Problems In Thermodynamics And Statistical Physics Peter T Landsberg

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Thermodynamics: History And Philosophy - Facts, Trends, Debates - Ropolyi L 1991-03-22
This book deals with different modern topics in probability, statistics and operations research. It has been written lucidly in a novel way. Wherever necessary, the theory is explained in great detail, with suitable illustrations. Numerous references are given, so that young researchers who want to start their work in a particular area will benefit immensely from the book.The contributors are distinguished statisticians and operations research experts from all over the world.
Theoretical Nuclear Physics - John Markus Blatt 1991-01-01
A classic work by two leading physicists and scientific educators endures as an uncommonly clear and cogent investigation and correlation of key aspects of theoretical nuclear physics. It is probably the most widely adopted book on the subject. The authors approach the subject as "the theoretical concepts, methods, and considerations which have been devised in order to interpret the experimental material and to advance our ability to predict and control nuclear phenomena." The present volume does not pretend to cover all aspects of theoretical nuclear physics. Its coverage is restricted to phenomena involving energies below about 50 Mev, a region sometimes called classical nuclear physics. Topics include studies of the nucleus, nuclear forces, nuclear spectroscopy and two-, three- and four-body problems, as well as explorations of nuclear reactions, beta-decay, and nuclear shell structure. The authors have designed the book for the experimental physicist working in nuclear physics or graduate students who have had at least a one-term course in quantum mechanics and who know the essential concepts and problems of nuclear physics.
Elementary Statistical Physics - Charles Kittel 1988
Noteworthy for the philosophical subtlety of its foundations and the elegance of its problem-solving methods, statistical mechanics can be employed in a broad range of applications -- among them, astrophysics, biology, chemistry, nuclear and solid state physics, communications engineering, metallurgy, and mathematics. Geared toward graduate students in physics, this text covers such important topics as stochastic processes and

transport theory in order to provide students with a working knowledge of statistical mechanics. To explain the fundamentals of his subject, the author uses the method of ensembles developed by J. Willard Gibbs. Topics include the properties of the Fermi-Dirac and Bose-Einstein distributions; the interrelated subjects of fluctuations, thermal noise, and Brownian movement; and the thermodynamics of irreversible processes. Negative temperature, magnetic energy, density matrix methods, and the Kramers-Kronig causality relations are treated briefly. Most sections include illustrative problems. Book jacket.

Introduction to Quantum Mechanics with Applications to Chemistry - Linus Pauling 2012-06-08

Classic undergraduate text explores wave functions for the hydrogen atom, perturbation theory, the Pauli exclusion principle, and the structure of simple and complex molecules. Numerous tables and figures.

Philosophic Foundations of Quantum Mechanics - Hans Reichenbach 1998-01-01

Written by an internationally renowned philosopher, this volume offers a three-part philosophical interpretation of quantum physics. The first part reviews the basics of quantum mechanics; the second outlines the mathematical methods of quantum mechanics; and the third section develops a variety of interpretations of quantum mechanics. 1944 edition.

Foundations of Laser Spectroscopy - Stig Stenholm 2012-09-20

A simple presentation of the theoretical foundations of steady-state laser spectroscopy, this text helps students to apply theory to calculations with a systematic series of examples and exercises. 1984 edition.

Foundations of Radiation Hydrodynamics - Dimitri Mihalas 1999-07-07

Largely self contained, this expert three-part treatment focuses on the dynamics of nonradiating fluids; explores the physics of radiation, radiation transport, and the dynamics of radiating fluids; and offers a brief appendix that explains the use of tensor concepts in equations related to the transition of ordinary fluids to relativistic fluids to radiation. 1984 edition.

Quantum Theory - Peter Bongaarts 2014-12-01

This book was inspired by the general observation that the great theories of modern physics are based on simple and transparent underlying mathematical structures - a fact not usually emphasized in standard physics textbooks - which makes it easy for mathematicians to understand their basic features. It is a textbook on quantum theory intended for advanced undergraduate or graduate students: mathematics students interested in modern physics, and physics students who are interested in the mathematical background of physics and are dissatisfied with the level of rigor in standard physics courses. More generally, it offers a valuable resource for all mathematicians interested in modern physics, and all physicists looking for a higher degree of mathematical precision with regard to the basic concepts in their field.

