Application Of The Statistical Physics Methods For The

Methods of Statistical Physics is an exposition of the tools of statistical mechanics, which evaluates the kinetic equations of classical and quantized systems. The book also analyzes the equations of macroscopic physics, such as the equations of hydrodynamics for normal and superfluid liquids and macroscopic electrodynamics. The text gives particular attention to the study of quantum systems. This study begins with a discussion of problems of quantum statistics with a detailed description of the basics of quantum mechanics along with the theory of measurement. An analysis of the asymptotic behavior of universal quantities is also explained. Strong consideration is given to the systems with spontaneously broken system. Theories such as the kinetic theory of gases, the theory of Brownian motion, the theory of the slowing down of neutrons, and the theory of transport phenomena in crystals are discussed. The book will be a useful tool for physicists, mathematicians, students, and researchers in the field of statistical mechanics.

Standard text opens with clear, concise chapters on classical statistical mechanics, quantum statistical mechanics, and the relation of statistical mechanics to thermodynamics. Further topics cover fluctuations, the theory of imperfect gases and condensation, distribution functions and the liquid state, nearest neighbor (Ising) lattice statistics, and more.

This book is based on many years of teaching statistical and thermal physics. It assumes no previous knowledge of thermodynamics, kinetic theory, or probability---the only prerequisites are an elementary knowledge of classical and modern physics, and of multivariable calculus. The first half of the book introduces the subject inductively but rigorously, proceeding from the concrete and specific to the abstract and general. In clear physical language the book explains the key concepts, such as temperature, heat, entropy, free energy, chemical potential, and distributions, both classical and quantum. The second half of the book applies these concepts to a wide variety of phenomena, including perfect gases, heat engines, and transport processes. Each chapter contains fully worked examples and real-world problems drawn from physics, astronomy, biology, chemistry, electronics, and mechanical engineering.

From the reviews: "...This book is a very useful addition to polymer literature, and it is a pleasure to recommend it to the polymer community." (J.E. Mark, University of Cincinnati, POLYMER NEWS)

This systematic book covers in simple language the physical foundations of evolution equations, stochastic processes and generalized Master equations applied on complex economic systems, helping to understand the large variability of financial markets, trading and communications networks.

Methods and Applications of Statistical Physics. Volume II

Applications of the Monte Carlo Method in Statistical Physics

A Probabilistic Approach

Thermodynamics And Statistical Mechanics

Statistical Physics of Nanoparticles in the Gas Phase

This book starts from a set of common basic principles to establish the basic formalisms of all disciplines of fundamental physics, including quantum field theory, quantum mechanics, statistical mechanics, thermodynamics, general relativity, electromagnetism, and classical mechanics. Instead of the traditional pedagogic way, the author arranges the subjects and formalisms in a logical order, i.e. all the formulas are derived from the formulas before them. The formalisms are also kept self-contained. Most mathematical tools are given in the appendices. Although this book covers all the disciplines of fundamental physics, it contains only a single volume because the contents are kept concise and treated as an integrated entity, which is consistent with the motto that simplicity is beauty, unification is beauty, and thus physics is beauty.This can be used as an advanced textbook for graduate students. It is also suitable for physicists who wish to have an overview of fundamental physics.

A completely revised edition that combines a comprehensive coverage of statistical and thermal physics with enhanced computational tools, accessibility, and active learning activities to meet the needs of today's students and educators This revised and expanded edition of Statistical and Thermal Physics introduces students to the essential ideas and techniques used in many areas of contemporary physics. Ready-to-run programs help make the many abstract concepts concrete. The text requires only a background in introductory mechanics and some basic ideas of quantum theory, discussing material typically found in undergraduate texts as well as topics such as fluids, critical phenomena, and computational techniques, which serve as a natural bridge to graduate study. Completely revised to be more accessible to students Encourages active reading with guided problems tied to the text Updated open source programs available in Java, Python, and JavaScript Integrates Monte Carlo and molecular dynamics simulations and other numerical techniques Self-contained introductions to thermodynamics and probability, including Bayes' theorem A fuller discussion of magnetism and the Ising model than other undergraduate texts Treats ideal classical and quantum gases within a uniform framework Features a new chapter on transport coefficients and linear response theory Draws on findings from contemporary research Solutions manual (available only to instructors)

This is the definitive treatise on the fundamentals of statistical mechanics. A concise exposition of classical statistical mechanics is followed by a thorough elucidation of quantum statistical mechanics: postulates, theorems, statistical ensembles, changes in quantum mechanical systems with time, and more. The final two chapters discuss applications of statistical mechanics to thermodynamic behavior. 1930 edition.

