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Titolo	Neutron scattering with a triple-axis spectrometer : basic techniques / / Gen Shirane, Stephen M. Shapiro, and John M. Tranquada [[electronic resource]]
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Descrizione fisica	1 online resource (x, 273 pages) : digital, PDF file(s)
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Soggetti	Neutrons - Scattering
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Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Properties of thermal neutrons -- Neutron sources -- Reciprocal space and scattering diagram -- Elastic scattering -- Inelastic scattering -- Neutron scattering instruments -- Three-axis instrument -- Time-of- flight (TOF) instrument -- Backscattering and neutron spin echo (NSE) -- Scattering formulas -- Fermi's Golden Rule and the Born approximation -- Coherent vs. incoherent scattering -- Coherent nuclear scattering -- Elastic scattering (Bragg peaks) -- Inelastic scattering -- Incoherent nuclear scattering -- Coherent magnetic scattering -- Paramagnetic scattering -- Magnetic form factors and orbital moments -- Determination of magnetic structures with unpolarized neutrons -- Coherent inelastic magnetic scattering -- Magnons -- Diffuse magnetic scattering -- Elements of a three-axis instrument -- Shielding -- Monochromators -- Focusing monochromators and analyzers -- Resolution effects -- Double

monochromators -- Collimators -- Filters -- Fast neutron filters -- Resonance filters -- Bragg-scattering filters -- Absorbers -- Spectrometer alignment -- Initial optical alignment -- Experimental alignment -- Goniometers -- Two-circle goniometer -- Four-circle goniometer -- Translation of the sample -- Super holder -- New developments -- Inelastic scattering and the resolution function -- Notation and definitions -- Definition of the resolution function -- Constant-Q scans -- Focusing -- Selection of collimators and energies -- Bragg tails -- Constant-E scans -- Vertical resolution -- Harmonics in the incident beam.

Sommario/riassunto

Neutron scattering is an extremely powerful tool in the study of elemental excitations in condensed matter. This book provides a practical guide to basic techniques using a triple-axis spectrometer. Introductory chapters summarize useful scattering formulas and describe the components of a spectrometer, followed by a comprehensive discussion of the resolution function and focusing effects. Later sections include simple examples of phonon and magnon measurements, and an analysis of spurious effects in both inelastic and elastic measurements, and how to avoid them. Finally, polarization analysis techniques and their applications are covered. This guide will allow graduate students and experienced researchers new to neutron scattering to make the most efficient use of their experimental time.
