

1. Record Nr.	UNINA9910787255603321
Autore	Ahmed Syed Naeem
Titolo	Physics and engineering of radiation detection // Syed Naeem Ahmed
Pubbl/distr/stampa	Amsterdam, Netherlands : , : Elsevier, , 2015 ©2015
ISBN	0-12-801644-2
Edizione	[2nd ed.]
Descrizione fisica	1 online resource (784 p.)
Disciplina	539.77
Soggetti	Ionizing radiation - Measurement
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record
Nota di contenuto	<p>Front Cover; Physics and Engineering of Radiation Detection; Copyright Page; Dedication; Contents; Preface to the second edition; Preface to the first edition; 1 Properties and sources of radiation; 1.1 Types of radiation; 1.2 Waves or particles?; 1.3 Radioactivity and radioactive decay; 1.3.A Decay energy or Q-value; 1.3.B The decay equation; 1.3.C Composite radionuclides; 1.3.D Radioactive chain; 1.3.E Decay equilibrium; E.1 Secular equilibrium; E.2 Transient equilibrium; E.3 No equilibrium; 1.3.F Branching ratio; 1.3.G Units of radioactivity; 1.4 Activation; 1.5 Sources of radiation</p> <p>1.5.A Natural sourcesA.1 Cosmic radiation sources; A.2 Terrestrial radiation sources; A.3 Internal radiation sources; 1.5.B Man-made sources; 1.6 General properties and sources of particles and waves; 1.6.A Photons; A.1 Sources of photons; X-ray machine; Synchrotron radiation; Laser; Gas lasers; Liquid lasers; Solid-state lasers; New developments; Radioactive sources of photons; 1.6.B Electrons; B.1 Sources of electrons; Electron gun; Radioactive sources of electrons; 1.6.C Positrons; C.1 Sources of positrons; Particle accelerators; Radioactive sources of positrons; 1.6.D Protons</p> <p>D.1 Sources of protonsParticle accelerators; Laser ion accelerators; Radioactive sources of protons; 1.6.E Neutrons; E.1 Sources of neutrons; Spallation sources; Composite sources; Fusion sources; Nuclear reactors; Radioactive sources of neutrons; 1.6.F Alpha particles; F.1 Sources of -particles; Accelerator-based sources; Radioactive sources of -particles; 1.6.G Fission fragments; 1.6.H Muons,</p>

neutrinos, and other particles; H.1 Muons; H.2 Neutrinos; H.3 Some other particles; Problems; Bibliography; 2 Interaction of radiation with matter; 2.1 Some basic concepts and terminologies  
2.1.A Inverse square law 2.1.B Cross section; 2.1.C Mean free path; 2.1.D Radiation length; 2.1.E Conservation laws; E.1 Conservation of energy; E.2 Conservation of momentum; E.3 Conservation of electrical charge; 2.2 Types of particle interactions; 2.2.A Elastic scattering; 2.2.B Inelastic scattering; 2.2.C Annihilation; 2.2.D Bremsstrahlung; 2.2.E Cherenkov radiation; 2.3 Interaction of photons with matter; 2.3.A Interaction mechanisms; A.1 Photoelectric effect; A.2 Compton scattering; A.3 Thompson scattering; A.4 Rayleigh scattering; A.5 Pair production  
2.3.B Passage of photons through matter B.1 Measuring attenuation coefficient; B.2 Mixtures and compounds; B.3 Stacked materials; 2.4 Interaction of heavy charged particles with matter; 2.4.A Rutherford scattering; 2.4.B Passage of charged particles through matter; 2.4.C Bragg curve; 2.4.D Energy straggling; 2.4.E Range and range straggling; E.1 Range of  $\alpha$ -particles; E.2 Range of protons; 2.5 Interaction of electrons with matter; 2.5.A Interaction modes; A.1 Ionization; A.2 Møller scattering; A.3 Bhabha scattering; A.4 Electron-positron annihilation; A.5 Bremsstrahlung; A.6 Cherenkov radiation  
2.5.B Passage of electrons through matter

---

Sommario/riassunto

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 kinds 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 fully 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 experim

---