

# Elements Of Modern X Ray Physics

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with this fully updated second edition readers will gain a detailed understanding of the physics and applications of modern x ray and euv radiation sources taking into account the most recent improvements in capabilities coverage is expanded to include new chapters on free electron lasers fels laser high harmonic generation hhg x ray and euv optics and nanoscale imaging a completely revised chapter on spatial and temporal coherence and extensive discussion of the generation and applications of femtosecond and attosecond techniques readers will be guided step by step through the mathematics of each topic with over 300 figures 50 reference tables and 600 equations enabling easy understanding of key concepts homework problems a solutions manual for instructors and links to youtube lectures accompany the book online this is the go to guide for graduate students researchers and industry practitioners interested in x ray and euv interaction with matter

the purpose of this book is to give a description of the state of the art in theoretical and experimental work achieved in radiation source development it summarizes clearly and comprehensibly the basic physical aspects needed to understand the phenomena and also provides the interested reader with sufficient literature to be able to follow the development in more detail in addition it contains a unified view of most theoretical effects and their common properties the most recent developments as well as references to further work can be found in this volume in many cases review articles and textbooks published in specialized areas are also incorporated into the text

up to date account of the principles and practice of inelastic and spectroscopic methods available at neutron and synchrotron sources multi technique approach set around a central theme rather than a monograph on one technique emphasis on the complementarity of neutron spectroscopy and x ray spectroscopy which are usually treated in separate books

this 2 volume set includes extensive discussions of scattering techniques light neutron and x ray and related fluctuation and grating techniques that are at the forefront of this field most of the scattering techniques are fourier space techniques recent advances have seen the development of powerful direct imaging methods such as atomic force microscopy and scanning probe microscopy in addition techniques that can be used to manipulate soft matter on the nanometer scale are also in rapid development these include the scanning probe microscopy technique mentioned above as well as optical and magnetic tweezers

international tables for crystallography is the definitive resource and reference work for crystallography and structural science each of the volumes in the series contains articles and tables of data relevant to crystallographic research and to applications of crystallographic methods in all sciences concerned with the structure and properties of materials emphasis is given to symmetry diffraction methods and techniques of crystal structure determination and the physical and chemical properties of crystals the data are accompanied by discussions of theory practical explanations and examples all of which are useful for teaching volume c provides the mathematical physical and chemical information needed for experimental studies in structural crystallography this volume covers all aspects of experimental techniques using all three principal radiation types x ray electron and neutron from the selection and mounting of crystals and production of radiation through data collection and analysis to interpretation of results each chapter is supported by a substantial collection of references and the volume ends with a section on precautions against radiation injury eleven chapters have been revised corrected or updated for the third edition of volume c more information on the series can be found at [it iucr org](http://it.iucr.org)

eagerly awaited this second edition of a best selling text comprehensively describes from a modern perspective the basics of x ray physics as well as the completely new opportunities offered by synchrotron radiation written by internationally acclaimed authors the style of the book is to develop the basic physical principles without

obscuring them with excessive mathematics the second edition differs substantially from the first edition with over 30 new material including a new chapter on non crystalline diffraction designed to appeal to the large community who study the structure of liquids glasses and most importantly polymers and bio molecules a new chapter on x ray imaging developed in close cooperation with many of the leading experts in the field two new chapters covering non crystalline diffraction and imaging many important changes to various sections in the book have been made with a view to improving the exposition four colour representation throughout the text to clarify key concepts extensive problems after each chapter there is also supplementary book material for this title available online booksupport wiley com praise for the previous edition the publication of jens als nielsen and des mcmorrow s elements of modern x ray physics is a defining moment in the field of synchrotron radiation a welcome addition to the bookshelves of synchrotron radiation professionals and students alike the text is now my personal choice for teaching x ray physics physics today 2002

this edition has been revised to incorporate the many advances in techniques and methods for studying materials that have developed since the mid 1970s topics new to this edition include x ray power diffractometry electron and neutron diffraction transmission electron microscopy electron microprobe analysis x ray fluorescence analysis atomic absorption analysis and inductively coupled plasma spectroscopy

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