This book provides a comprehensive presentation of the basics of statistical physics. The first part explains the essence of statistical physics and how it provides a bridge between microscopic and macroscopic phenomena, allowing one to derive quantities such as entropy. Here the author avoids going into details such as Liouville's theorem or the ergodic theorem, which are difficult for beginners and unnecessary for the actual application of the statistical mechanics. In the second part, statistical mechanics is applied to various systems which, although they look different, share the same mathematical structure. In this way readers can deepen their understanding of statistical physics. The book also features applications to quantum dynamics, thermodynamics, the Ising model and the statistical dynamics of free spins.

This book presents computer simulations using molecular dynamics techniques in statistical physics, with a focus on macromolecular systems. The numerical methods are introduced in the form of computer algorithms and can be implemented in computers using any desired computer programming language, such as Fortran 90, C/C++, and others. The book also explains how some of these numerical methods and their algorithms can be implemented in the existing computer programming software of macromolecular systems, such as the CHARMM program. In addition, it examines a number of advanced concepts of computer simulation techniques used in statistical physics as well as biological and physical systems. Discussing the molecular dynamics approach in detail to enhance readers understanding of the use of this method in statistical physics problems, it also describes the equations of motion in various statistical ensembles to mimic real-world experimental conditions. Intended for graduate students and research scientists working in the field of theoretical and computational biophysics, physics and chemistry, the book can also be used by postgraduate students of other disciplines, such as applied mathematics, computer sciences, and bioinformatics. Further, offering insights into fundamental theory, it as a valuable resource for expert practitioners and programmers and those new to the field.

An Introduction

Applications Of Field Theory Methods In Statistical Physics Of Nonequilibrium Systems

From Microphysics to Macrophysics

Molecular Dynamics Simulations in Statistical Physics: Theory and Applications

Principles and Selected Applications

This book, provides a general introduction to the ideas and methods of statistical mechanics with the principal aim of meeting the needs of Master's students in chemical, mechanical, and materials science engineering. Extensive introductory information is presented on many general physics topics in which students in engineering are inadequately trained, ranging from the Hamiltonian formulation of classical mechanics to basic quantum mechanics, electromagnetic fields in matter, intermolecular forces, and transport phenomena. Since engineers should be able to apply physical concepts, the book also focuses on the practical applications of statistical physics to material science and to cutting-edge technologies, with brief but informative sections on, for example, interfacial properties, disperse systems, nucleation, magnetic materials, superfluidity, and ultralow temperature technologies. The book adopts a graded approach to learning, the opening four basic-level chapters being followed by advanced "starred" sections in which special topics are discussed. Its relatively informal style, including the use of musical metaphors to guide the reader through the text, will aid self-learning.

The application of statistical methods to physics is essential. This unique book on statistical physics offers an advanced approach with numerous applications to the modern problems students are confronted with. Therefore the text contains more concepts and methods in statistics than the student would need for statistical mechanics alone. Methods from mathematical statistics and stochastics for the analysis of data are discussed as well. The book is divided into two parts, focusing first on the modeling of statistical systems and then on the analysis of these systems. Problems with hints for solution help the students to deepen their knowledge. The second edition has been updated and enlarged with new material on estimators based on a probability distribution for the parameters, identification of stochastic models from observations, and statistical tests and classification methods (Chaps. 10-12). Moreover, a customized set of problems with solutions is accessible on the Web. The author teaches and conducts research on stochastic dynamical systems at the University of Freiburg, Germany.

A self-contained, mathematical introduction to the driving ideas in equilibrium statistical mechanics, studying important models in detail.

Suitable for graduate students in chemical physics, statistical physics, and physical chemistry, this text develops an innovative, probabilistic approach to statistical mechanics. The treatment employs Gauss's principle and incorporates Bose-Einstein and Fermi-Dirac statistics to provide a powerful tool for the statistical analysis of physical phenomena. The treatment begins with an introductory chapter on entropy and probability that covers Boltzmann's principle and thermodynamic probability, among other topics. Succeeding chapters offer a case history of black radiation, examine quantum and classical statistics, and discuss methods of processing information and the origins of the canonical distribution. The text concludes with explorations of statistical equivalence, radiative and material phase transitions, and the kinetic foundations of Gauss's error law. Bibliographic notes complete each chapter.