Introduction to Modern Optics - Grant R. Fowles 1989-01-01

This incisive text provides a basic undergraduate-level course in modern optics for students in physics, technology and engineering. The first half of the book deals with classical physical optics; the second principally with the quantum nature of light. Chapters 1 and 2 treat the propagation of light waves, including the concepts of phase and group velocities, and the vectorial nature of light. Chapter 3 applies the concepts of partial coherence and coherence length to the study of interference, and Chapter 4 takes up multiple-beam interference and includes Fabry-Perot interferometry and multilayer-film theory. Diffraction and holography are the subjects of Chapter 5, and the propagation of light in material media (including crystal and nonlinear optics) are central to Chapter 6. Chapters 7 and 8 introduce the quantum theory of light and elementary optical spectra, and Chapter 9 explores the theory of light amplification and lasers. Chapter 10

briefly outlines ray optics in order to introduce students to the matrix method for treating optical systems and to apply the ray matrix to the study of laser resonators. Many applications of the laser to the study of optics are integrated throughout the text. The author assumes students have had an intermediate course in electricity and magnetism and some advanced mathematics beyond calculus. For classroom use, a list of problems is included at the end of each chapter, with selected answers at the end of the book.

Energy, Force and Matter - Peter M. Harman 1982-04-30

By focusing on the conceptual issues faced by nineteenth century physicists, this book clarifies the status of field theory, the ether, and thermodynamics in the work of the period. A remarkably synthetic account of a difficult and fragmentary period in scientific development.

Introduction to Matrix Methods in Optics - Anthony Gerrard 1994-01-01

Clear, accessible guide requires little prior knowledge and considers just two topics: paraxial imaging and polarization. Lucid discussions of paraxial imaging properties of a centered optical system, optical resonators and laser beam propagation, matrices in polarization optics and propagation of light through crystals, much more. 60 illustrations. Appendixes. Bibliography.

Investigations on the Theory of the Brownian Movement - Albert Einstein 1956-01-01

Five early papers evolve theory that won Einstein a Nobel Prize: "Movement of Small Particles Suspended in a Stationary Liquid Demanded by the Molecular-Kinetic Theory of Heat"; "On the Theory of the Brownian Movement"; "A New Determination of Molecular Dimensions"; "Theoretical Observations on the Brownian Motion"; and "Elementary Theory of the Brownian Motion."

Problems in Thermodynamics and Statistical Physics - Peter T. Landsberg 2014-07-16

Well respected and widely used, this volume presents problems and full solutions related to a wide range of topics in thermodynamics, statistical physics, and statistical mechanics. The text is intended for instructors, undergraduates, and graduate students of mathematics, physics, chemistry, and engineering. Twenty-eight chapters, each prepared by an expert, proceed from simpler to more difficult subjects. Similarly, the early chapters are easier than the later ones, making the book ideal for independent study. Subjects begin with the laws of thermodynamics and statistical theory of information and of ensembles, advancing to the ideal classical gases of polyatomic molecules, non-electrolyte liquids and solutions, and surfaces. Subsequent chapters explore imperfect classical and quantum gas, phase transitions, cooperative phenomena, Green function methods, the plasma, transport in gases and metals, Nyquist's theorem and its generalizations, stochastic methods, and many other topics.

Thermodynamics with Quantum Statistical Illustrations - Peter Theodore Landsberg 1961

Time's Arrow and Archimedes' Point - Huw Price 1997-12-04

Why is the future so different from the past? Why does the past affect the future and not the other way around? What does quantum mechanics really tell us about the world? In this important and accessible book, Huw Price throws fascinating new light on some of the great mysteries of modern physics, and connects them in a wholly original way. Price begins with the mystery of the arrow of time. Why, for example, does disorder always increase, as required by the second law of thermodynamics? Price shows that, for over a century, most physicists have thought about these problems the wrong way. Misled by the human perspective from within time, which distorts and exaggerates the differences between past and future, they have fallen victim to what Price calls the "double standard fallacy": proposed explanations of the difference between the past and the future turn out to rely on a difference which has been

