

Advances in
IMAGING and ELECTRON PHYSICS

Mikhail Yavor

Optics of Charged Particle Analyzers

Volume 157



[MOBI] Advances In Imaging And Electron Physics: Optics Of Charged Particle Analyzers (Volume 157) (Advances In Imaging And Electron Physics, Volume 157)

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Advances in Imaging and Electron Physics-

2020-03-18 Advances in Imaging and Electron Physics, Volume 213, merges two long-running serials, Advances in Electronics and Electron Physics and Advances in Optical and Electron Microscopy. The series features extended articles on the physics of electron devices (especially semiconductor devices), particle optics at high and low energies, microlithography, image science, digital image processing, electromagnetic wave propagation, electron microscopy and the computing methods used in all these domains. Contains contributions from leading authorities on the subject matter Informs and updates on the latest developments in the field of imaging and electron physics Provides practitioners interested in microscopy, optics, image processing, mathematical

morphology, electromagnetic fields, electrons and ion emission with a valuable resource Features extended articles on the physics of electron devices (especially semiconductor devices), particle optics at high and low energies, microlithography, image science and digital image processing

Advances in Imaging and Electron Physics-

Beate Meffert 2005-12-07 Advances in Imaging and Electron Physics merges two long-running serials-Advances in Electronics and Electron Physics and Advances in Optical and Electron Microscopy. This series features extended articles on the physics of electron devices (especially semiconductor devices), particle optics at high and low energies, microlithography, image science and digital image processing, electromagnetic wave propagation, electron microscopy, and the

computing methods used in all these domains.

Advances in Imaging and Electron Physics-

Mikhail Yavor 2009 Advances in Imaging and Electron Physics merges two long-running serials--Advances in Electronics and Electron Physics and Advances in Optical and Electron Microscopy. This series features extended articles on the physics of electron devices (especially semiconductor devices), particle optics at high and low energies, microlithography, image science and digital image processing, electromagnetic wave propagation, electron microscopy, and the computing methods used in all these domains. * Contributions from leading international scholars and industry experts * Discusses hot topic areas and presents current and future research trends * Invaluable reference and guide for physicists, engineers and mathematicians

Advances in Imaging and Electron Physics-

1999-03-04 Advances in Imaging & Electron Physics merges two long-running serials--Advances in Electronics & Electron Physics and Advances in Optical & Electron Microscopy. The series features extended articles on the physics of electron devices (especially semiconductor devices), particle optics at high and low energies, microlithography, image science and digital image processing, electromagnetic wave propagation, electron microscopy, and the computing methods used in all these domains.

Advances in Imaging and Electron Physics-

Peter W. Hawkes 2011-07-29 Advances in Imaging and Electron Physics merges two long-running serials--Advances in Electronics and Electron Physics and Advances in Optical and Electron Microscopy. This series features extended articles on the physics of electron

devices (especially semiconductor devices), particle optics at high and low energies, microlithography, image science and digital image processing, electromagnetic wave propagation, electron microscopy, and the computing methods used in all these domains.

Advances in Imaging and Electron Physics-Dmitry

Greenfield 2011-08-29

Advances in Imaging and Electron Physics merges two long-running serials Advances in Electronics and Electron Physics and Advances in Optical and Electron Microscopy. This series features extended articles on the physics of electron devices (especially semiconductor devices), particle optics at high and low energies, microlithography, image science and digital image processing, electromagnetic wave propagation, electron microscopy, and the computing methods used in all these domains. This monograph summarizes the authors' knowledge and

experience acquired over many years in their work on computational charged particle optics. Its main message is that even in this era of powerful computers with a multitude of general-purpose and problem-oriented programs, asymptotic analysis based on perturbation theory remains one of the most effective tools to penetrate deeply into the essence of the problem in question.

