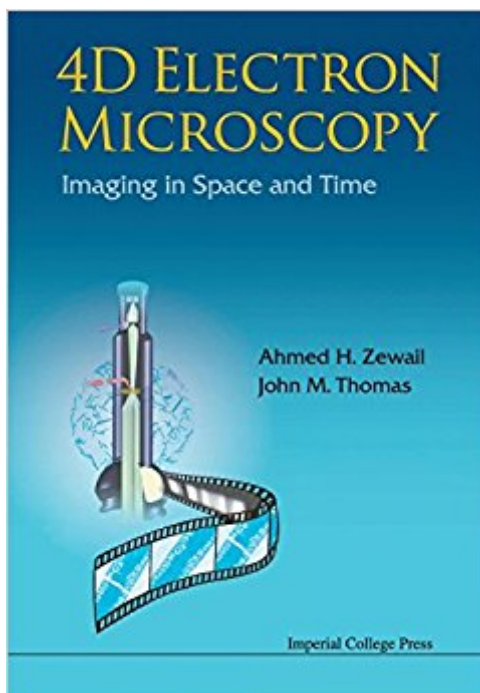


The book was found

4D Electron Microscopy: Imaging In Space And Time



Synopsis

The modern electron microscope, as a result of recent revolutionary developments and many evolutionary ones, now yields a wealth of quantitative knowledge pertaining to structure, dynamics, and function barely matched by any other single scientific instrument. It is also poised to contribute much new spatially-resolved and time-resolved insights of central importance in the exploration of most aspects of condensed matter, ranging from the physical to the biological sciences. Whereas in all conventional EM methods, imaging, diffraction, and chemical analyses have been conducted in a static - time-integrated - manner, now it has become possible to unite the time domain with the spatial one, thereby creating four-dimensional (4D) electron microscopy. This advance is based on the fundamental concept of timed, coherent single-electron packets, or electron pulses, which are liberated with femtosecond durations. Structural phase transitions, mechanical deformations, and the embryonic stages of melting and crystallization are examples of phenomena that can now be imaged in unprecedented structural detail with high spatial resolution, and ten orders of magnitude as fast as hitherto. No monograph in existence attempts to cover the revolutionary dimensions that EM in its various modes of operation nowadays makes possible. The authors of this book chart these developments, and also compare the merits of coherent electron waves with those of synchrotron radiation. They judge it prudent to recall some important basic procedural and theoretical aspects of imaging and diffraction so that the reader may better comprehend the significance of the new vistas and applications now afoot. This book is not a vade mecum - numerous other texts are available for the practitioner for that purpose. It is instead an in-depth expose of the paradigm concepts and the developed techniques that can now be executed to gain new knowledge in the entire domain of biological and physical science, and in the four dimensions of space and time.

Book Information

Paperback: 360 pages

Publisher: Imperial College Press; 1 edition (February 24, 2009)

Language: English

ISBN-10: 1848164009

ISBN-13: 978-1848164000

Product Dimensions: 6.7 x 0.8 x 9.6 inches

Shipping Weight: 1.3 pounds (View shipping rates and policies)

Average Customer Review: 4.0 out of 5 stars 2 customer reviews

Best Sellers Rank: #1,979,721 in Books (See Top 100 in Books) #56 in Books > Science & Math > Experiments, Instruments & Measurement > Electron Microscopes & Microscopy #552 in Books > Science & Math > Chemistry > Physical & Theoretical > Physical Chemistry #671 in Books > Science & Math > Physics > Solid-State Physics

Customer Reviews

This book, by leaders in femtosecond spectroscopy and solid-state chemistry, gives an exciting overview of the new field of time-resolved transmission electron microscopy ... Despite the enormous challenges in this new field, this stimulating book from these authorities should be read by all graduate students about to choose a field of research. A book to make the experts think.

--Professor John Spence, Arizona State University, USA This is a unique and ground-breaking book.

For the first time it includes the important time dimension in electron microscopy, revealing time-resolved electron micrographs and diffraction patterns on an almost unbelievably fast time scale. The book is written with great clarity and is lavishly illustrated with some stunning

micrographs. --Professor Colin Humphreys, Cambridge University, UK This is one of the most enlightening science textbooks I have ever read. The basic concepts behind 3D and 4D electron microscopy are presented in a concise and clear language, accompanied by figures of remarkable didactic content. This excellent textbook blends the qualities of an introductory with an in-depth account, and is bound to become a reference in the field. --Professor Majed Chergui, EPFL,

Lausanne, Switzerland "This is a fascinating book, very timely published when electron microscopy (EM) is at a turning point with dramatically improved capacities ... The description of scattering of electrons and the function of the electron microscope is sufficiently complete to make this book well suited as a university textbook." --Crystallography Reviews

"Combining the authors' expertise in femtochemistry, catalysis, and electron microscopy has resulted in a book that conveys the excitement and potential for this new paradigm in electron imaging ... there is no doubt that the development of the 4D microscope has introduced a new paradigm for characterization by TEM.

