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Fundamentals of Plasma Physics *Fundamentals of Plasma Physics The Framework Of Plasma Physics* The Physics of Plasmas **Fundamentals of Plasma Physics** *Plasma Physics: An Introductory Course Plasma Physics Plasma Physics and Controlled Nuclear Fusion* **Introduction to Plasma Physics Principles of Plasma Physics Plasma Physics Plasma Physics Plasma Physics Plasma Physics** Introduction to Plasma Physics Plasma Physics for Astrophysics Principles of Plasma Physics for Engineers and Scientists **Introduction to Plasma Physics and Controlled Fusion** *Reviews of Plasma Physics* **Introduction to Plasma Physics Reviews of Plasma Physics Introduction to Plasma Physics and Controlled Fusion** *STATISTICAL PLASMA PHYSICS* **Plasma Physics and Engineering** *Plasma Physics via Computer Simulation* **Basic Space Plasma Physics Introduction to Plasma Physics Introduction to Plasma Physics** Elements of Plasma Physics *Modern Plasma Physics: Volume 1, Physical Kinetics of Turbulent Plasmas* **Fundamentals of Plasma Physics Introduction to Plasma Physics** *Reviews of Plasma Physics / Voprosy Teorii Plazmy / Вопросы Теории Плазмы* **Controlled Fusion and Plasma Physics** *STATISTICAL PLASMA PHYSICS Principles of Plasma Physics for Engineers and Scientists* An Introduction to Plasma Physics and Its Space Applications, Volume 2 *Introduction to Plasma Physics* **Ionospheres** *Plasma Physics for Nuclear Fusion*

Modern Plasma Physics: Volume 1, Physical Kinetics of Turbulent Plasmas Apr 27 2020 This three-volume series presents the ideas, models and approaches essential to understanding plasma dynamics and self-organization for researchers and graduate students in plasma physics, controlled fusion and related fields such as plasma astrophysics. Volume I develops the physical kinetics of plasma turbulence through a focus on quasi-particle models and dynamics. It discusses the essential physics concepts and theoretical methods for describing weak and strong fluid and phase space turbulence in plasma systems far from equilibrium. The book connects the traditionally 'plasma' topic of weak or wave turbulence theory to more familiar fluid turbulence theory, and extends both to the realm of collisionless phase space turbulence. This gives readers a deeper understanding of these related fields, and builds a foundation for future applications to multi-scale processes of self-organization in tokamaks and other confined plasmas. This book emphasizes the conceptual foundations and physical intuition underpinnings of plasma turbulence theory.

Fundamentals of Plasma Physics Sep 25 2022 This rigorous explanation of plasmas is relevant to diverse plasma applications such as controlled fusion, astrophysical plasmas, solar physics, magnetospheric plasmas, and plasma thrusters. More thorough than previous texts, it exploits new powerful mathematical techniques to develop deeper insights into plasma behavior. After developing the basic plasma equations from first principles, the book explores single particle motion with particular attention to adiabatic invariance. The author then examines types of plasma waves and the issue of Landau damping. Magnetohydrodynamic equilibrium and stability are tackled with emphasis on the topological concepts of magnetic helicity and self-organization. Advanced topics follow, including magnetic reconnection, nonlinear waves, and the Fokker-Planck treatment of collisions. The book concludes by discussing unconventional plasmas such as non-neutral and dusty plasmas. Written for beginning graduate students and advanced undergraduates, this text emphasizes the fundamental principles that apply across many different contexts.

Plasma Physics Sep 13 2021 This edited collection of papers by pioneering experts was a standard text throughout the 1960s and 70s. A timeless introduction to foundations of plasma physics and a valuable source of historic context. 1961 edition.

The Physics of Plasmas Jul 23 2022 A comprehensive introductory graduate textbook illustrating specialised topics in current physics.

Introduction to Plasma Physics Feb 24 2020 Advanced undergraduate/beginning graduate text on space and laboratory plasma physics.

