



# Principles Of Radiation Interaction In Matter And Detection

*Claude Leroy, Pier-Giorgio Rancoita*

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This book, like its first edition, addresses the fundamental principles of interaction between radiation and matter and the principle of particle detectors in a wide scope of fields, from low to high energy, including space physics and the medical environment. It provides abundant information about the processes of electromagnetic and hadronic energy deposition in matter, detecting systems, and performance and optimization of detectors.

In this second edition, new sections dedicated to the following topics are included: space and high-energy physics radiation environment, non-ionizing energy loss (NIEL), displacement damage in silicon devices and detectors, single event effects, detection of slow and fast neutrons with silicon detectors, solar cells, pixel detectors, and additional material for dark matter detectors.

This book will benefit graduate students and final-year undergraduates as a reference and supplement for courses in particle, astroparticle, and space physics and instrumentation. A part of it 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.

**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; Ionization Chambers; Principles of Particle Energy Determination; Superheated Droplet (Bubble) Detectors and CDM Search; Medical Physics Applications.

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