributes compiled by the National Academy of Engineering as a personal remembrance of the lives and outstanding achievements of its members and foreign associates. These volumes are intended to stand as an enduring record of the many contributions of engineers and engineering to the benefit of humankind. In most cases, the authors of the tributes are contemporaries or colleagues who had personal knowledge of the interests and the engineering accomplishments of the deceased. Through its members and foreign associates, the Academy carries out the responsibilities for which it was established in 1964. Under the charter of the National Academy of Sciences, the National Academy of Engineering was formed as a parallel organization of outstanding engineers. Members are elected on the basis of significant contributions to engineering theory and practice and to the literature of engineering or on the basis of demonstrated unusual accomplishments in the pioneering of new and developing fields of technology. The National Academies share a responsibility to advise the federal government on matters of science and technology. The expertise and credibility that the National Academy of Engineering brings to that task stem directly from the abilities, interests, and achievements of our members and foreign associates, our colleagues and friends, whose special gifts we remember in this book.

The second edition of a bestseller, this book presents the latest innovative research methods that help break new ground by applying patterns, reuse, and design science to research. The book relies on familiar patterns to provide the solid fundamentals of various research philosophies and techniques as touchstones that demonstrate how to innovate research methods. Filled with practical examples of applying patterns to IT research with an emphasis on reusing research activities to save time and money, this book describes design science research in relation to other information systems research paradigms such as positivist and interpretivist research.

New Techniques for the Detection of Nuclear and Radioactive Agents

Particle Detectors

A Handbook for Teachers and Students

Concepts, Methods, and Devices

*Since the publication of the bestselling first edition, there have been numerous advances in the field of nuclear science. In medicine, accelerator based teletherapy and electron-beam therapy have become standard. New demands in national security have stimulated major advances in nuclear instrumentation. An ideal introduction to the*

*fundamentals of nuclear science and engineering, this book presents the basic nuclear science needed to understand and quantify an extensive range of nuclear phenomena. New to the Second Edition— A chapter on radiation detection by Douglas McGregor Up-to-date coverage of radiation hazards, reactor designs, and medical applications Flexible organization of material that allows for quick reference This edition also takes an in-depth look at particle accelerators, nuclear fusion reactions and devices, and nuclear technology in medical diagnostics and treatment. In addition, the author discusses applications such as the direct conversion of nuclear energy into electricity. The breadth of coverage is unparalleled, ranging from the theory and design characteristics of nuclear reactors to the identification of biological risks associated with ionizing radiation. All topics are supplemented with extensive nuclear data compilations to perform a wealth of calculations. Providing extensive coverage of physics, nuclear science, and nuclear technology of all types, this up-to-date second edition of Fundamentals of Nuclear Science and Engineering is a key reference for any physicists or engineer.*

*A clear, concise, comprehensive review of detectors of high-energy particles and radiation; thoroughly revised and updated.*

*Complexities of the requirements for accurate radiation dosimetry evaluation in both diagnostic and therapeutic nuclear medicine (including PET) have grown over the past decade. This is due primarily to four factors: Growing consideration of accurate patient-specific treatment planning for radionuclide therapy as a means of improving the therapeutic benefit, development of more realistic anthropomorphic phantoms and their use in estimating radiation transport and dosimetry in patients, Design and use of advanced Monte Carlo algorithms in calculating the above-mentioned radiation transport and dosimetry which require the user to have a thorough understanding of the theoretical principles used in such algorithms, their appropriateness and their limitations, increasing regulatory scrutiny of the radiation dose burden borne by nuclear medicine patients in the clinic and in the development of new radiopharmaceuticals, thus requiring more accurate and robust dosimetry evaluations. An element common to all four factors is the need for precise radiation dosimetry in nuclear medicine, which is fundamental to the therapeutic success of a patient undergoing radionuclide therapy and to the safety of the patients undergoing diagnostic nuclear medicine and PET procedures. As the complexity of internal radiation dosimetry applied to diagnostic and therapeutic nuclear medicine increases, this book will provide the theoretical foundations for: enabling the practising nuclear medicine physicist to understand the dosimetry calculations being used and their limitations, allowing the research nuclear medicine physicist to critically examine the internal radiation dosimetry algorithms available and under development; and providing the developers of Monte Carlo codes for the transport of radiation resulting from internal radioactive sources with the only comprehensive and definitive.*