Reviews of Plasma Physics Apr 08 2021 ''The review articles in this series are invariably of a high standard, and those contained in the most recent volumes to appear (Volumes 14-16), are no exception.'' --- Journal of Plasma Physics, from a review of previous volumes The current volume includes chapters on the generation of noninductive current in a tokamak and resonance effects in oscillations of uneven flows of continuous media.

An Introduction to Plasma Physics and Its Space Applications, Volume 2 Sep 20 2019 This book is a brief introduction to plasma physics. The book is divided into two parts, focusing initially on molecular collisions, before moving on to examine the physical description of plasmas as a system of interacting particles. Basic concepts are introduced in a simple way and mathematical developments and demonstrations are covered thoroughly. The fundamental processes in a plasma at the atomic and molecular level are discussed, with updated experimental data sets provided. Each chapter concludes with references and commentaries for further insight in the essential points. Two important applications of plasma physics in aerospace technology are introduced in the last chapters: the electric propulsion in space and low-pressure microwave electric discharges, currently denominated multipactor and corona. The book is for Master and undergraduate courses of aerospace engineering and physics. It is also aimed at both non-specialists and professionals involved in laboratory testing for space qualification.

STATISTICAL PLASMA PHYSICS Dec 04 2020

Introduction to Plasma Physics Mar 07 2021 Introduction to Plasma Physics presents the latest on plasma physics. Although plasmas are not very present in our immediate environment, there are still universal phenomena that we encounter, i.e., electric shocks and galactic jets. This book presents, in parallel, the basics of plasma theory and a number of applications to laboratory plasmas or natural plasmas. It provides a fresh look at concepts already addressed in other disciplines, such as pressure and temperature. In addition, the information provided helps us understand the links between fluid theories, such as MHD and the kinetic theory of these media, especially in wave propagation. Presents the different phenomena that make up plasma physics Explains the basics of plasma theory Helps readers comprehend the various concepts related to plasmas

Principles of Plasma Physics for Engineers and Scientists Jun 10 2021 This unified introduction provides the tools and techniques needed to analyze plasmas and connects plasma phenomena to other fields of study. Combining mathematical rigor with qualitative explanations, and linking theory to practice with example problems, this is a perfect textbook for senior undergraduate and graduate students taking one-semester introductory plasma physics courses. For the first time, material is presented in the context of unifying principles, illustrated using organizational charts, and structured in a successive progression from single particle motion, to kinetic theory and average values, through to collective phenomena of waves in plasma. This provides students with a stronger understanding of the topics covered, their interconnections, and when different types of plasma models are applicable. Furthermore, mathematical derivations are rigorous, yet concise, so physical understanding is not lost in lengthy mathematical treatments. Worked examples illustrate practical applications of theory and students can test their new knowledge with 90 end-of-chapter problems.

Ionospheres Jul 19 2019 Describes the physical, plasma and chemical processes controlling ionospheres, upper atmospheres and exospheres, for researchers and graduates.

Elements of Plasma Physics May 29 2020 The book deals with the basic concepts , motion of charged particles in the magnetic and electric fields.

Reviews of Plasma Physics Feb 06 2021 Reviews of Plasma Physics, Volume 23, presents two high quality reviews from the cutting-edge of Russian plasma physics research: "Plasma Models of Atom and Radiative-Collisional Processes", by V.A. Astapenko, L.A. Bureyeva, V.S. Lisitsa, is devoted to a unified description of the atomic core polarization effects in the free-free, free-bound and bound-bound transitions of the charged particles in the field of multielectron atom.

"Asymptotic Theory of Charge Exchange And Mobility Processes for Atomic Ions" by B.M. Smirnov reviews the process of resonant charge exchange, and also the transport processes (mobility and diffusion coefficients) for ions in parent gases which are determined by resonant electron transfer.

