

Basic Concepts of X-Ray Diffraction

Authored by a university professor deeply involved in X-ray diffraction-related research, this textbook is based on his lectures given to graduate students for more than 20 years. It adopts a well-balanced approach, describing basic concepts and experimental techniques, which make X-ray diffraction an unsurpassed method for studying the structure of materials.

Both dynamical and kinematic X-ray diffraction is considered from a unified viewpoint, in which the dynamical diffraction in single-scattering approximation serves as a bridge between these two parts. The text emphasizes the fundamental laws that govern the interaction of X-rays with matter, but also covers in detail classical and modern applications, e.g., line broadening, texture and strain/stress analyses, X-ray mapping in reciprocal space, high-resolution X-ray diffraction in the spatial and wave vector domains, X-ray focusing, inelastic and time-resolved X-ray scattering. This unique scope, in combination with otherwise hard-to-find information on analytic expressions for simulating X-ray diffraction profiles in thin-film heterostructures, X-ray interaction with phonons, coherent scattering of Mössbauer radiation, and energy-variable X-ray diffraction, makes the book indispensable for any serious user of X-ray diffraction techniques.

Compact and self-contained, this textbook is suitable for students taking X-ray diffraction courses towards specialization in materials science, physics, chemistry, or biology. Numerous clear-cut illustrations, an easy-to-read style of writing, as well as rather short, easily digestible chapters all facilitate comprehension.

Dieses Lehrbuch eines erfahrenen Universitätsdozenten gibt Antworten auf die Fragen, die Studierende wirklich stellen. Klare Illustrationen, eine klare Sprache und klar gegliederte, kurze Kapitel lassen keine Verständnisprobleme aufkommen.



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