

Electrodynamics Of Continuous Media

Covers the theory of electromagnetic fields in matter, and the theory of the macroscopic electric and magnetic properties of matter. There is a considerable amount of new material particularly on the theory of the magnetic properties of matter and the theory of optical phenomena with new chapters on spatial dispersion and non-linear optics. The chapters on ferromagnetism and antiferromagnetism and on magnetohydrodynamics have been substantially enlarged and eight other chapters have additional sections.

Foundations of Electrical Engineering:

Fields—Networks—Waves describes the general principles of electrical engineering, with emphasis on fields, networks, and waves. The limitations of validity are defined and methods of calculation are outlined. Examples are used to illustrate the theory and microphysical explanations based on simple models are given. This book is divided into five sections and begins with an overview of the inductive approach to Maxwell's equations, along with the uniqueness of their solution. Energy conversion in the electromagnetic field as well as the basic concepts of vector algebra and vector analysis are also considered. Subsequent chapters focus on static and steady fields, including cylindrically symmetrical fields and magnetic fields; the laws of network analysis and network synthesis; transient phenomena; and transmission lines. The remaining sections deal with electromagnetic waves, with emphasis on boundary value problems, and further developments in electrical engineering. This monograph will be of interest to students of electrical engineering and mathematics.

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theory of macroscopic electric and magnetic properties of matter. There is a considerable amount of new material particularly on the theory of the magnetic properties of matter and the theory of optical phenomena with new chapters on spatial dispersion and non-linear optics.

Largely a condensed amalgamation of two previous books by the same authors - Mechanics and The Classical Theory of Fields - omitting the rather more advanced topics such as general relativity.

Volume 8.

This introduction to classical theoretical physics emerged from a course for students in the third and fourth semester, which the authors have given several times at the University of Freiburg (Germany). The goal of the course is to give the student a comprehensive and coherent overview of the principal areas of classical theoretical physics. In line with this goal, the content, the terminology, and the mathematical techniques of theoretical physics are all presented along with applications, to serve as a solid foundation for further courses in the basic areas of experimental and theoretical physics. In conceiving the course, the authors had four interdependent goals in mind: • the presentation of a consistent overview, even at this elementary level • the establishment of a well-balanced interactive relationship between physical content and mathematical methods • a demonstration of the important applications of physics, and • an acquisition of the most important mathematical

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techniques needed to solve specific problems. In relation to the first point, it was necessary to limit the amount of material treated. This introductory course was not intended to preempt a later, primarily On the other hand, we aimed for a certain completeness in theoretical, course.

Translated from the 6th Russian edition, this latest edition contains seven new sections with chapters on General Relativity, Gravitational Waves and Relativistic Cosmology, where Professor Lifshitz's interests lay. The text of the 3rd English edition has been thoroughly revised and additional problems inserted

An engaging writing style and a strong focus on the physics make this graduate-level textbook a must-have for electromagnetism students.

For graduate students and researchers, this self contained text provides a carefully structured, coherent, and comprehensive treatment of the mathematical modelling in electromagnetism of continuous media. The authors provide a systematic review of known subjects along with many original results. Part I reviews basic notions and approaches in electromagnetism (Maxwell's equations, Green's functions, harmonic fields, dispersive effects) and emphasizes the physical motivation for the modelling of non-conventional materials. The frequency-dependent properties (such as conductivity, polarizability, and magnetizability), which enter wave

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diffraction and dispersion, are shown, and these lead to a discussion of models of materials with fading memory in the time domain. Part II develops the thermodynamics of electromagnetic and thermoelectromagnetic materials with memory and provides a systematic account of thermodynamic restrictions. Existence, uniqueness and stability problems are investigated. Also, variational formulations and wave propagation solution are established. Part III is devoted to more involved models which are motivated by the interest in materials and structures with non-conventional properties. The mathematical modelling deals with non-linearity, non-locality and hysteresis. In non-linear materials attention is focussed on the generation of harmonics and in discontinuity waves. Non-locality is examined in a general way and hence is applied to superconductivity. Hysteresis is developed for magnetism. A review of known schemes is given along with new results about the modelling of hysteresis loops. The wide application of technologies in new mechanical, electronic and biomedical systems calls for materials and structures with non-conventional properties (e.g materials with 'memory'). Of equal importance is the understanding of the physical behaviour of these materials and consequently developing mathematical modelling techniques for prediction. Includes appendices that include some properties of Bessel functions, Fourier

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transforms and Sobolev spaces, compact operators and eigenfunctions, differential operators in curvilinear coordinates, and finite formulation of electromagnetism.