slipped in at the beginning, when the physicists themselves treat the past and future in different ways. To avoid this fallacy, Price argues, we need to overcome our natural tendency to think about the past and the future differently. We need to imagine a point outside time -- an Archimedean "view from nowhen" -- from which to observe time in an unbiased way. Offering a lively criticism of many major modern physicists, including Richard Feynman and Stephen Hawking, Price shows that this fallacy remains common in physics today -- for example, when contemporary cosmologists theorize about the eventual fate of the universe. The "big bang" theory normally assumes that the beginning and end of the universe will be very different. But if we are to avoid the double standard fallacy, we need to consider time symmetrically, and take seriously the possibility that the arrow of time may reverse when the universe recollapses into a "big crunch." Price then turns to the greatest mystery of modern physics, the meaning of quantum theory. He argues that in missing the Archimedean viewpoint, modern physics has missed a radical and attractive solution to many of the apparent paradoxes of quantum physics. Many consequences of quantum theory appear counterintuitive, such as Schrodinger's Cat, whose condition seems undetermined until observed, and Bell's Theorem, which suggests a spooky "nonlocality," where events happening simultaneously in different places seem to affect each other directly. Price shows that these paradoxes can be avoided by allowing that at the quantum level the future does, indeed, affect the past. This demystifies nonlocality, and supports Einstein's unpopular intuition that quantum theory describes an objective world, existing independently of human observers: the Cat is alive or dead, even when nobody looks. So interpreted, Price argues, quantum mechanics is simply the kind of theory we ought to have expected in microphysics -- from the symmetric standpoint. Time's Arrow and Archimedes' Point presents an innovative and controversial view of time and contemporary physics. In this exciting book, Price urges physicists, philosophers, and anyone who has ever pondered the mysteries of time to look at the world from the fresh perspective of Archimedes' Point and gain a deeper understanding of ourselves, the universe around us, and our own place in time.

Concepts of Force - Max Jammer 1999-01-01

This work by a noted physicist traces conceptual development from ancient to modern times. Kepler's initiation, Newton's definition, subsequent reinterpretation — contrasting concepts of Leibniz, Boscovich, Kant with those of Mach, Kirchhoff, Hertz. "An excellent presentation." — Science.

Magnetism and Metallurgy of Soft Magnetic Materials - Chih-Wen Chen 1986-01-01

Directed to solid-state physicists, engineers, and graduate-level students: a comprehensive treatment of the theory and application of soft magnets — vital in computer and telecommunications technology. Topics include ferromagnetism and ferrimagnetism, magnetization and domain structure, metallurgy and applications of soft magnetic materials. 227 figures.

Understanding Thermodynamics - H.C. Van Ness 2012-06-08

Clear treatment of systems and first and second laws of thermodynamics features informal language, vivid and lively examples, and fresh perspectives. Excellent supplement for undergraduate science or engineering class.

Applied Optics and Optical Design - Alexander Eugen Conrady 1992-01-01

Classic work presents Conrady's complete system of optical design. Part One covers all ordinary ray-tracing methods, together with the complete theory of primary aberration and as much of higher aberration as is needed for the design of telescopes, low-power microscopes, and simple optical systems.

Statistical Mechanics - Peter S Riseborough 2020-10-20

The book is aimed at undergraduate students in their senior year and first year graduate students. It elucidates the basis of thermodynamics and provides a basis for the understanding of, not only the

thermodynamic properties of a microscopic system, but also their fluctuations, correlations and close-to-equilibrium properties.

Hypersonic Inviscid Flow - Wallace Dean Hayes 2004-01-01
Unified, self-contained view of nonequilibrium effects, body geometries, and similitudes available in hypersonic flow and thin shock layer; appropriate for graduate-level courses in hypersonic flow theory. 1966 edition.

Quanta, Matter, and Change - Peter Atkins 2008-11-15
Beginning with quantum mechanics, introducing statistical mechanics, and progressing through to thermodynamics, this new text for the two-semester physical chemistry course features a wealth of new applications and insights, as well as new Mathematical Background inter-chapters to help students review key quantitative concepts. "This is a splendid book. True to the authors' philosophy as outlined in the preface, it approaches physical chemistry by first developing the quantum theory of molecular electronic structure, then by statistical arguments moves into thermodynamics, and thence to kinetics." - Peter Taylor, Review in Chemistry World (Royal Society of Chemistry), July 31, 2009.

An Introduction to Statistical Mechanics and Thermodynamics - Robert H. Swendsen 2012-03
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.

The Arrow Of Time - Roger Highfield 2015-06-30
In our century, the subject of time has become an area of serious inquiry for science. Theories that contain time as a simple quantity form the basis of our understanding of many scientific disciplines, yet the debate rages on: why does there seem to be a direction to time, an arrow of time pointing from past to future? In this authoritative and accessible Sunday Times bestseller, physical chemist Dr Peter Coveney and award-winning science journalist Dr Roger Highfield demonstrate that the common sense view of time agrees with the most advanced scientific theory. Time does in fact move like an arrow, shooting forward into what is genuinely unknown, leaving the past immutably behind. The authors make their case by exploring three centuries of science, offering bold reinterpretations of Newton's mechanics, Einstein's special and general theories of relativity, quantum mechanics, and advancing the insights of chaos theory. In their voyage through science the authors link apparently irreconcilable subjects, from Einstein's obsession with causality to chaos theory, from Marvell's winged chariot to that Monday morning feeling. Finally, drawing together the various interpretations of time, they describe a novel way to give it a sense of direction. And they call for a new fundamental theory to take account of the Arrow of Time. Foreword by Ilya Prigogine, Nobel laureate.

