

Radiation Detection Systems

Medical Imaging, Industrial Testing, and Security Applications

The advances in semiconductor detectors, scintillators, photodetectors such as silicon photomultipliers (SiPM), and readout electronics have experienced tremendous growth in recent years in terms of basic technologies and a variety of applications. The second edition of Radiation Detection Systems presents variety of radiation detection systems, giving readers a broad view of the state-of-the-art in the design of detectors, front-end electronics, and systems offering optimized choices of the detection tools for a particular application. The new edition has been divided into two volumes. This volume on Medical Imaging, Industrial Testing, and Security Applications presents specific applications of the detection systems in medical imaging, industrial testing, and security applications. These newly developed technologies play a vital role in the detection, diagnosis, and treatment of major human diseases. Featuring contributions from leading experts and pioneers in their respective fields, this book: - Describes new advances in development of detection systems based on CdZnTe (CZT) and CdTe detectors utilizing a direct conversion of radiation to electric signals - Reports a recent progress in technologies and performance of SiPM used for reading the light from scintillators - Explores exciting new application opportunities created by development of the cutting-edge detection technologies in X-ray spectroscopy, computed tomography (CT), bone dosimetry, and nuclear medicine (PET, SPECT) - Considers the future use of photon-counting detectors in clinical CT scanners providing K-edge imaging to reduce the amount of contrast agents and ultimately offering both an anatomical and a functional information - Describes, uses of radiation detection systems in security applications such as luggage scanning, dirty bomb detection, and border control With its combined coverage of new materials and innovative new system approaches, as well as a succinct overview of recent developments, this book is an invaluable tool for any engineer, professional, or student working in electronics or an associated field. Readers can refer to the other volume, Sensor Materials, Systems, Technology, and Characterization Measurements, which puts emphasis on sensor materials, detector structures, front electronics technology, and their designs and system optimization for different applications.

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