Reviews of Plasma Physics / Voprosy Teorii Plazmy / Вопросы Теории Плазмы Jan 25 2020 In the interest of speed and economy the notation of the orig inal text has been retained so that the cross product of two vectors A and B is denoted by [AB], the dot product by (AB), the Laplacian operator by ~. etc. It might also be worth pointing out that the temperature is frequently expressed in energy units in the Soviet literature so that the Boltzmann constant will be missing in various familiar expressions. In matters of terminology, whenever pos sible several forms are used when a term is first introduced, e. g. , magnetoacoustic and magnetosonic waves, "probkotron" and mirror machine, etc. It is hoped in this way to help the reader to relate the terms used here with those in existing translations and with the conventional nomenclature. In general the system of literature citation used in the bibliographies follows that of the American Institute of Physics "Soviet Physics" series. Except for the cor rection of some obvious misprints the text is that of the original. We wish to express our gratitude to Academician Leontovich for kindly providing the latest corrections and additions to the Russian text. v CONTENTS Steady-State Plasma Flow in a Magnetic Field A. I. Morozov and L. S. Solov'ev Introduction. . . . . 1 Chapter 1. Acceleration Mechanisms , • • • • • • • • • • . 2 §1. Microscopic Picture of Plasma Acceleration . . . . . 2 §2.

Plasma Physics Nov 15 2021 The enlarged new edition of this textbook provides a comprehensive introduction to the basic processes in plasmas and demonstrates that the same fundamental concepts describe cold gas-discharge plasmas, space plasmas, and hot fusion plasmas. Starting from particle drifts in magnetic fields, the principles of magnetic confinement fusion are explained and compared with laser fusion. Collective processes are discussed in terms of plasma waves and instabilities. The concepts of plasma description by magnetohydrodynamics, kinetic theory, and particle simulation are stepwise introduced. Space charge effects in sheath regions, double layers and plasma diodes are given the necessary attention. The novel fundamental mechanisms of dusty plasmas are explored and integrated into the framework of conventional plasmas. The book concludes with a concise description of modern plasma discharges. Written by an internationally renowned researcher in experimental plasma physics, the text keeps the mathematical apparatus simple and emphasizes the underlying concepts. The guidelines of plasma physics are illustrated by a host of practical examples, preferentially from plasma diagnostics. There, Langmuir probe methods, laser interferometry, ionospheric sounding, Faraday rotation, and diagnostics of dusty plasmas are discussed. Though primarily addressing students in plasma physics, the book is easily accessible for researchers in neighboring disciplines, such as space science, astrophysics, material science, applied physics, and electrical engineering. This second edition has been thoroughly revised and contains substantially enlarged chapters on plasma diagnostics, dusty plasmas and plasma discharges. Probe techniques have been rearranged into basic theory and a host of practical examples for probe techniques in dc, rf, and space plasmas. New topics in dusty plasmas, such as plasma crystals, Yukawa balls, phase transitions and attractive forces have been adopted. The chapter on plasma discharges now contains a new section on conventional and high-power impulse magnetron sputtering. The recently discovered electrical asymmetry effect in capacitive rf-discharges is described. The text is based on an introductory course to plasma physics and advanced courses in plasma diagnostics, dusty plasmas, and plasma waves, which the author has taught at Kiel University for three decades. The pedagogical approach combines detailed explanations, a large number of illustrative figures, short summaries of the basics at the end of each chapter, and a selection of problems with detailed solutions.

Plasma Physics via Computer Simulation Oct 02 2020 Divided into three main parts, the book guides the reader to an understanding of the basic concepts in this fascinating field of research. Part 1 introduces you to the fundamental concepts of simulation. It examines one-dimensional electrostatic codes and electromagnetic codes, and describes the numerical methods and analysis. Part 2 explores the mathematics and physics behind the algorithms used in Part 1. In Part 3, the authors address some of the more complicated simulations in two and three dimensions. The book introduces projects to encourage practical work Readers can download plasma modeling and simulation software — the ES1 program — with implementations for PCs and Unix systems along with the original FORTRAN source code. p-BodyText2Now available in paperback, Plasma Physics via Computer Simulation is an ideal complement to plasma physics courses and for self-study.