This popular, often cited text returns in a softcover edition to provide a thorough introduction to statistical physics and thermodynamics, and to exhibit the universal chain of ideas leading from the laws of microphysics to the macroscopic behaviour of matter. A wide range of applications illustrates the concepts, and many exercises reinforce understanding. Volume II applies statistical methods to systems governed by quantum effects, in particular to solid state physics, explaining properties due to the crystal structure or to the lattice excitations or to the electrons. The last chapters are devoted to non-equilibrium processes

and to kinetic equations, with many applications included.
Concepts, Tools, and Applications
Non-equilibrium Statistical Physics with Application to Disordered Systems
Conformal Invariance and Applications to Statistical Mechanics
A Concrete Mathematical Introduction
Fundamentals and Applications

Thermal processes are ubiquitous and an understanding of thermal phenomena is essential for a complete description of the physics of nanoparticles, both for the purpose of modeling the dynamics of the particles and for the correct interpretation of experimental data. The second edition of this book follows the logic of first edition, with an emphasis on presentation of literature results and to guide the reader through derivations. Several topics have been added to the repertoire, notably magnetism, a fuller exposition of aggregation and the related area of nucleation theory. Also a new chapter has been added on the transient hot electron phenomenon. The book remains focused on the fundamental properties of nanosystems in the gas phase. Each chapter is enriched with additional new exercises and three Appendices provide additional useful material.

Statistical physics has its origins in attempts to describe the thermal properties of matter in terms of its constituent particles, and has played a fundamental role in the development of quantum mechanics. Based on lectures taught by Professor Kardar at MIT, this textbook introduces the central concepts and tools of statistical physics. It contains a chapter on probability and related issues such as the central limit theorem and information theory, and covers interacting particles, with an extensive description of the van der Waals equation and its derivation by mean field approximation. It also contains an integrated set of problems, with solutions to selected problems at the end of the book and a complete set of solutions is available to lecturers on a password protected website at www.cambridge.org/9780521873420. A companion volume, Statistical Physics of Fields, discusses non-mean field aspects of scaling and critical phenomena, through the perspective of renormalization group.

Deals with the computer simulation of complex physical sys- tems encounteredin condensed-matter physics and statistical mechanics as well as in related fields such as metallurgy, polymer research, lattice gauge theory and quantummechanics.

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.

The focus is on the main physical ideas and mathematical methods of the microscopic theory of fluids, starting with the basic principles of statistical mechanics. The detailed derivation of results is accompanied by explanation of their physical meaning. The same approach refers to several specialized topics of the liquid state, most of which are recent developments, such as: a perturbation approach to the surface tension, an algebraic perturbation theory of polar nonpolarizable fluids and ferrocolloids, a semi-phenomenological theory of the Tolman length and some others.

Principles Of Physics: From Quantum Field Theory To Classical Mechanics (Second Edition)
A Kinetic View of Statistical Physics
Statistical and Thermal Physics
Equilibrium Statistical Mechanics
Statistical Mechanics and Applications in Condensed Matter

This unique text introduces classical statistical mechanics using molecular dynamic simulations to teach and explore the subject. Illustrated by numerous figures and animations, the book will be useful for students and professionals wishing to receive a contemporary understanding of statistical physics and use the methods in their research.

Statistical Mechanics discusses the fundamental concepts involved in understanding the physical properties of matter in bulk on the basis of the dynamical behavior of its microscopic constituents. The book emphasizes the equilibrium states of physical systems. The text first details the statistical basis of thermodynamics, and then proceeds to discussing the elements of ensemble theory. The next two chapters cover the canonical and grand canonical ensemble. Chapter 5 deals with the formulation of quantum statistics, while Chapter 6 talks about the theory of simple gases. Chapters 7 and 8 examine the ideal Bose and Fermi systems. In the next three chapters, the book covers the statistical mechanics of interacting systems, which includes the method of cluster expansions, pseudopotentials, and quantized fields. Chapter 12 discusses the theory of phase transitions, while Chapter 13 discusses fluctuations. The book will be of great use to researchers and practitioners from wide array of disciplines, such as physics, chemistry, and engineering.

This book provides a comprehensive exposition of the theory of equilibrium thermodynamics and statistical mechanics at a level suitable for well-prepared undergraduate students. The fundamental message of the book is that all results in equilibrium thermodynamics and statistical mechanics follow from a single unprovable axiom — namely, the principle of equal a priori probabilities — combined with elementary probability theory, elementary classical mechanics, and elementary quantum mechanics.

