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# Charged Particle Optics Theory And Simulation Cposts

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Electrostatic Lens Systems,  
Advances in Imaging and Electron Physics  
Uniformly Accelerating Charged Particles  
Advances in Electronics and Electron Physics  
Charged Particle Optics Theory  
Charged-particle Optics  
Electron and Ion Optics  
The Optics of Charged Particle Beams  
Quantum Mechanics of Charged Particle Beam Optics: Understanding Devices from  
Electron Microscopes to Particle Accelerators  
Charged-particle Optics : 15 July 1993, San Diego, California  
Principles of Electron Optics, Volume 2  
Applied Charged Particle Optics  
The Finite Element Method in Charged Particle Optics  
Focusing of Charged Particles  
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Aberration Theory in Electron and Ion Optics  
Advances in Imaging and Electron Physics  
Theory and Design of Charged Particle Beams  
An Introduction to Theory and Applications of Quantum Mechanics  
Classical Charged Particles

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## **TIANA MORSE**

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Electrostatic Lens Systems, Springer Science & Business Media  
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* Courier Corporation  
Although particle accelerators are the book's main thrust, it offers a broad synoptic description of beams which applies to a wide range of other devices such as low-energy focusing and transport systems and high-power microwave sources. Develops material from first principles, basic equations and theorems in a systematic way. Assumptions and approximations are clearly indicated. Discusses underlying physics and validity of theoretical relationships, design formulas and scaling laws. Features a significant amount of recent work including image

effects and the Boltzmann line charge density profiles in bunched beams.  
Uniformly Accelerating Charged Particles  
CRC Press

This resource covering all theoretical aspects of modern geometrical charged-particle optics is aimed at anyone involved in the design of electron optical instruments and beam-guiding systems for charged particles.

Advances in Electronics and Electron Physics John Wiley & Sons

This is a complete handbook and reference volume which covers everything that one needs to know about electron optics. It is a comprehensive coverage of theoretical background and modern computing methods. It contains a detailed and unique account of numerical methods and an extensive bibliography.

*Charged Particle Optics Theory* Springer Science & Business Media  
Principles of Electron Optics

**Charged-particle Optics** John Wiley & Sons

Optics of Charged Particles describes how charged particles move in the main and fringing fields of magnetic or electrostatic dipoles, quadrupoles, and hexapoles using the same type of formulation and consistent nomenclature throughout. This book not only describes the particle trajectories and beam shapes, but also provides guidelines for designing particle optical instruments. The topics discussed include Gaussian optics and transfer matrices, general relations for the motion of charged particles in electromagnetic fields, and quadrupole lenses. The sector field lenses, charged particle beams and phase space, and particle beams in periodic structures are also elaborated.

This text likewise considers the fringing fields, image aberrations, and design of particle spectrometers and beam guide lines. This publication is suitable for undergraduate students in physics and mathematics.

Electron and Ion Optics Springer Science & Business Media

With this volume, *Methods of Experimental Physics* becomes *Experimental Methods in the Physical Sciences*, a name change which reflects the evolution of today's science. This volume is the first of three which will provide a comprehensive treatment of the key experimental methods of atomic, molecular, and optical physics; the three volumes as a set will form an excellent experimental handbook for the field. The wide availability of tunable lasers in the past several years has revolutionized the field and led to the introduction of many new experimental methods that are covered in these volumes.

Traditional methods are also included to ensure that the volumes will be a complete reference source for the field.

**The Optics of Charged Particle Beams** Springer Science & Business Media

Particle Accelerator Physics covers the dynamics of relativistic particle beams, basics of particle guidance and focusing, lattice design, characteristics of beam transport systems and circular accelerators. Particle-beam optics is treated in the linear approximation including sextupoles to correct for chromatic aberrations. Perturbations to linear beam dynamics are analyzed in detail and correction measures are discussed, while basic lattice design features and building blocks leading to the design of more complicated beam transport systems and circular accelerators are studied. Characteristics

of synchrotron radiation and quantum effects due to the statistical emission of photons on particle trajectories are derived and applied to determine particle-beam parameters. The discussions specifically concentrate on relativistic particle beams and the physics of beam optics in beam transport systems and circular accelerators such as synchrotrons and storage rings. This book forms a broad basis for further, more detailed studies of nonlinear beam dynamics and associated accelerator physics problems, discussed in the subsequent volume.

**Quantum Mechanics of Charged Particle Beam Optics: Understanding Devices from Electron Microscopes to Particle Accelerators** Elsevier

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 discuss hot topic areas and presents current and future research trends. Invaluable reference and guide for physicists, engineers and mathematicians.

**Charged-particle Optics : 15 July 1993, San Diego, California** Academic Press

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 *Principles of Electron Optics, Volume 2* Society of Photo Optical

In the span of only a few decades, the finite element method has become an important numerical technique for solving problems in the subject of charged particle optics. The situation has now developed up to the point where finite element simulation software is sold commercially and routinely used in industry. The introduction of the finite element method in charged particle optics came by way of a PHD thesis written by Eric Munro at the University of Cambridge, England, in 1971 [1], shortly after the first papers appeared on its use to solve Electrical Engineering problems in the late sixties. Although many papers on the use of the finite element method in charged particle optics have been published since Munro's pioneering work, its development in this area has not as yet appeared in any textbook. This fact must be understood within a broader context. The first textbook on the finite element method in Electrical Engineering was published in 1983 [2]. At present, there are only a handful of other books that describe it in relation to Electrical

Engineering topics [3], let alone charged particle optics. This is but a tiny fraction of the books dedicated to the finite element method in other subjects such as Civil Engineering. The motivation to write this book comes from the need to redress this imbalance. There is also another important reason for writing this book.