Plasma Physics and Engineering Nov 03 2020 Plasma engineering is a rapidly expanding area of science and technology with increasing numbers of engineers using plasma processes over a wide range of applications. An essential tool for understanding this dynamic field, Plasma Physics and Engineering provides a clear, fundamental introduction to virtually all aspects of modern plasma science and technology, including plasma chemistry and engineering, combustion, chemical physics, lasers, electronics, methods of material treatment, fuel conversion, and environmental control. The book contains an extensive database on plasma kinetics and thermodynamics, many helpful numerical formulas for practical calculations, and an array of problems and concept questions.

Introduction to Plasma Physics Jun 29 2020 Introducing the principles and applications of plasma physics, this new edition is ideal as an advanced undergraduate or graduate-level text.

Introduction to Plasma Physics Aug 20 2019 Introduction to Plasma Physics is the standard text for an introductory lecture course on plasma physics. The text's six sections lead readers systematically and comprehensively through the fundamentals of modern plasma physics. Sections on single-particle motion, plasmas as fluids, and collisional processes in plasmas lay the groundwork for a thorough understanding of the subject. The authors take care to place the material in its historical context for a rich understanding of the ideas presented. They also emphasize the importance of medical imaging in radiotherapy, providing a logical link to more advanced works in the area. The text includes problems, tables, and illustrations as well as a thorough index and a complete list of references.

The Framework Of Plasma Physics Aug 24 2022 This book provides an excellent introduction to the fundamental physics of plasmas, which comprise most of the matter in the universe. It is based on lectures that were used for an introductory plasma course at the graduate level.

Fundamentals of Plasma Physics Oct 26 2022 This rigorous explanation of plasmas is relevant to diverse plasma applications such as controlled fusion, astrophysical plasmas, solar physics, magnetospheric plasmas, and plasma thrusters. More thorough than previous texts, it exploits new powerful mathematical techniques to develop deeper insights into plasma behavior. After developing the basic plasma equations from first principles, the book explores single particle motion with particular attention to adiabatic invariance. The author then examines types of plasma waves and the issue of Landau damping. Magnetohydrodynamic equilibrium and stability are tackled with emphasis on the topological concepts of magnetic helicity and self-organization. Advanced topics follow, including magnetic reconnection, nonlinear waves, and the Fokker–Planck treatment of collisions. The book concludes by discussing unconventional plasmas such as non-neutral and dusty plasmas. Written for beginning graduate students and advanced undergraduates, this text emphasizes the fundamental principles that apply across many different contexts.

Principles of Plasma Physics Jan 17 2022

Principles of Plasma Physics for Engineers and Scientists Oct 22 2019 This unified introduction provides the tools and techniques needed to analyze plasmas and connects plasma phenomena to other fields of study. Combining mathematical rigor with qualitative explanations, and linking theory to practice with example problems, this is a perfect textbook for senior undergraduate and graduate students taking one-semester introductory plasma physics courses. For the first time, material is presented in the context of unifying principles, illustrated using organizational charts, and structured in a successive progression from single particle motion, to kinetic theory and average values, through to collective phenomena of waves in plasma. This provides students with a stronger understanding of the topics covered, their interconnections, and when different types of plasma models are applicable. Furthermore, mathematical derivations are rigorous, yet concise, so physical understanding is not lost in lengthy mathematical treatments. Worked examples illustrate practical applications of theory and students can test their new knowledge with 90 end-of-chapter problems.

Plasma Physics for Nuclear Fusion Jun 17 2019 The original English-language edition of this work appeared in 1979. Since then