*A dynamic and comprehensive overview of the field of health physics This trusted, one-of-a-kind guide delivers authoritative and succinctly written coverage of the entire field of health physics including the biological basis for radiation safety standards,*

*radioactivity, nuclear reactors, radioactive waste, and non-ionizing radiation, as well as radiation dosimetry, radiation instrumentation, and principles of radiation protection. This thorough overview of need-to-know topics, from a review of physical principles to a useful look at the interaction of radiation with matter, offers a problem-solving approach that will serve readers throughout their careers. More than 470 "Homework Problems" and 175+ "Example Problems" Essential background material on quantitative risk assessment for radiation exposure Unique Integration of industrial hygiene with radiation safety Authoritative radiation safety and environmental health coverage that supports the International Commission on Radiological Protection's standards for specific populations – now including ICRP 130 recommendations High-yield appendices to expand comprehension of chapter material Essential coverage of non-ionizing radiation, lasers and microwaves, computer use in dose calculation, and dose limit recommendations NEW to this edition! Expanded information on tissue and radiation weighting factors, advances in detectors, and the Fukushima accident Airborne Radioactive Discharges and Human Health Effects: An Introduction Particle Physics Reference Library Techniques for Nuclear and Particle Physics Experiments Fundamentals of Nuclear Science and Engineering Second Edition Handbook of Drug Metabolism, Third Edition*

This publication is aimed at students and teachers involved in teaching programmes in field of medical radiation physics, and it covers the basic medical physics knowledge required in the form of a syllabus for modern radiation oncology. The information will be useful to those preparing for professional certification exams in radiation oncology, medical physics, dosimetry or radiotherapy technology.

The topic of this book is the use of scintillating materials in the detection of ionising radiation for medical imaging. The text surveys the state of the art in radiation detectors for medical imaging, followed by an in-depth review of all aspects of the use of scintillating materials. Also included are detailed discussion of ways to improve the performance of existing scintillating materials and completely novel uses of scintillating materials.

Essential for students, science and medical graduates who want to understand the basic science of Positron Emission Tomography (PET), this book describes the physics, chemistry, technology and overview of the clinical uses behind the science of PET and the imaging techniques it uses. In recent years, PET has moved from high-end research imaging tool used by the highly specialized to an essential component of clinical evaluation in the clinic, especially in cancer management. Previously being the realm of scientists, this book explains PET instrumentation, radiochemistry, PET data acquisition and image formation, integration of structural and functional images, radiation dosimetry and protection, and applications in dedicated areas such as drug development, oncology, and gene expression imaging. The technologist, the science, engineering or chemistry graduate seeking further detailed information about PET, or the medical advanced trainee wishing to gain insight into the basic science of PET will find this

book invaluable. This book is primarily repackaged content from the Basic Science section of the 'big' Valk book on PET. It contains new, completely revised and unchanged chapters covering the "basic sciences" section of the main book - total 18 chapters: 2 new (chapters 1, 16) 8 completely revised (chapters 4, 5, 8, 13, 14, 15, 17, 18) 3 minor corrections (chapters 2, 6, 11) 5 unchanged (chapters 3, 7, 9, 10, 12)

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Proceedings of ADNHEAP 2017

Fundamentals and Applications

Semiconductor Radiation Detectors

Detectors for Particle Radiation

Radiation Detection and Measurement

Physics and Engineering of Radiation Detection presents an overview of the physics of radiation detection and its applications. It covers the origins and properties of different types of ionizing radiation, their detection and measurement, and the procedures used to protect people and the environment from their potentially harmful effects. The second edition is completely revised and provides the latest developments in detector technology and analyses software. Also, more material related to measurements in particle physics and a complete solutions manual have been added. Discusses the experimental techniques and instrumentation used in different detection systems in a very practical way without sacrificing the physics content. Provides useful formulae and explains methodologies to solve problems related to radiation measurements. Contains many worked-out examples and end-of-chapter problems. Detailed discussions on different detection media, such as gases, liquids, liquefied gases, semiconductors, and scintillators. Chapters on statistics, data analysis techniques, software for data analysis, and data acquisition systems.