The Philosophy Behind Physics - Thomas A. Brody 2012-12-06
Thomas Brody had one of the most powerful and wide-ranging intellects of his generation. Although primarily a physicist who worked on statistical prob lems in nuclear physics, on probability theory and on computational physics he had an extensive knowledge of the philosophy of science and of philosophy, and was fluent in many languages. He is well-known among physicists for the Brody-Moshinsky transformation but his extensive work on probability and on the philosophy of science remained almost unknown. This was because the originality of his ideas entailed many lengthy battles with uncomprehending referees, and he frequently published in Mexican journals of limited circula tion. In addition, his strongly critical spirit inhibited his willingness to publish his ideas. He was always most concerned by the very unsatisfactory situation in the philosophy of physics, that is largely due to the generally poor knowledge that physicists and philosophers have of each other's disciplines. Philosophers of science write at length about physics

without any detailed first-hand knowl edge of how research is actually carried out. Physicists, for their part, often implicitly assume naive or erroneous philosophical ideas, and this often hinders their scientific work, besides spreading further confusion if they try to give an account of what they are doing.

Advanced Strength of Materials - J. P. Den Hartog 2014-07-01

Four decades ago, J.P. Den Hartog, then Professor of Mechanical Engineering at Massachusetts Institute of Technology, wrote Strength of Materials, an elementary text that still enjoys great popularity in engineering schools throughout the world. Widely used as a classroom resource, it has also become a favorite reference and refresher on the subject among engineers everywhere. This is the first paperback edition of an equally successful text by this highly respected engineer and author. Advanced Strength of Materials takes this important subject into areas of greater difficulty, masterfully bridging its elementary aspects and its most formidable advanced reaches. The book reflects Den Hartog's impressive talent for making lively, discursive and often witty presentations of his subject, and his unique ability to combine the scholarly insight of a distinguished scientist with the practical, problem-solving orientation of an experienced industrial engineer. The concepts here explored in depth include torsion, rotating disks, membrane stresses in shells, bending of flat plates, beams on elastic foundation, the two-dimensional theory of elasticity, the energy method and buckling. The presentation is aimed at the student who has a one-semester course in elementary strength of materials. The book includes an especially thorough and valuable section of problems and answers which give both students and professionals practice in techniques and clear illustrations of applications.

Methods of Thermodynamics - Howard Reiss 1996-01-01

Outstanding text focuses on physical technique of thermodynamics, typical problems, and significance and use of thermodynamic potential. Mathematical apparatus, first law of thermodynamics, second law and entropy, more. 1965 edition.

Thermodynamics And Statistical Mechanics - Richard Fitzpatrick 2020-07-07

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.

Statistical Mechanics - Shang-Keng Ma 1985

This is a unique and exciting graduate and advanced undergraduate text written by a highly respected physicist who had made significant contributions to the subject. This book conveys to the reader that statistical mechanics is a growing and lively subject. It deals with many modern topics from a physics standpoint in a very physical way. Particular emphasis is given to the fundamental assumption of statistical mechanics S=1n and its logical foundation. Calculational rules are derived without resorting to abstract ensemble theory.

Theory of Heat - James Clerk Maxwell 2001-01-01

Thisnbsp;classic sets forth the fundamentals of thermodynamics clearly and simply enough to be understood by a beginning student, yet with enough subtlety and depth of thought to appeal also to more advanced readers. It elucidates fundamentals of kinetic theory and illustrates the Second Law of Thermodynamicsnbsp;withnbsp;"Maxwell’s demon."

Continuum Mechanics - Peter Chadwick 1999-01-01

Written in response to the dearth of practical and meaningful textbooks in the field of fundamental continuum mechanics, this comprehensive treatment offers students and instructors an immensely useful tool. Its 115 solved problems and exercises not only provide

essential practice but also systematically advance the understanding of vector and tensor theory, basic kinematics, balance laws, field equations, jump conditions, and constitutive equations. Readers follow clear, formally precise steps through the central ideas of classical and modern continuum mechanics, expressed in a common, efficient notation that fosters quick comprehension and renders these concepts familiar when they reappear in other contexts. Completion of this brief course results in a unified basis for work in fluid dynamics and the mechanics of solid materials, a foundation of particular value to students of mathematics and physics, those studying continuum mechanics at an intermediate or advanced level, and postgraduate students in the applied sciences. "Should be excellent in its intended function as a problem book to accompany a lecture course." — Quarterly of Applied Math.