researchers around the world have made slow but steady progress toward the realization of sustained, controlled nuclear fusion. This new edition has been updated to review the important contributions of the past decade. The final chapter, "Confinement of High-Temperature Plasmas, " has been rewritten entirely to include the recent results of confinement in several types of devices and advances the under standing of wave heating. Miyamoto's approach is unique in encompassing Western, Soviet, and Japanese research in the fusion field. The book's 16 chapters are grouped into four major subject areas. Chapters in the first part develop the fundamentals of plasma physics and present the conditions of nuclear fusion reactions; those in the next two parts provide a magnetohydrodynamic description of plasmas and explain wave phenomena and instabilities by means of a kinetic model. Concluding chapters take up the problems of heating, diagnostics, and confinement. Specific topics include the Lawson condition; Boltzmann and Vlasov equations; plasma equilibrium; magnetohydrodynamic instabilities; waves in cold and hot plasmas; microinstabilities; fast neutral beam injection and wave heating; and diagnostics using microwaves, lasers, and energy analyzers. Plasma confinement in tokamaks and stellarators, multipole fields, mirrors, and cusps, as well as inertial confinement, are reviewed. Kenro Miyamoto, is Professor of Physics at the University of Tokyo.

Introduction to Plasma Physics Feb 18 2022 Covers the basic concepts of plasma physics

Plasma Physics: An Introductory Course May 21 2022 A wide-ranging introduction to the theoretical and experimental study of plasmas and their applications.

Introduction to Plasma Physics Jul 31 2020 This book grew out of lecture notes for an undergraduate course in plasma physics that has been offered for a number of years at UCLA. With the current increase in interest in controlled fusion and the wide spread use of plasma physics in space research and relativistic as trophysics, it makes sense for the study of plasmas to become a part of an undergraduate student's basic experience, along with subjects like thermodynamics or quantum mechanics. Although the primary purpose of this book was to fulfill a need for a text that seniors or juniors can really understand, I hope it can also serve as a painless way for scientists in other fields- solid state or laser physics, for instance to become acquainted with plasmas. Two guiding principles were followed: Do not leave algebraic steps as an exercise for the reader, and do not let the algebra obscure the physics. The extent to which these opposing aims could be met is largely due to the treatment of a plasma as two interpenetrating fluids. The two-fluid picture is both easier to understand and more accurate than the single-fluid approach, at least for low-density plasma phe nomena.

Fundamentals of Plasma Physics Jun 22 2022 A general introduction designed to present a comprehensive, logical and unified treatment of the fundamentals of plasma physics based on statistical kinetic theory. Its clarity and completeness make it suitable for self-learning and self-paced courses. Problems are included.

Introduction to Plasma Physics and Controlled Fusion Jan 05 2021 TO THE SECOND EDITION In the nine years since this book was first written, rapid progress has been made scientifically in nuclear fusion, space physics, and nonlinear plasma theory. At the same time, the energy shortage on the one hand and the exploration of Jupiter and Saturn on the other have increased the national awareness of the important applications of plasma physics to energy production and to the understanding of our space environment. In magnetic confinement fusion, this period has seen the attainment 13 of a Lawson number nTE of 2 x 10 cm -3 sec in the Alcator tokamaks at MIT; neutral-beam heating of the PL T tokamak at Princeton to KTi = 6. 5 keV; increase of average ß to 3%-5% in tokamaks at Oak Ridge and General Atomic; and the stabilization of mirror-confined plasmas at Livermore, together with injection of ion current to near field-reversal conditions in the 2XIIß device. Invention of the tandem mirror has given magnetic confinement a new and exciting dimension. New ideas have emerged, such as the compact torus, surface-field devices, and the EßT mirror-torus hybrid, and some old ideas, such as the stellarator and the reversed-field pinch, have been revived. Radiofrequency heat ing has become a new star with its promise of dc current drive. Perhaps most importantly, great progress has been made in the understanding of the MHD behavior of toroidal plasmas: tearing modes, magnetic Vll Vlll islands, and disruptions.

STATISTICAL PLASMA PHYSICS Nov 22 2019

Fundamentals of Plasma Physics Mar 27 2020 Fundamentals of Plasma Physics is a general introduction designed to present a comprehensive, logical and unified treatment of the fundamentals of plasma physics based on statistical kinetic theory, with applications to a variety of important plasma phenomena. Its clarity and completeness makes the text suitable for self-learning and for self-paced courses. Throughout the text the emphasis is on clarity, rather than formality, the various derivations are explained in detail and, wherever possible, the physical interpretations are emphasized. The mathematical treatment is set out in great detail, carrying out the steps which are usually left to the reader. The problems form an integral part of the text and most of them were designed in such a way as to provide a guideline, stating intermediate steps with answers.