This book formulates a unified approach to the description of many-particle systems combining the methods of statistical physics and quantum field theory. The benefits of such an approach are in the description of phase transitions during the formation of new spatially inhomogeneous phases, as well in describing quasi-equilibrium systems with spatially inhomogeneous particle distributions (for example, self-gravitating systems) and metastable states.The validity of the methods used in the statistical description of many-particle systems and models (theory of phase transitions included) is discussed and compared. The idea of using the quantum field theory approach and related topics (path integration, saddle-point and stationary-phase methods, Hubbard-Stratonovich transformation, mean-field theory, and functional integrals) is described in detail to facilitate further understanding and explore more applications.To some extent, the book could be treated as a brief encyclopedia of methods applicable to the statistical description of spatially inhomogeneous equilibrium and metastable particle distributions. Additionally, the general approach is not only formulated, but also applied to solve various practically important problems (gravitating gas, Coulomb-like systems, dusty plasmas, thermodynamics of cellular structures, non-uniform dynamics of gravitating systems, etc.).

This undergraduate textbook provides a statistical mechanicalfoundation to the classical laws of thermodynamics via acomprehensive treatment of the basics of classical thermodynamics,equilibrium statistical mechanics, irreversible thermodynamics, andthe statistical mechanics of non-equilibrium phenomena. This timely book has a unique focus on the concept of entropy,which is studied starting from the well-known ideal gas law,employing various thermodynamic processes, example systems andinterpretations to expose its role in the second law ofthermodynamics. This modern treatment of statistical physicsincludes studies of neutron stars, superconductivity and therecently developed fluctuation theorems. It also presents figuresand problems in a clear and concise way, aiding the student'sunderstanding.

International Series of Monographs in Natural Philosophy

Proceedings of the NATO Advanced Research Workshop Held at Technical University of Budapest, Hungary, 19-22 May 1999

Introduction to Statistical Physics

Computational Statistical Physics

A Prelude and Fugue for Engineers

This volume contains Introductory Notes and major reprints on conformal field theory and its applications to 2-dimensional statistical mechanics of critical phenomena. The subject relates to many different areas in contemporary physics and mathematics, including string theory, integrable systems, representations of infinite Lie algebras and automorphic functions. Contents:General Principles:Infinite Conformal Symmetry in Two-dimensional Quantum Field Theory (A A Belavin et al.)Conformal Invariance and Surface Critical Behaviour (J Cardy)Mathematical Background:Contravariant Form for Infinite-dimensional Lie Algebras and Superalgebras (V Kac)Verma Modules over the Virasoro Algebra (B Feigin & D Fuks)Unitary Representations of the Virasoro and Super-Virasoro Algebras (P Goddard et al.)Critical Models and Computation of Correlations:Conformal Algebra and Multipoint Correlation Functions in 2D Statistical Models (Vl Dotsenko & V Fateev)On the Identification of Finite Operator Algebras in Two-dimensional Conformally Invariant Field Theories (P Christe & R Flume)Finite Size Scaling:Conformal Invariance, the Central Charge and Universal Finite Size Amplitudes at Criticality (H Blöte et al.)Universal Term in the Free Energy at a Critical Point and the Conformal Anomaly (I Affleck)Exact Surface and Wedge Exponents for Polymers in Two Dimensions (B Duplantier & H Saleur)Modular Invariance:Modular Invariant Partition Functions in Two Dimensions (A Cappelli et al.)Modular Invariant Partition Functions for Parafermionic Field Theories (D Gepner & Z Qiu)Discrete Symmetries of Conformal Theories (J-B Zuber)Connections With Integrable Systems:Exact Exponents for Infinitely many New Multicritical Points (D Huse)Automorphic Properties of Local Height Probabilities for Integrable Solid-on-solid Models (E Date et al.)Models with c = 1:Correlation Functions on the Critical Lines of the Baxter and Ashkin-Teller Models (L Kadanoff & A Brown)Supersymmetric Critical Phenomena and the Two Dimensional Gaussian Model (D Friedan & S Shenker)Curiosities at c=1 (P Ginsparg)Coulomb Gas Picture:Lattice Derivation of Modular Invariant Partition Functions on the Torus (V Pasquier)Vicinity of the Critical Point:Integrals of Motion in Scaling 3-state Potts Model Field Theory (A Zamolodchikov)Correlation Functions and Higher Topology:The Conformal Field Theory of Orbifolds (L Dixon et al.)Conformal and Current Algebras on a General Riemann Surface (T Eguchi & H Ooguri)and other papers Readership: Theoretical physicists in particle and statistical physics and mathematicians.