Problems in Thermodynamics and Statistical Physics - Peter Theodore Landsberg 1971

Physics and Chance - Lawrence Sklar 1995-09-29

Lawrence Sklar offers a comprehensive, non-technical introduction to statistical mechanics and attempts to understand its foundational elements.

Variational Principles in Dynamics and Quantum Theory - Wolfgang Yourgrau 1979-01-01

Historical, theoretical survey with many insights, much hard-to-find material. Covers Hamilton's principle, Hamilton-Jacobi equation, relationship to quantum theory and wave mechanics, and more.

Non-equilibrium Thermodynamics - Sybren Ruurds de Groot 1984-01-01

Classic monograph treats the irreversible processes and phenomena of thermodynamics: non-equilibrium thermodynamics. Covers statistical foundations and applications of the field with special chapters on fluctuation theory, theory of stochastic processes, kinetic theory of gases, derivation of the Onsager reciprocal relations, more. 4 black-and-white illustrations.

Four Laws That Drive the Universe - Peter Atkins 2007-09-06

The laws of thermodynamics drive everything that happens in the universe. From the sudden expansion of a cloud of gas to the cooling of hot metal, and from the unfurling of a leaf to the course of life itself - everything is directed and constrained by four simple laws. They establish fundamental concepts such as temperature and heat, and reveal the arrow of time and even the nature of energy itself. Peter Atkins' powerful and compelling introduction explains what the laws are and how they work, using accessible language and virtually no mathematics. Guiding the reader from the Zeroth Law to the Third Law, he introduces the fascinating concept of entropy, and how it not only explains why your desk tends to get messier, but also how its unstoppable rise constitutes the engine of the universe.

The Physical Principles of the Quantum Theory - Werner Heisenberg 1949-01-01

Nobel Laureate discusses quantum theory, uncertainty, wave mechanics, work of Dirac, Schroedinger, Compton, Einstein, others. "An authoritative statement of Heisenberg's views on this aspect of the quantum theory." ? Nature.

Applied Nonlinear Optics - Frits Zernike 2006-01-01

Directed toward physicists and engineers interested in the device applications enabled by nonlinear optics, this text is suitable for advanced undergraduates and graduate students. Its content is presented entirely on a classical basis and requires only an elementary knowledge of quantum mechanics. The authors demonstrate how real laboratory situations can diverge from ideal theory, acquainting readers with the kinds of problems common to construction of a nonlinear device. They also offer a detailed discussion of the practical problems and characteristics of nonlinear materials, as well as the selection procedures necessary to ensure the use of good material. Their treatment begins with an introduction to the theories of linear and nonlinear

optics, along with the basic ideas behind them. Succeeding chapters explore phase matching and nonlinear materials, followed by detailed treatments of second-harmonic generation, parametric up-conversion, and optical parametric amplification and oscillation. Appendixes offer a comprehensive list of materials and their properties; the text concludes with references and an index.

Thermodynamics and Statistical Mechanics - Peter T. Landsberg 2014-03-05

Exceptionally articulate treatment of negative temperatures, relativistic effects, black hole thermodynamics, gravitational collapse, much more. Over 100 problems with worked solutions. Geared toward advanced undergraduates and graduate students.

Statistical Physics of Fields - Mehran Kardar 2007-06-07

While many scientists are familiar with fractals, fewer are familiar with scale-invariance and universality which underlie the ubiquity of their shapes. These properties may emerge from the collective behaviour of simple fundamental constituents, and are studied using statistical field theories. Initial chapters connect the particulate perspective developed in the companion volume, to the coarse grained statistical fields studied here. Based on lectures taught by Professor Kardar at MIT, this textbook demonstrates how such theories are formulated and studied. Perturbation theory, exact solutions, renormalization groups, and other tools are employed to demonstrate the emergence of scale invariance and universality, and the non-equilibrium dynamics of interfaces and directed paths in random media are discussed. Ideal for advanced graduate courses in statistical physics, it contains an integrated set of problems, with solutions to selected problems at the end of the book and a complete set available to lecturers at www.cambridge.org/9780521873413.