Particles and Waves in Electron Optics and Microscopy- 2016-05-27

Advances in Imaging and Electron Physics merges two long-running serials, Advances in Electronics and Electron Physics and Advances in Optical and Electron Microscopy. The series features extended articles on the physics of electron devices (especially semiconductor devices), particle optics at high and low energies, microlithography, image science, digital image processing, electromagnetic wave propagation, electron microscopy, and the computing methods used in

all these domains. Contains contributions from leading authorities on the subject matter Informs and updates all the latest developments in the field of imaging and electron physics Provides practitioners interested in microscopy, optics, image processing, mathematical morphology, electromagnetic fields, electron, and ion emission with a valuable resource Features extended articles on the physics of electron devices (especially semiconductor devices), particle optics at high and low energies, microlithography, image science, and digital image processing

The Beginnings of Electron Microscopy-Peter W. Hawkes
2013-11-06 The Beginnings of Electron Microscopy presents the technical development of electron microscope. This book examines the mechanical as well as the technical problems arising from the physical properties of the electron. Organized into 19 chapters, this book begins with an overview of the history of scanning electron microscopy and

electron beam microanalysis. This text then explains the applications and capabilities of electron microscopes during the war. Other chapters consider the classical techniques of light microscopy. This book presents as well the schematic outline of the preparation techniques for investigation of nerve cells by electron microscopy. The final chapter deals with the historical account of the beginnings of electron microscopy in Russia. This book is a valuable resource for scientists, technologists, physicists, electrical engineers, designers, and technicians. Graduate students as well as researcher workers who are interested in the history of electron microscopy will also find this book extremely useful.

Advances in Imaging and Electron Physics- 2000

Advances in Imaging and Electron Physics-
2011-07-20 Advances in Imaging and Electron Physics

merges two long-running serials--Advances in Electronics and Electron Physics and Advances in Optical and Electron Microscopy. This series features extended articles on the physics of electron devices (especially semiconductor devices), particle optics at high and low energies, microlithography, image science and digital image processing, electromagnetic wave propagation, electron microscopy, and the computing methods used in all these domains. Contributions from leading international scholars and industry experts Discusses hot topic areas and presents current and future research trends Invaluable reference and guide for physicists, engineers and mathematicians

Scanning Electron Microscopy for the Life Sciences-Heide Schatten 2012-12-06 A guide to modern scanning electron microscopy instrumentation, methodology and techniques, highlighting

novel applications to cell and molecular biology.

The Growth of Electron Microscopy- 1996-08-05 As a complement to The Beginnings of Electron Microscopy, Advances in Imaging and Electron Physics is pleased to present Volume 96, The Growth of Electron Microscopy. This comprehensive collection of articles surveys the accomplishments of various national groups that comprise the International Federation of Societies of Electron Microscopy (IFSEM).

Liquid Cell Electron Microscopy-

4D Electron Microscopy-Ahmed H. Zewail 2010 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.

Modeling Nanoscale Imaging in Electron Microscopy-Thomas Vogt

2012-03-02 This book presents advances in nanoscale imaging capabilities of scanning transmission electron microscopes, along with superresolution techniques,

special denoising methods, application of mathematical/statistical learning theory, and compressed sensing.

A Beginners' Guide to Scanning Electron

Microscopy-Anwar Ul-Hamid

2018-10-26 This book was developed with the goal of providing an easily understood text for those users of the scanning electron microscope (SEM) who have little or no background in the area. The SEM is routinely used to study the surface structure and chemistry of a wide range of biological and synthetic materials at the micrometer to nanometer scale. Ease-of-use, typically facile sample preparation, and straightforward image interpretation, combined with high resolution, high depth of field, and the ability to undertake microchemical and crystallographic analysis, has made scanning electron microscopy one of the most powerful and versatile techniques for characterization today. Indeed, the SEM is a vital tool

for the characterization of nanostructured materials and the development of nanotechnology. However, its wide use by professionals with diverse technical backgrounds—including life science, materials science, engineering, forensics, mineralogy, etc., and in various sectors of government, industry, and academia—emphasizes the need for an introductory text providing the basics of effective SEM imaging. A Beginners' Guide to Scanning Electron Microscopy explains instrumentation, operation, image interpretation and sample preparation in a wide ranging yet succinct and practical text, treating the essential theory of specimen-beam interaction and image formation in a manner that can be effortlessly comprehended by the novice SEM user. This book provides a concise and accessible introduction to the essentials of SEM includes a large number of illustrations specifically chosen to aid readers' understanding of key concepts highlights recent advances in instrumentation, imaging and sample

preparation techniques offers examples drawn from a variety of applications that appeal to professionals from diverse backgrounds.