Plasma Physics Oct 14 2021 This book provides the ideal introduction to this complex and fascinating field of research, balancing the theoretical and practical and preparing the student for further study.

Plasma Physics Dec 16 2021 Encompasses the Lectured Works of a Renowned Expert in the Field Plasma Physics: An Introduction is based on a series of university course lectures by a leading name in the field, and thoroughly covers the physics of the fourth state of matter. This book looks at non-relativistic, fully ionized, nondegenerate, quasi-neutral, and weakly coupled plasma. Intended for the student market, the text provides a concise and cohesive introduction to plasma physics theory, and offers a solid foundation for students wishing to take higher level courses in plasma physics. Mathematically Rigorous, but Driven by Physics This work contains over 80 exercises—carefully selected for their pedagogical value—with fully worked out solutions available in a separate solutions manual for professors. The author provides an in-depth discussion of the various fluid theories typically used in plasma physics. The material presents a number of applications, and works through specific topics including basic plasma parameters, the theory of charged particle motion in inhomogeneous electromagnetic fields, plasma fluid theory, electromagnetic waves in cold plasmas, electromagnetic wave propagation through inhomogeneous plasmas, magnetohydrodynamical fluid theory, and kinetic theory. Discusses fluid theory illustrated by the investigation of Langmuir sheaths Explores charged particle motion illustrated by the investigation of charged particle trapping in the earth’s magnetosphere Examines the WKB theory illustrated by the investigation of radio wave propagation in the earth’s ionosphere Studies the MHD theory illustrated by the investigation of solar wind, dynamo theory, magnetic reconnection, and MHD shocks Plasma Physics: An Introduction addresses applied areas and advanced topics in the study of plasma physics, and specifically demonstrates the behavior of ionized gas.

Plasma Physics and Controlled Nuclear Fusion Mar 19 2022 The primary objectives of this book are, firstly, to present the essential theoretical background needed to understand recent fusion research and, secondly, to describe the current status of fusion research for graduate students and senior undergraduates. It will also serve as a useful reference for scientists and engineers working in the related fields. In Part I, Plasma Physics, the author explains the basics of magneto-hydrodynamics and kinetic theory in a simple and compact way and, at the same time, covers important new topics for fusion studies such as the ballooning representation, instabilities driven by energetic particles, and various plasma models for computer simulations. Part II, Controlled Nuclear Fusion, attempts to review the "big picture" in fusion research. Mathematical derivations are comprehensively explained to better enable readers to later concentrate on the physics. All important phenomena and technologies are addressed, with a particular emphasis on the topics of most concern in current research.

Introduction to Plasma Physics and Controlled Fusion May 09 2021 This complete introduction to plasma physics and controlled fusion by one of the pioneering scientists in this expanding field offers both a simple and intuitive discussion of the basic concepts of this subject and an insight into the challenging problems of current research. In a wholly lucid manner the work covers single-particle motions, fluid equations for plasmas, wave motions, diffusion and resistivity, Landau damping, plasma instabilities and nonlinear problems. For students, this outstanding text offers a painless introduction to this important field; for teachers, a large collection of problems; and for researchers, a concise review of the fundamentals as well as original treatments of a number of topics never before explained so clearly. This revised edition contains new material on kinetic effects, including Bernstein waves and the plasma dispersion function, and on nonlinear wave equations and solitons. For the third edition, updates was made throughout each existing chapter, and two

