



Electron Dynamics by Inelastic X-Ray Scattering (Oxford Series on Synchrotron Radiation)

By Winfried Schuelke

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Knowledge of the dynamics of many-electron systems is of fundamental importance to all disciplines of condensed matter physics. A very effective access to electron dynamics is offered by inelastic X-ray scattering (IXS) spectroscopy. The double differential scattering cross section for IXS is directly related to the time-dependent two-particle density correlation function, and, for large momentum and energy transfer (Compton limit) to the electron momentum distribution. Moreover, resonant inelastic X-ray scattering (RIXS) enables the study of electron dynamics via electronic excitations in a very selective manner (e.g. selectively spin, crystal momentum, or symmetry), so that other methods are efficaciously complemented. The progress of IXS spectroscopy is intimately related to the growing range of applications of synchrotron radiation. The aim of the book is to provide the growing community of researchers with accounts of experimental methods, instrumentation, and data analysis of IXS, with representative examples of successful applications, and with the theoretical framework for interpretations of the measurements.

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