Modern Map Methods in Particle Beam Physics-

1999-09-22 Advances in Imaging & Electron Physics merges two long-running serials--Advances in Electronics & Electron Physics and Advances in Optical & Electron Microscopy. The series features extended articles on the physics of electron devices (especially semiconductor devices), particle optics at high and low energies, microlithography, image science and digital image processing, electromagnetic wave propagation, electron microscopy, and the computing methods used in all these domains.

Advances in Imaging and Electron Physics-

2012-11-01 Advances in Imaging and Electron Physics merges two long-running

serials--Advances in Electronics and Electron Physics and Advances in Optical and Electron Microscopy. This series features extended articles on the physics of electron devices (especially semiconductor devices), particle optics at high and low energies, microlithography, image science and digital image processing, electromagnetic wave propagation, electron microscopy, and the computing methods used in all these domains. Contributions from leading authorities Informs and updates on all the latest developments in the field

Cellular Electron

Microscopy-J. Richard McIntosh 2011-09-02 Recent advances in the imaging technique electron microscopy (EM) have improved the method, making it more reliable and rewarding, particularly in its description of three-dimensional detail. Cellular Electron Microscopy will help biologists from many disciplines understand

modern EM and the value it might bring to their own work. The book's five sections deal with all major issues in EM of cells: specimen preparation, imaging in 3-D, imaging and understanding frozen-hydrated samples, labeling macromolecules, and analyzing EM data. Each chapter was written by scientists who are among the best in their field, and some chapters provide multiple points of view on the issues they discuss. Each section of the book is preceded by an introduction, which should help newcomers understand the subject. The book shows why many biologists believe that modern EM will forge the link between light microscopy of live cells and atomic resolution studies of isolated macromolecules, helping us toward the goal of an atomic resolution understanding of living systems. Updates the numerous technological innovations that have improved the capabilities of electron microscopy Provides timely coverage of the subject given the significant rise in the number of biologists using light microscopy to answer their questions and the

natural limitations of this kind of imaging Chapters include a balance of "how to", "so what" and "where next", providing the reader with both practical information, which is necessary to use these methods, and a sense of where the field is going

Advances in Electronics and Electron Physics-L.
Marton 1956

Electron-Microscopy-Based Tools for Imaging Cellular Circuits and Organisms-
Yoshiyuki Kubota 2019-12-30

Visualizing Chemistry-
National Research Council
2006-06-01 Scientists and engineers have long relied on the power of imaging techniques to help see objects invisible to the naked eye, and thus, to advance scientific knowledge. These experts are constantly pushing the limits of technology in pursuit of chemical imaging—the ability to visualize molecular structures and chemical composition in time and space

as actual events unfold—from the smallest dimension of a biological system to the widest expanse of a distant galaxy. Chemical imaging has a variety of applications for almost every facet of our daily lives, ranging from medical diagnosis and treatment to the study and design of material properties in new products. In addition to highlighting advances in chemical imaging that could have the greatest impact on critical problems in science and technology, Visualizing Chemistry reviews the current state of chemical imaging technology, identifies promising future developments and their applications, and suggests a research and educational agenda to enable breakthrough improvements.