This updated and expanded second edition of the *Electrodynamics of Continuous Media (COURSE OF THEORETICAL PHYSICS)* provides a user-friendly introduction to the subject. Taking a clear structural framework, it guides the reader through the subject's core elements. A flowing writing style combines with the use of illustrations and diagrams throughout the text to ensure the reader understands even the most complex of concepts. This succinct and enlightening overview is a required reading for all those interested in the subject. We hope you find this book useful in shaping your future career & Business.

This textbook covers the basic principles of statistical physics and thermodynamics. The text is pitched at the level equivalent to first-year graduate studies or advanced undergraduate studies. It presents the subject in a straightforward and lively manner. After reviewing the basic probability theory of classical thermodynamics, the author addresses the standard topics of statistical physics. The text demonstrates their relevance in other scientific fields using clear and explicit examples. Later chapters introduce phase transitions, critical phenomena and non-equilibrium phenomena.

Fluid Mechanics, Second Edition deals with fluid

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mechanics, that is, the theory of the motion of liquids and gases. Topics covered range from ideal fluids and viscous fluids to turbulence, boundary layers, thermal conduction, and diffusion. Surface phenomena, sound, and shock waves are also discussed, along with gas flow, combustion, superfluids, and relativistic fluid dynamics. This book is comprised of 16 chapters and begins with an overview of the fundamental equations of fluid dynamics, including Euler's equation and Bernoulli's equation. The reader is then introduced to the equations of motion of a viscous fluid; energy dissipation in an incompressible fluid; damping of gravity waves; and the mechanism whereby turbulence occurs. The following chapters explore the laminar boundary layer; thermal conduction in fluids; dynamics of diffusion of a mixture of fluids; and the phenomena that occur near the surface separating two continuous media. The energy and momentum of sound waves; the direction of variation of quantities in a shock wave; one- and two-dimensional gas flow; and the intersection of surfaces of discontinuity are also also considered. This monograph will be of interest to theoretical physicists.

Based on a lecture course in physics and astrophysics. Ginzburg treats certain problems and methods that are not rigorously treated in most texts. These are associated with microscopic and

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macroscopic electrodynamics and material concerning the theory of transition radiation and transition scattering. He discusses recent ideas and results, such as the problem of toroidal dipole moments. Book club price, \$42. Annotation copyrighted by Book News, Inc., Portland, OR

Based on the author's many years of lectures and tutorials at Novosibirsk State University and the University of Manchester, *Physics of Continuous Media: Problems and Solutions in Electromagnetism, Fluid Mechanics and MHD, Second Edition* takes a problems-based approach to teaching continuous media. The book's problems and detailed solutions make it an ideal companion text for advanced physics and engineering courses. Suitable for any core physics program, this revised and expanded edition includes a new chapter on magnetohydrodynamics as well as additional problems and more detailed solutions. Each chapter begins with a summary of the definitions and equations that are necessary to understand and tackle the problems that follow. The text also provides numerous references throughout, including Landau and Lifshitz's famous course of theoretical physics and original journal publications.

Devoted to the foundation of mechanics, namely classical Newtonian mechanics, the subject is based mainly on Galileo's principle of relativity and Hamilton's principle of least action. The exposition is

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simple and leads to the most complete direct means of solving problems in mechanics. The final sections on adiabatic invariants have been revised and augmented. In addition a short biography of L D Landau has been inserted.