The field of statistical physics has undergone a spectacular development in recent years. The fundamentals of the subject have advanced dynamically with multidisciplinary approaches involving physicists, chemists and mathematicians. Equally spectacular has been the development of applications of statistical mechanics to shed light on a wide range of problems, many of them arising in fields quite distant from traditional physics disciplines. Recent applications range from such topics as oil recovery from porous rock to protein folding, DNA structure, morphogenesis and the cooperative behavior of living creatures. Concepts and methods of statistical physics have been applied successfully to "exotic" problems that seem to be far from physics, such as vehicular and pedestrial traffic, or economy and finance. This book presents not only the keynote invited talks, but a number of high quality, interesting, contributed communications from senior scientists and young students active in the field. Topics covered include DNA migration, wetting, chemical waves, granular media, molecular motors, biological pattern formation and motion, as well as practical problems such as heart diagnosis, internet traffic jamming, oil recovery and econophysics.

Statistical Physics offers an advanced treatment with numerous applications to modern problems of relevance to researchers and students. Supplementing the concepts and methods employed in statistical mechanics, the book also covers the fundamentals of probability and statistics, mathematical statistics, and stochastic methods for the analysis of data. It is divided into two parts, the first focusing on the modeling of statistical systems, the second on the analysis of these systems.

This text presents statistical mechanics and thermodynamics as a theoretically integrated field of study. It stresses deep coverage of fundamentals, providing a natural foundation for advanced topics. The large problem sets (with solutions for teachers) include many computational problems to advance student understanding.

Key features include an elementary introduction to probability, distribution functions, and uncertainty; a review of the concept and significance of energy; and various models of physical systems. 1968 edition.

Statistical Physics and Economics

An Introduction to Statistical Mechanics and Thermodynamics

With Computer Applications, Second Edition

Statistical Physics of Fluids

Statistical Mechanics

This textbook is the result of the enhancement of several courses on non-equilibrium statistics, stochastic processes, stochastic differential equations, anomalous diffusion and disorder. The target audience includes students of physics, mathematics, biology, chemistry, and engineering at undergraduate and graduate level with a grasp of the basic elements of mathematics and physics of the fourth year of a typical undergraduate course. The little-known physical and mathematical concepts are described in sections and specific exercises throughout the text, as well as in appendices. Physical-mathematical motivation is the main driving force for the development of this text. It presents the academic topics of probability theory and stochastic processes as well as new educational aspects in the presentation of non-equilibrium statistical theory and stochastic differential equations.. In particular it discusses the problem of irreversibility in that context and the dynamics of Fokker-Planck. An introduction on fluctuations around metastable and unstable points are given. It also describes relaxation theory of non-stationary Markov periodic in time systems. The theory of finite and infinite transport in disordered networks, with a discussion of the issue of anomalous diffusion is introduced. Further, it provides the basis for establishing the relationship between quantum aspects of the theory of linear response and the calculation of diffusion coefficients in amorphous systems.

Classic text combines thermodynamics, statistical mechanics, and kinetic theory in one unified presentation. Topics include equilibrium statistics of special systems, kinetic theory, transport coefficients, and fluctuations. Problems with solutions. 1966 edition.

Statistical physics is a core component of most undergraduate (and some post-graduate) physics degree courses. It is primarily concerned with the behavior of matter in bulk-from boiling water to the superconductivity of metals. Ultimately, it seeks to uncover the laws governing random processes, such as the snow on your TV screen. This essential new textbook guides the reader quickly and critically through a statistical view of the physical world, including a wide range of physical applications to illustrate the methodology. It moves from basic examples to more advanced topics, such as broken symmetry and the Bose-Einstein equation. To accompany the text, the author, a renowned expert in the field, has written a Solutions Manual/Instructor's Guide, available free of charge to lecturers who adopt this book for their courses. Introduction to Statistical Physics will appeal to students and researchers in physics, applied mathematics and statistics.

The application of statistical methods to physics is essential. This unique book on statistical physics offers an advanced approach with numerous applications to the modern problems students are confronted with. Therefore the text contains more concepts and methods in statistics than the student would need for statistical mechanics alone. Methods from mathematical statistics and stochastics for the analysis of data are discussed as well. The book is divided into two parts, focusing first on the modeling of statistical systems and then on the analysis of these systems. Problems with hints for solution help the students to deepen their knowledge. The third edition has been updated and enlarged with new sections deepening the knowledge about data analysis. Moreover, a customized set of problems with solutions is accessible on the Web at extras.springer.com.