Electron Energy-Loss Spectroscopy in the Electron Microscope-R.F.
Egerton 2013-03-09 to the Second Edition Since the first (1986) edition of this book, the numbers of installations, researchers, and research publications devoted to

electron energy-loss spectroscopy (EELS) in the electron microscope have continued to expand. There has been a trend towards intermediate accelerating voltages and field-emission sources, both favorable to energy-loss spectroscopy, and several types of energy-filtering microscope are now available commercially. Data-acquisition hardware and software, based on personal computers, have become more convenient and user-friendly. Among university researchers, much thought has been given to the interpretation and utilization of near-edge fine structure. Most importantly, there have been many practical applications of EELS. This may reflect an increased awareness of the potentialities of the technique, but in many cases it is the result of skill and persistence on the part of the experimenters, often graduate students. To take account of these developments, the book has been extensively revised (over a period of two years) and more than a third of it rewritten. I have made various minor changes to the

figures and added about 80 new ones. Except for a few small changes, the notation is the same as in the first edition, with all equations in SI units.

Scanning Electron Microscopy and X-Ray Microanalysis

Joseph Goldstein 2012-12-06 This text provides students as well as practitioners with a comprehensive introduction to the field of scanning electron microscopy (SEM) and X-ray microanalysis. The authors emphasize the practical aspects of the techniques described. Topics discussed include user-controlled functions of scanning electron microscopes and x-ray spectrometers and the use of x-rays for qualitative and quantitative analysis. Separate chapters cover SEM sample preparation methods for hard materials, polymers, and biological specimens. In addition techniques for the elimination of charging in non-conducting specimens are detailed.

Transmission Electron Microscopy

David B. Williams 2009-07-31 This profusely illustrated text on Transmission Electron Microscopy provides the necessary instructions for successful hands-on application of this versatile materials characterization technique. The new edition also includes an extensive collection of questions for the student, providing approximately 800 self-assessment questions and over 400 questions suitable for homework assignment.

Electromagnetics in Magnetic Resonance Imaging

Christopher M. Collins 2016-03-01 In the past few decades, Magnetic Resonance Imaging (MRI) has become an indispensable tool in modern medicine, with MRI systems now available at every major hospital in the developed world. But for all its utility and prevalence, it is much less commonly understood and less readily explained than other common medical imaging techniques.

Unlike optical, ultrasonic, X-ray (including CT), and nuclear medicine-based imaging, MRI does not rely primarily on simple transmission and/or reflection of energy, and the highest achievable resolution in MRI is orders of magnitude smaller than the smallest wavelength involved. In this book, MRI will be explained with emphasis on the magnetic fields required, their generation, their concomitant electric fields, the various interactions of all these fields with the subject being imaged, and the implications of these interactions to image quality and patient safety. Classical electromagnetics will be used to describe aspects from the fundamental phenomenon of nuclear precession through signal detection and MRI safety. Simple explanations and illustrations combined with pertinent equations are designed to help the reader rapidly gain a fundamental understanding and an appreciation of this technology as it is used today, as well as ongoing advances that will increase its value in the future. Numerous

references are included to facilitate further study with an emphasis on areas most directly related to electromagnetics.

Topics in Electron Diffraction and Microscopy of Materials

Peter. B Hirsch
1999-01-01 Topics in Electron Diffraction and Microscopy of Materials celebrates the retirement of Professor Michael Whelan from the University of Oxford. Professor Whelan taught many of today's heads of department and was a pioneer in the development and use of electron microscopy. His collaborators and colleagues, each one of whom has made important advances in the use of microscopy to study materials, have contributed to this cohesive work. The book provides a useful overview of current applications for selected electron microscope techniques that have become important and widespread in their use for furthering our understanding of how materials behave. Linked through the dynamical theory of electron diffraction and

inelastic scattering, the topics discussed include the history and impact of electron microscopy in materials science, weak-beam techniques for problem solving, defect structures and dislocation interactions, using beam diffraction patterns to look at defects in structures, obtaining chemical identification at atomic resolution, theoretical developments in backscattering channeling patterns, new ways to look at atomic bonds, using numerical simulations to look at electronic structure of crystals, RHEED observations for MBE growth, and atomic level imaging applications.