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 detecting scintillation light, and the excess noise factor. Revised discussions are also included on microcalorimeters and cryogenic spectrometers, radiation backgrounds, and the VME standard. Engineers will gain a strong understanding of the field with this updated book.

Scintillation Dosimetry delivers a comprehensive introduction to plastic scintillation dosimetry, covering everything from basic radiation dosimetry concepts to plastic scintillation fiber optics. Comprised of chapters authored by leading experts in the medical physics community, the book: Discusses a broad range of technical implementations, from point source dosimetry scaling to 3D-volumetric and 4D-scintillation dosimetry. Addresses a wide scope of clinical applications, from machine quality assurance to small-field and in vivo dosimetry. Examines related optical techniques, such as optically stimulated luminescence (OSL) or thermoluminescence. Thus, Scintillation Dosimetry provides an authoritative reference for detailed, state-of-the-art information on plastic scintillation dosimetry and its use in the field of radiation dosimetry.

Nuclear and radioactive agents are considerable concerns especially after the early 1990s. More attention has been focused on the radiation detection technologies. This book contains the selected presentations of NATO Advanced Training Course held 26-30 May 2008 in Mugla, Turkey. The contributions represent a wide range of documents related to contemporary

monitoring and measurement methods of nuclear / radioactive isotopes and agents for fundamental and applied works dealing with their use for different purposes. This book presents environmental data from many locations of different countries and also contains contributions in the detection/monitoring programs of some authors from CIS countries. The basic goal of this book is to deal with recent developments and applications of environmental monitoring and measurement techniques of environmental radionuclides and nuclear agents, as well as the auxiliary techniques. The many recent examples contributed by authors are useful in monitoring/ measurement studies of radioactive/nuclear agents in the present environment, and can help, not only in carrying out outdoor and laboratory experiments, but also in protection of possible sources of radionuclides and nuclear agents. Especially the contributions of experts and specialists involved in this book assured the highest level of knowledge in the field of techniques for the detection of radioactive and nuclear agents.

Wie Radiation Detection and Measurement  
A How-to Approach

Principles of Radiation Interaction in Matter and Detection

Physics and Engineering of Radiation Detection

Memorial Tributes

**This textbook provides an introduction to radiation, the principles of interaction between radiation and matter, and the exploitation of those principles in the design of modern radiation detectors. Both radiation and detectors are given equal attention and their interplay is carefully laid out with few assumptions made about the prior knowledge of the student. Part I is dedicated to radiation, broadly interpreted in terms of energy and type, starting with an overview of particles and forces, an extended review of common natural and man-made sources of radiation, and an introduction to particle accelerators. Particular attention is paid to real life examples, which place the types of radiation and their energy in context. Dosimetry is presented from a modern, user-led point of view, and relativistic kinematics is introduced to give the basic knowledge needed to handle the more formal aspects of radiation dynamics and interaction. The explanation of the physics principles of interaction between radiation and matter is given significant space to allow a deeper understanding of the various technologies based on those principles. Following an introduction to the ionisation mechanism, detectors are introduced in Part II, grouped according to the physical principle that underpins their functionality, with chapters covering gaseous detectors, semiconductor detectors, the scintillation process and light detectors. The final two chapters describe the phenomenology of showers and the design of calorimeters, and cover additional phenomena including Cherenkov and transition radiation and the detection of neutrinos. An appendix offers the reader a useful review of statistics and probability distributions. The mathematical formalism is kept to a minimum throughout and simple derivations are presented to guide the reasoning and facilitate understanding of the working principles. The book is unique in its wide scope and introductory level, and is suitable for undergraduate and graduate students in physics and engineering. The reader will acquire an awareness of how radiation and its exploitation are becoming**

increasingly relevant in the modern world, with over 140 experimental figures, detector schematics and photographs helping to relate the material to a broader research context.