Taken together with introductory texts covering TEM, it provides the understanding necessary for the reader to appreciate the principles of this brand new field." --Journal of the American Chemistry Society "Researchers using electron microscopy will find this book fascinating and very helpful for learning about the latest advances in electron microscopy imaging technology." --IEEE Electrical

Insulation Magazine "The renowned authors of this new appearance on time-resolved 3D electron microscopy have created a fantastic book that will appeal to a broad range of scientists. Its topic and breadth will surely be of interest to those interested in physics, material science, and solid-state

chemistry –| The expertise of the authors and the clear, well-documented nature of the book combine to lend it great potential to set the standard in this field."--Angewandte Chemie "It is for the 'ultrafast' chapters that the book will be read for these contain new and very unfamiliar material. The book is handsomely produced with all the illustrations on a Cambridge blue background."

--Ultramicroscopy This is one of the most enlightening science textbooks I have ever read. The basic concepts behind 3D and 4D electron microscopy are presented in a concise and clear language, accompanied by figures of remarkable didactic content. This excellent textbook blends the qualities of an introductory with an in-depth account, and is bound to become a reference in the field.

--Professor Majed Chergui, EPFL, Lausanne, Switzerland

The modern electron microscope, as a result of recent revolutionary developments and many evolutionary ones, now yields a wealth of quantitative knowledge pertaining to structure, dynamics, and function barely matched by any other single scientific instrument. It is also poised to contribute much new spatially-resolved and time-resolved insights of central importance in the exploration of most aspects of condensed matter, ranging from the physical to the biological sciences. Whereas in all conventional EM methods, imaging, diffraction, and chemical analyses have been conducted in a static time-integrated manner, now it has become possible to unite the time domain with the spatial one, thereby creating four-dimensional (4D) electron microscopy. This advance is based on the fundamental concept of timed, coherent single-electron packets, or electron pulses, which are liberated with femtosecond durations. Structural phase transitions, mechanical deformations, and the embryonic stages of melting and crystallization are examples of phenomena that can now be imaged in unprecedented structural detail with high spatial resolution, and ten orders of magnitude as fast as hitherto. No monograph in existence attempts to cover the revolutionary dimensions that EM in its various modes of operation nowadays makes possible. The authors of this book chart these developments, and also compare the merits of coherent electron waves with those of synchrotron radiation. They judge it prudent to recall some important basic procedural and theoretical aspects of imaging and diffraction so that the reader may better comprehend the significance of the new vistas and applications now afoot. This book is not a vade mecum; numerous other texts are available for the practitioner for that purpose. It is instead an in-depth expose of the paradigm concepts and the developed techniques that can now be executed to gain new knowledge in the entire domain of biological and physical science, and in the four dimensions of space and time.

One of the best book i have ever read!

I discovered this book because it was referenced in a summary of the topic in Scientific American. I think the subject is important and fascinating. But after reading a few pages of the book, I decided regretfully that, as usual, before you can understand the latest scientific advances in any detail you have to master whole fields of science -- in this instance, optics and quantum physics. It's not the author's fault. He writes well, but there's no way to simplify the underlying prerequisites. (The annotated pictures in the Scientific American article did help to gain some notion of what's going on.)

[Download to continue reading...](#)

Electron microscopy for beginners: Easy course for understanding and doing electron microscopy (Electron microscopy in Science) Scanning Electron Microscopy, X-Ray Microanalysis, and Analytical Electron Microscopy: A Laboratory Workbook 4D Electron Microscopy: Imaging in Space and Time Electron Microprobe Analysis and Scanning Electron Microscopy in Geology Liquid Cell Electron Microscopy (Advances in Microscopy and Microanalysis) Electron Diffraction in the Transmission Electron Microscope (Microscopy Handbooks) Monte Carlo Modeling for Electron Microscopy and Microanalysis (Oxford Series in Optical and Imaging Sciences) Scanning Transmission Electron Microscopy: Imaging and Analysis Scanning Transmission Electron Microscopy of Nanomaterials : Basics of Imaging and Analysis Scanning Transmission Electron Microscopy of Nanomaterials: Basics of Imaging Analysis Portal Hypertension: Diagnostic Imaging and Imaging-Guided Therapy (Medical Radiology / Diagnostic Imaging) High Energy Electron Diffraction and Microscopy (Monographs on the Physics and Chemistry of Materials) Scanning Electron Microscopy and X-Ray Microanalysis: A Text for Biologists, Materials Scientists, and Geologists Scanning Electron Microscopy and X-ray Microanalysis: Third Edition Scanning Electron Microscopy and X-Ray Microanalysis Diagnostic Electron Microscopy: A Practical Guide to Interpretation and Technique Scanning and Transmission Electron Microscopy: An Introduction Fungal morphology and ecology: Mostly scanning electron microscopy Handbook of Sample Preparation for Scanning Electron Microscopy and X-Ray Microanalysis Electron Microscopy and Analysis, Third Edition

[Contact Us](#)

[DMCA](#)

[Privacy](#)

[FAQ & Help](#)