#### Applied Charged Particle Optics

Academic Press

The field of electron and ion optics is based on the analogy between geometrical light optics and the motion of charged particles in electromagnetic fields. The spectacular development of the electron microscope clearly shows the possibilities of image formation by charged particles of wavelength much shorter than that of visible light. As new applications such as particle accelerators, cathode ray tubes, mass and energy spectrometers, microwave tubes, scanning-type analytical instruments, heavy beam technologies, etc. emerged, the scope of particle beam optics has been extended to the formation of fine probes. The goal is to concentrate as many particles as possible in as small a volume as possible. Fabrication of microcircuits is a good example of the growing importance of this field. The current trend is towards increased circuit complexity and pattern density. Because of the diffraction limitation of processes using optical photons and the technological difficulties connected with x-ray processes, charged particle beams are becoming popular. With them it is possible to write directly on a wafer under computer control, without using a mask. Focused ion beams offer especially great possibilities in the submicron region. Therefore, electron and ion beam technologies will most probably play a very important role

in the next twenty years or so.

*The Finite Element Method in Charged Particle Optics* Academic Press

Classical Charged Particle Beam Optics used in the design and operation of all present-day charged particle beam devices, from low energy electron microscopes to high energy particle accelerators, is entirely based on classical mechanics. A question of curiosity is: How is classical charged particle beam optics so successful in practice though the particles of the beam, like electrons, are quantum mechanical? *Quantum Mechanics of Charged Particle Beam Optics* answers this question with a comprehensive formulation of 'Quantum Charged Particle Beam Optics' applicable to any charged particle beam device.

#### **Focusing of Charged Particles**

Springer Science & Business Media

*Focusing of Charged Particles, Volume II* presents the aspects of particle optics, including the electron, the ion optical domains, and the accelerator field. This book provides a detailed analysis of the principles of the laws of propagation of beams. Comprised of three parts encompassing three chapters, this volume starts with an overview of how a beam of charged particles traverses a region that is at a uniform, constant, electrostatic potential. This book then discusses the principle of charge repulsion effect by which the space charge of the beam modifies the potential in the region that it traverses. Other chapters examine the general design techniques and performances obtainable for electron guns applicable for use in initiating a beam for linear beam tubes that is given in a condensed form. The last chapter deals with the two stable charged particles that can be accelerated, namely, protons and

electrons. This book is a valuable resource to physicists, accelerator experts, and experimenters in search of interactions in the detector target.

**Principles of Electron Optics** CRC Press

*Intense Ion and Electron Beams* treats intense charged-particle beams used in vacuum tubes, particle beam technology and experimental installations such as free electron lasers and accelerators. It addresses, among other things, the physics and basic theory of intense charged-particle beams; computation and design of charged-particle guns and focusing systems; multiple-beam charged-particle systems; and experimental methods for investigating intense particle beams. The coverage is carefully balanced between the physics of intense charged-particle beams and the design of optical systems for their formation and focusing. It can be recommended to all scientists studying or applying vacuum electronics and charged-particle beam technology, including students, engineers, and researchers.

*Advances in Imaging and Electron Physics* Springer Science & Business Media

*Advances in Imaging and Electron Physics, Volume 229* merges two long-running serials, *Advances in Electronics and Electron Physics* and *Advances in Optical and Electron Microscopy*. Chapters in this release cover Characterization of nanomaterials properties using FE-TEM, Cold field-emission electron sources: From higher brightness to ultrafast beams, Every electron counts: Towards the development of aberration optimized and aberration corrected electron sources, and more. The series features 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.

Provides the authority and expertise of leading contributors from an international board of authors Presents the latest release in the Advances in Imaging and Electron Physics series

**Introduction to the Theory of Space-charge Optics** Elsevier

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.

Principles of Electron Optics, Volume 3  
Academic Press

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

Handbook of Charged Particle Optics

Springer Science & Business Media  
Written by a pioneer in the field, this overview of charged particle optics provides a solid introduction to the subject area for all physicists wishing to design their own apparatus or better understand the instruments with which they work. It begins by introducing electrostatic lenses and fields used for acceleration, focusing and deflection of ions or electrons. Subsequent chapters give detailed descriptions of electrostatic

deflection elements, uniform and non-uniform magnetic sector fields, image aberrations, and, finally, fringe field confinement.

**Charged Particle Optics IV** Academic Press

This book deals with diffraction radiation, which implies the boundary problems of electromagnetic radiation theory.

Diffraction radiation is generated when a charged particle moves near a target edge at a distance ( $\gamma$  - Lorentz factor,  $\lambda$  - wave length). Diffraction radiation of non-relativistic particles is widely used to design intense emitters in the cm

wavelength range. Diffraction radiation from relativistic charged particles is important for noninvasive beam diagnostics and design of free electron lasers based on Smith-Purcell radiation which is diffraction radiation from periodic structures. Different analytical models of diffraction radiation and results of recent experimental studies are presented in this book. The book may also serve as guide to classical electrodynamics applications in beam physics and electrodynamics. It can be of great use for young researchers to develop skills and for experienced scientists to obtain new results.

Best Sellers - Books :

- [Fahrenheit 451 By Ray Bradbury](#)
- [The Nightingale: A Novel By Kristin Hannah](#)
- [Haunting Adeline \(cat And Mouse Duet\) By H. D. Carlton](#)
- [What To Expect When You're Expecting By Heidi Murkoff](#)
- [8 Rules Of Love: How To Find It, Keep It, And Let It Go By Jay Shetty](#)
- [Guess How Much I Love You](#)
- [How To Catch A Leprechaun](#)
- [The Very Hungry Caterpillar](#)
- [Ugly Love: A Novel](#)
- [Leigh Howard And The Ghosts Of Simmons-pierce Manor By Shawn M. Warner](#)