Electron Backscatter Diffraction in Materials Science

Adam J. Schwartz
2010-03-11 Electron backscatter diffraction is a very powerful and relatively new materials characterization technique aimed at the determination of crystallographic texture, grain boundary character distributions, lattice strain, phase identification, and

much more. The purpose of this book is to provide the fundamental basis for electron backscatter diffraction in materials science, the current state of both hardware and software, and illustrative examples of the applications of electron backscatter diffraction to a wide-range of materials including undeformed and deformed metals and alloys, ceramics, and superconductors. The text has been substantially revised from the first edition, and the authors have kept the format as close as possible to the first edition text. The new developments covered in this book include a more comprehensive coverage of the fundamentals not covered in the first edition or other books in the field, the advances in hardware and software since the first edition was published, and current examples of application of electron backscatter diffraction to solve challenging problems in materials science and condensed-matter physics.

Principles of Electron Tunneling Spectroscopy-E.

L. Wolf 2012 Electron tunnelling spectroscopy as a research tool has strongly advanced understanding of superconductivity. This book explains the physics and instrumentation behind the advances illustrated in beautiful images of atoms, rings of atoms and exotic states in high temperature superconductors, and summarizes the state of knowledge that has resulted.

Cell Imaging Techniques-

Douglas J. Taatjes 2006 Cell imaging methodologies have now become essential research tools for a variety of disciplines that traditionally had not relied on them. In Cell Imaging Techniques: Methods and Protocols, distinguished international researchers describe in detail their state-of-the-art methods for the microscopic imaging of cells and molecules. The authors cover a wide spectrum of complementary techniques, including such methods as fluorescence microscopy, electron microscopy, atomic force microscopy, and laser scanning cytometry. Additional protocols on

confocal scanning laser microscopy, quantitative computer-assisted image analysis, laser-capture microdissection, microarray image scanning, near-field scanning optical microscopy, and reflection contrast microscopy round out this eclectic collection of cutting-edge imaging techniques now available. The authors also discuss preparative methods for particles and cells by transmission electron microscopy. The protocols follow the successful Methods in Molecular Biology series format, each offering step-by-step laboratory instructions, an introduction outlining the principles behind the technique, lists of the necessary equipment and reagents, and tips on troubleshooting and avoiding known pitfalls. Timely and highly practical, *Cell Imaging Techniques: Methods and Protocols* provides researchers and clinicians with a richly useful guide to selecting and performing the best imaging method from a bewildering variety of microscopy-based techniques.

Microscopy and Analysis-

Stefan G. Stanciu 2016-09-21
Microscopes represent tools of the utmost importance for a wide range of disciplines. Without them, it would have been impossible to stand where we stand today in terms of understanding the structure and functions of organelles and cells, tissue composition and metabolism, or the causes behind various pathologies and their progression. Our knowledge on basic and advanced materials is also intimately intertwined to the realm of microscopy, and progress in key fields of micro- and nanotechnologies critically depends on high-resolution imaging systems. This volume includes a series of chapters that address highly significant scientific subjects from diverse areas of microscopy and analysis. Authoritative voices in their fields present in this volume their work or review recent trends, concepts, and applications, in a manner that is accessible to a broad readership audience from both within and outside their specialist area.

Principles of Electron

Optics, Volume 2-Peter W.

Hawkes 2017-12-13 Principles of Electron Optics: Applied Geometrical Optics, Second Edition gives detailed information about the many optical elements that use the theory presented in Volume 1: electrostatic and magnetic lenses, quadrupoles, cathode-lens-based instruments including the new ultrafast microscopes, low-energy-electron microscopes and photoemission electron microscopes and the mirrors found in their systems, Wien filters and deflectors. The chapter on aberration correction is largely new. The long section on electron guns describes recent theories and covers multi-column systems and carbon nanotube emitters. Monochromators are included in the section on curved-axis systems. The lists of references include many articles that will enable the reader to go deeper into the subjects discussed in the text. The book is intended for postgraduate students and teachers in physics and electron optics, as well as researchers and scientists in academia and industry

working in the field of electron optics, electron and ion microscopy and nanolithography. Offers a fully revised and expanded new edition based on the latest research developments in electron optics Written by the top experts in the field Covers every significant advance in electron optics since the subject originated Contains exceptionally complete and carefully selected references and notes Serves both as a reference and text

Reflection Electron Microscopy and Spectroscopy for Surface

Analysis-Zhong Lin Wang 2005-08-22 A self-contained book on electron microscopy and spectrometry techniques for surface studies.