This volume is written by Academician Sedov who is considered by many as the leading scientist in mechanics in the USSR. This latest fourth edition helps the reader in a relatively short time to master and acquire fully the essence of many geometrical and mechanical theories. Contents:

Volume 1: Kinematics of a Deformable Medium
Dynamic Concepts and Dynamic Equations of Continuum

Mechanics
The Closed Systems of Mechanical Equations for the Simplest Models of Continuous Media. Some Results from Tensor Analysis
Basic Thermodynamic Concepts and Equations
Basic Concepts and Equations of

Electrodynamics
On the Formulation of Problems in Continuum Mechanics
Nonlinear Tensor Functions of Several Tensor Arguments
Models of Continuous Media with Internal Degrees of Freedom

Volume 2: Hydrodynamics
Theory of Elasticity
Theory of Plasticity
Introduction to the Plane Problems of the Theory of Elasticity and the Theory of Cracks

Readership: Scientists/researchers of mechanical engineering, applied physics and theoretical physicists.

Classical Electrodynamics captures Schwinger's inimitable lecturing style, in which everything flows inexorably from what has gone before. Novel elements of the approach include the immediate inference of Maxwell's equations from Coulomb's law and (Galilean) relativity, the use of action and stationary principles, the central role of Green's functions both in statics and dynamics, and, throughout, the integration of mathematics and physics. Thus, physical problems in electrostatics are used to develop the properties of Bessel

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functions and spherical harmonics. The latter portion of the book is devoted to radiation, with rather complete treatments of synchrotron radiation and diffraction, and the formulation of the mode decomposition for waveguides and scattering. Consequently, the book provides the student with a thorough grounding in electrodynamics in particular, and in classical field theory in general, subjects with enormous practical applications, and which are essential prerequisites for the study of quantum field theory. An essential resource for both physicists and their students, the book includes a 'Reader's Guide,' which describes the major themes in each chapter, suggests a possible path through the book, and identifies topics for inclusion in, and exclusion from, a given course, depending on the instructor's preference. Carefully constructed problems complement the material of the text, and introduce new topics. The book should be of great value to all physicists, from first-year graduate students to senior researchers, and to all those interested in electrodynamics, field theory, and mathematical physics. The text for the graduate classical electrodynamics course was left unfinished upon Julian Schwinger's death in 1994, but was completed by his coauthors, who have brilliantly recreated the excitement of Schwinger's novel approach.

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Course of Theoretical Physics, Volume 5: Statistical Physics, Third Edition, Part 1 covers the fundamental principles of statistical physics and thermodynamic quantities. The book discusses the Gibbs and Maxwellian distributions; the Boltzmann distribution for ideal gases; and the Fermi and Bose distributions. Solids are tackled with regard to their application of statistical methods of calculating the thermodynamic quantities. The book describes the deviations of gases from the ideal state, conditions of phase equilibrium, solutions, and chemical reactions. The text also discusses the

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properties of matter at very high density; the Gaussian distribution; fluctuations of the fundamental thermodynamic quantities; and fluctuations in solids and ideal gases. The symmetry of crystals; phase transitions of the second kind and critical phenomena; and surfaces are considered as well. Students taking statistical physics and those involved in the areas of statistical physics will find the book invaluable. Covering a wide range of topics, this textbook is aimed at undergraduate and postgraduate students in physics and applied mathematics. It is constructed as a set of problems followed by detailed and rigorous solutions with the aim of exploring and illustrating general theory. Problems are novel and topical and the quality of exposition in solutions is excellent. It will thus act as a complimentary text for standard courses on the physics of continuous media.

Several significant additions have been made to the second edition, including the operator method of calculating the bremsstrahlung cross-section, the calculation of the probabilities of photon-induced pair production and photon decay in a magnetic field, the asymptotic form of the scattering amplitudes at high energies, inelastic scattering of electrons by hadrons, and the transformation of electron-positron pairs into hadrons.

Unconventional superconductivity (or superconductivity with a nontrivial Cooper pairing) is believed to exist in many heavy-fermion materials as well as in high temperature superconductors, and is a subject of great theoretical and experimental interest. The remarkable progress achieved in this field has not been reflected in published monographs

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and textbooks, and there is a gap between current research and the standard education of solid state physicists in the theory of superconductivity. This book is intended to meet this information need and includes the authors' original results.

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