

1. Record Nr.	UNINA9910876693603321
Autore	Polushkin Vladimir
Titolo	Nuclear electronics : superconducting detectors and processing techniques // Vladimir Polushkin
Pubbl/distr/stampa	Chichester, West Sussex, England ; ; Hoboken, NJ, : J. Wiley & Sons, c2004
ISBN	0-470-85762-5 1-280-27074-8 0-470-85769-2 9786610270743 0-470-30007-8 1-280-27076-4 9786610270767 0-470-33651-X 0-470-85768-4
Descrizione fisica	1 online resource (404 p.)
Disciplina	539.7/7
Soggetti	Superconductors Nuclear counters Molecular electronics Nanotechnology
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Nuclear Electronics; Contents; Preface; 1 Detection Methods with Cryogenic Particle and Radiation Sensors; 1.1 Quasiparticle detectors: Interaction of nuclear radiation with superconductors; 1.2 Superconducting tunnel junction detectors; 1.3 Microcalorimeters based on transition edge sensor; 1.4 Other cryogenic detectors; 2 Front-end Read-out Electronic Circuits; 2.1 FET transconductance preamplifiers; 2.2 Dynamics and noise of JFET amplifiers; 2.3 SQUID current amplifier; 2.4 SQUID read-out electronics; 2.5 SQUID amplifier in the small-signal limit (noise) 2.6 SQUID current amplifier in the large-signal limit (dynamics)2.7

SQUID current amplifier at ultralow temperature; 2.8 SQUID voltage amplifier; 3 Energy Resolution (FWHM) of Superconducting Detectors; 3.1 Signal-to-noise ratio, equivalent noise charge and noise linewidth of spectrometers: General formulations; 3.2 Signal-to-noise ratio, ENC, energy resolution at FWHM of Tunnel Junctions; 3.3 Noise equivalent power, energy resolution of superconductor microcalorimeters; 3.4 Dynamics and noise of time-variant detector systems
3.5 Signal-to-noise ratio of detector arrays with multiplexed read-out
4 Pulse Processing Electronics; 4.1 Pulse processing techniques; 4.2 Analogue-to-digital conversion; 4.3 Digital rise (fall) time discrimination; 4.4 Superconductor digital spectrometer; 4.5 Selected topics on the hardware design; 5 Applications of Systems Based on Superconducting Detectors; 5.1 Electron-Probe Nanoanalysis with Superconductor detectors; 5.2 Biopolymer mass spectrometer; 6 Selected Topics of Analysis and Synthesis of Detector Systems; 6.1 Analogue electronic circuitry analysis and design principles
6.2 Discrete-time systems and Systems with periodically changing parameters
6.3 Inductance calculations of the superconducting structures; Index

Sommario/riassunto

With the commercialisation of superconducting particles and radiation detectors set to occur in the very near future, nuclear analytical instrumentation is taking a big step forward. These new detectors have a high degree of accuracy, stability and speed and are suitable for high-density multiplex integration in nuclear research laboratories and astrophysics. Furthermore, superconducting detectors can also be successfully applied to food safety, airport security systems, medical examinations, doping tests & forensic investigations. This book is the first to address a new generation of analy