X-Ray Free Electron Lasers-

Uwe Bergman 2017-08-15 Edited by pioneers in this exciting field, and featuring contributions from leading researchers, this book discusses the principles and applications of XFELs.

Handbook of Microscopy for Nanotechnology-Nan

Yao 2006-07-12

Nanostructured materials take on an enormously rich variety of properties and promise exciting new advances in micromechanical, electronic, and magnetic devices as well as in molecular fabrications. The structure-composition-processing-property relationships for these sub 100 nm-sized materials can only be understood by employing an array of modern microscopy and microanalysis tools. Handbook of Microscopy for Nanotechnology aims to provide an overview of the basics and applications of various microscopy techniques for nanotechnology. This handbook highlights various key microscopical techniques and their applications in this fast-growing field. Topics to be covered include the following: scanning near field optical microscopy, confocal optical microscopy, atomic force microscopy, magnetic force microscopy, scanning tunneling microscopy, high-

resolution scanning electron microscopy, orientational imaging microscopy, high-resolution transmission electron microscopy, scanning transmission electron microscopy, environmental transmission electron microscopy, quantitative electron diffraction, Lorentz microscopy, electron holography, 3-D transmission electron microscopy, high-spatial resolution quantitative microanalysis, electron-energy-loss spectroscopy and spectral imaging, focused ion beam, secondary ion microscopy, and field ion microscopy.

X-Ray Microscopy-Chris

Jacobsen 2019-12-19 A

complete introduction to x-ray microscopy, covering optics, 3D and chemical imaging, lensless imaging, radiation damage, and applications.

Advanced Transmission Electron Microscopy-

Francis Leonard Deepak

2015-06-05 This book

highlights the current understanding of materials in

the context of new and continuously emerging techniques in the field of electron microscopy. The authors present applications of electron microscopic techniques in characterizing various well-known & new nanomaterials. The applications described include both inorganic nanomaterials as well as organic nanomaterials.

The Resolution Revolution: Recent Advances In

cryoEM- 2016-08-26 cryoEM, a new volume in the Methods in Enzymology series, continues the legacy of this premier serial with quality chapters authored by leaders in the field. This volume covers research methods and new developments in recording images, the creation, evaluation and validation of 3D maps from the images, model building into maps and refinement of the resulting atomic structures, and applications of essentially single particle methods to helical structures and to sub-tomogram averaging. Continues the

legacy of this premier serial with quality chapters authored by leaders in the field Covers research methods that determine the structures of biological molecules, a vital step for understanding their function Contains the technical developments underpinning the advances of cryoEM and captures the exciting insights that have resulted

Scanning Electrochemical Microscopy

Allen J. Bard
2001-04-18 Scanning Electrochemical Microscopy describes the theory and operating principles of scanning electrochemical microscopy (SECM), including instrumentation, tip preparation, imaging techniques and potentiometric probes. The book explores applications relevant to electron transfer reactions, reaction kinetics, chemical events at interfaces, biological

Advances in Visual

Computing-George Bebis
2014-12-02 The two volume set LNCS 8887 and 8888

constitutes the refereed proceedings of the 10th International Symposium on Visual Computing, ISVC 2014, held in Las Vegas, NV, USA. The 74 revised full papers and 55 poster papers presented together with 39 special track papers were carefully reviewed and selected from more than 280 submissions. The papers are organized in topical sections: Part I (LNCS 8887) comprises computational bioimaging, computer graphics; motion, tracking, feature extraction and matching, segmentation, visualization, mapping,

modeling and surface reconstruction, unmanned autonomous systems, medical imaging, tracking for human activity monitoring, intelligent transportation systems, visual perception and robotic systems. Part II (LNCS 8888) comprises topics such as computational bioimaging , recognition, computer vision, applications, face processing and recognition, virtual reality, and the poster sessions.