new chapters were added; Ch 9 on “Special Plasmas” and Ch 10 on Plasma Applications (including Atmospheric Plasmas).
Plasma Physics Apr 20 2022 The enlarged new edition of this textbook provides a comprehensive introduction to the basic processes in plasmas and demonstrates that the same fundamental concepts describe cold gas-discharge plasmas, space plasmas, and hot fusion plasmas. Starting from particle drifts in magnetic fields, the principles of magnetic confinement fusion are explained and compared with laser fusion. Collective processes are discussed in terms of plasma waves and instabilities. The concepts of plasma description by magnetohydrodynamics, kinetic theory, and particle simulation are stepwise introduced. Space charge effects in sheath regions, double layers and plasma diodes are given the necessary attention. The novel fundamental mechanisms of dusty plasmas are explored and integrated into the framework of conventional plasmas. The book concludes with a concise description of modern plasma discharges. Written by an internationally renowned researcher in experimental plasma physics, the text keeps the mathematical apparatus simple and emphasizes the underlying concepts. The guidelines of plasma physics are illustrated by a host of practical examples, preferentially from plasma diagnostics. There, Langmuir probe methods, laser interferometry, ionospheric sounding, Faraday rotation, and diagnostics of dusty plasmas are discussed. Though primarily addressing students in plasma physics, the book is easily accessible for researchers in neighboring disciplines, such as space science, astrophysics, material science, applied physics, and electrical engineering. This second edition has been thoroughly revised and contains substantially enlarged chapters on plasma diagnostics, dusty plasmas and plasma discharges. Probe techniques have been rearranged into basic theory and a host of practical examples for probe techniques in dc, rf, and space plasmas. New topics in dusty plasmas, such as plasma crystals, Yukawa balls, phase transitions and attractive forces have been adopted. The chapter on plasma discharges now contains a new section on conventional and high-power impulse magnetron sputtering. The recently discovered electrical asymmetry effect in capacitive rf-discharges is described. The text is based on an introductory course to plasma physics and advanced courses in plasma diagnostics, dusty plasmas, and plasma waves, which the author has taught at Kiel University for three decades. The pedagogical approach combines detailed explanations, a large number of illustrative figures, short summaries of the basics at the end of each chapter, and a selection of problems with detailed solutions.
Plasma Physics for Astrophysics Jul 11 2021 Designed to teach plasma physics and astrophysics 'from the ground up', this textbook proceeds from the simplest examples through a careful derivation of results and encourages the reader to think for themselves.
Controlled Fusion and Plasma Physics Dec 24 2019 Resulting from ongoing, international research into fusion processes, the International Tokamak Experimental Reactor (ITER) is a major step in the quest for a new energy source.The first graduate-level text to cover the details of ITER, Controlled Fusion and Plasma Physics introduces various aspects and issues of recent fusion research activ
Basic Space Plasma Physics Sep 01 2020 This textbook deals with the requirements of space physics. The first part starts with a description of the Earth's plasma environment, followed by a derivation of single particle motions in electromagnetic fields, with applications to the Earth's magnetosphere. Then the origin and effects of collisions and conductivities, formation of the ionosphere, magnetospheric convection and dynamics, and solar wind-magnetosphere coupling are discussed.The second part of the book presents a more theoretical foundation of plasma physics, starting from kinetic theory. Introducing moments of the distribution function permits derivation of the fluid equations, followed by an analysis of fluid boundaries, with the Earth's magnetopause and bow shock as examples. Finally, fluid and kinetic theory are applied to derive the relevant wave modes in a plasma.A representative selection of the many space plasma instabilities and relevant aspects of nonlinear theory is given in a companion textbook, Advanced Space Plasma Physics, by the same authors.
Introduction to Plasma Physics Aug 12 2021 Introduction to Plasma Physics is the standard text for an introductory lecture course on plasma physics. The text’s six sections lead readers systematically and comprehensively through the fundamentals of modern plasma physics. Sections on single-particle motion, plasmas as fluids, and collisional processes in plasmas lay the groundwork for a thorough understanding of the subject. The authors take care to place the material in its historical context for a rich understanding of the ideas presented. They also emphasize the importance of medical imaging in radiotherapy, providing a logical link to more advanced works in the area. The text includes problems, tables, and illustrations as well as a thorough index and a complete list of references.