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. \* 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.

A straightforward presentation of the broad concepts underlying radiological physics and radiation dosimetry for the graduate-level student. Covers photon and neutron attenuation, radiation and charged particle equilibrium, interactions of photons and charged particles with matter, radiotherapy dosimetry, as well as photographic, calorimetric, chemical, and thermoluminescence dosimetry. Includes many new derivations, such as Kramers X-ray spectrum, as well as topics that have not been thoroughly analyzed in other texts, such as broad-beam attenuation and geometrics, and the reciprocity theorem. Subjects are laid out in a logical sequence, making the topics easier for students to follow. Supplemented with numerous diagrams and tables.

Applied Gamma-Ray Spectrometry covers real life application of the gamma-ray and the devices used in their experimental studies. This book is organized into 9 chapters, and starts with discussions of the various decay processes, the possible interaction mechanisms of gamma radiation with matter, and the intrinsic and extrinsic variables, which affect the observed gamma-ray and X-ray spectra. The subsequent chapters deal with the properties and fabrication of scintillation detectors, semiconductor detectors, and proportional gas counters. These chapters present some of the most widely utilized applications of these detectors, with a particular emphasis to the activation analysis. These topics are followed by reviews of the description of

basic equipment, such as amplifiers, analyzers, special spectrometer arrangements, and detector shielding. Other chapters describe energy and time resolution and quantitative calibration. The quantitative and qualitative interpretation of the spectra is also explained, along with the calibration of the detectors. The last chapter considers the analytical applications of gamma-ray and X-ray spectrometry in tracer studies, activation analysis, fission product studies, and X-ray fluorescence analysis. This book will be of value to analytical chemists and analytical chemistry researchers.

Advanced Theoretical Principles

Student Solutions Manual to accompany Radiation Detection and Measurement, 4e

Applied Gamma-Ray Spectrometry

Radioactivity and Its Measurement

Radiation Detectors for Medical Applications

***The book presents high-quality papers presented at a national conference on 'Advanced Detectors for Nuclear, High Energy and Astroparticle Physics'. The conference was organized to commemorate 100 years of Bose Institute. The book is based on the theme of the conference and provides a clear picture of basics and advancement of detectors for nuclear physics, high-energy physics and astroparticle physics together. The topics covered in the book include detectors for accelerator-based high energy physics; detectors for non-accelerator particle physics; nuclear physics detectors; detection techniques in astroparticle physics and dark matter; and applications and simulations. The book will be a good reference for researchers and industrial personnel working in the area of nuclear and astroparticle physics.***

***This book describes the fundamentals of particle detectors as well as their applications. Detector development is an important part of nuclear, particle and astroparticle physics, and through its applications in radiation imaging, it paves the way for advancements in the biomedical and materials sciences. Knowledge in detector physics is one of the required skills of an experimental physicist in these fields. The breadth of knowledge required for detector development comprises many areas of physics and technology, starting from interactions of particles with matter, gas- and solid-state physics, over charge transport and signal development, to elements of microelectronics. The book's aim is to describe the fundamentals of detectors and their different variants and implementations as clearly as possible and as deeply as needed for a thorough understanding. While this comprehensive opus contains all the materials taught in experimental particle***

***physics lectures or modules addressing detector physics at the Master's level, it also goes well beyond these basic requirements. This is an essential text for students who want to deepen their knowledge in this field. It is also a highly useful guide for lecturers and scientists looking for a starting point for detector development work.***

***Introduction to the Physics of Radiation and Detection Devices  
Scintillation Dosimetry***

***Device Physics***

***Introduction to Health Physics, Fifth Edition***

***Advanced Materials for Radiation Detection***