

1. Record Nr.	UNINA9910410001703321
Autore	Korzhik Mikhail
Titolo	Physics of Fast Processes in Scintillators / / by Mikhail Korzhik, Gintautas Tamulaitis, Andrey N. Vasil'ev
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2020
ISBN	3-030-21966-6
Edizione	[1st ed. 2020.]
Descrizione fisica	1 online resource (XII, 250 p. 130 illus., 110 illus. in color.)
Collana	Particle Acceleration and Detection, , 1611-1052
Disciplina	620.11295
Soggetti	Nuclear physics Heavy ions Spectrum analysis Optical materials Electronics - Materials Solid state physics Crystallography Physical measurements Measurement Nuclear Physics, Heavy Ions, Hadrons Spectroscopy/Spectrometry Optical and Electronic Materials Solid State Physics Crystallography and Scattering Methods Measurement Science and Instrumentation
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Chapter 1. Energy release of ionizing radiation in inorganic scintillator -- Chapter 2. Timing measurements with light pulses -- Chapter 3. Development of excited region of the track. Rise and decay kinetics in scintillation -- Chapter 4. Shallow traps in scintillation materials -- Chapter 5. Free carrier dynamics in scintillation materials -- Chapter 6. Transient phenomena in scintillators -- Chapter 7. Wide-band-gap semiconductor scintillators -- Chapter 8. Coincidence time resolution

with scintillators.

Sommario/riassunto

This book presents the current advances in understanding of the fast excitation transfer processes in inorganic scintillation materials, the discovery of new materials exhibiting excellent time resolution, and the results on the evaluation of timing limits for scintillation detectors. The book considers in-depth basic principles of primary processes in energy relaxation, which play a key role in creating scintillating centers to meet a growing demand for knowledge to develop new materials combining high energy and time resolutions. The rate of relaxation varies. However, the goal is to make it extremely fast, occurring within the ps domain or even shorter. The book focuses on fast processes in scintillation materials. This approach enables in-depth understanding of fundamental processes in scintillation and supports the efforts to push the time resolution of scintillation detectors towards 10 ps target. Sophisticated theoretical and advanced experimental research conducted in the last decade is reviewed. Engineering and control of the energy transfer processes in the scintillation materials are addressed. The new era in development of instrumentation for detection of ionizing radiation in high- energy physics experiments, medical imaging and industrial applications is introduced. This book reviews modern trends in the description of the scintillation build up processes in inorganic materials, transient phenomena, and engineering of the scintillation properties. It also provides reliable background of scientific and educational information to stimulate new ideas for readers to implement in their research and engineering. The book is aimed at providing a coherent updated background of scientific and instructive information to stimulate new ideas for readers in their research and engineering.