Providing a detailed and pedagogical account of the rapidly-growing field of computational statistical physics, this book covers both the theoretical foundations of equilibrium and non-equilibrium statistical physics, and also modern, computational applications such as percolation, random walks, magnetic systems, machine learning dynamics, and spreading processes on complex networks. A detailed discussion of molecular dynamics simulations is also included, a topic of great importance in biophysics and physical chemistry. The accessible and self-contained approach adopted by the authors makes this book suitable for teaching courses at graduate level, and numerous worked examples and end of chapter problems allow students to test their progress and understanding.

The Principles of Statistical Mechanics

Fundamentals and Application to Condensed Matter : with Lectures, Problems and Solutions

Applications of Statistical Physics

Statistical Physics of Particles
Statistical Physics of Polymers

In this revised and enlarged second edition, Tony Guénault provides a clear and refreshingly readable introduction to statistical physics. The treatment itself is self-contained and concentrates on an understanding of the physical ideas, without requiring a high level of mathematical sophistication. The book adopts a straightforward quantum approach to statistical averaging from the outset. The initial part of the book is geared towards explaining the equilibrium properties of a simple isolated assembly of particles. The treatment of gases gives full coverage to Maxwell-Boltzmann, Fermi-Dirac and Bose-Einstein statistics.

Aimed at graduate students, this book explores some of the core phenomena in non-equilibrium statistical physics. It focuses on the development and application of theoretical methods to help students develop their problem-solving skills. The book begins with microscopic transport processes: diffusion, collision-driven phenomena, and exclusion. It then presents the kinetics of aggregation, fragmentation and adsorption, where the basic phenomenology and solution techniques are emphasized. The following chapters cover kinetic spin systems, both from a discrete and a continuum perspective, the role of disorder in non-equilibrium processes, hysteresis from the non-equilibrium perspective, the kinetics of chemical reactions, and the properties of complex networks. The book contains 200 exercises to test students' understanding of the subject. A link to a website hosted by the authors, containing supplementary material including solutions to some of the exercises, can be found at www.cambridge.org/9780521851039.

Learning is one of the things that humans do naturally, and it has always been a challenge for us to understand the process. Nowadays this challenge has another dimension as we try to build machines that are able to learn and to undertake tasks such as datamining, image processing and pattern recognition. We can formulate a simple framework, artificial neural networks, in which learning from examples may be described and understood. The contribution to this subject made over the last decade by researchers applying the techniques of statistical mechanics is the subject of this book. The authors provide a coherent account of various important concepts and techniques that are currently only found scattered in papers, supplement this with background material in mathematics and physics and include many examples and exercises to make a book that can be used with courses, or for self-teaching, or as a handy reference.

Applications of Statistical PhysicsProceedings of the NATO Advanced Research Workshop Held at Technical University of Budapest, Hungary, 19-22 May 1999North-Holland

This innovative and modular textbook combines classical topics in thermodynamics, statistical mechanics and many-body theory with the latest developments in condensed matter physics research. Written by internationally renowned experts and logically structured to cater for undergraduate and postgraduate students and researchers, it covers the underlying theoretical principles and includes numerous problems and worked examples to put this knowledge into practice. Three main streams provide a framework for the book; beginning with thermodynamics and classical statistical mechanics, including mean field approximation, fluctuations and the renormalization group approach to critical phenomena. The authors then examine quantum statistical mechanics, covering key topics such as normal Fermi and Luttinger liquids, superfluidity and superconductivity. Finally, they explore classical and quantum kinetics, Anderson localization and quantum interference, and disordered Fermi liquids. Unique in providing a bridge between thermodynamics and advanced topics in condensed matter, this textbook is an invaluable resource to all students of physics.

Statistical Mechanics of Learning

Basic Concepts and Applications

Statistical Physics

An Entropic Approach

Methods of Statistical Physics

The aim of this book is to provide the fundamentals of statistical physics and its application to condensed matter. The combination of statistical mechanics and quantum mechanics has provided an understanding of properties of matter leading to spectacular technological innovations and discoveries in condensed matter which have radically changed our daily life. The book

gives the steps to follow to understand fundamental theories and to apply these to real materials.
International Series in Natural Philosophy

An Advanced Approach with Applications
Statistical Mechanics of Lattice Systems
Principles of Statistical Physics and Numerical Modeling