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Mathematical Methods for Scientists and Engineers - Donald Allan McQuarrie 2003 "Intended for upper-level undergraduate and graduate courses in chemistry, physics, math and engineering, this book will also become a must-have for the personal library of all advanced students in the physical sciences. Comprised of more than 2000 problems and 700 worked examples that detail every single step, this text is exceptionally well adapted for self study as well as for course use."--From publisher description.

Manual de Física Estadística - Salvador Mafé 1998 El objetivo de este texto es servir de apoyo al estudiante que sigue un curso básico de Física Estadística, útil también para profesores, especialmente para los que se plantean qué contenidos escoger para el curso. Se trata, pues, de un "Manual de Física Estadística" con un planteamiento y contenido adecuados a los fines docentes que se persiguen y que ha surgido en conexión directa con la valoración de la docencia de los autores.

Molecular Thermodynamics - Donald A. McQuarrie 1999-02-24 Covers the principles of quantum mechanics and engages those principles in the development of thermodynamics. Coverage includes the properties of gases, the First Law of Thermodynamics, a molecular interpretation of the principal thermodynamic state functions, solutions, non equilibrium thermodynamics, and electrochemistry. Features 10-12 worked examples and some 60 problems for each

chapter. A separate Solutions Manual is forthcoming in April 1999. Annotation copyrighted by Book News, Inc., Portland, OR
Liquids, Solutions, and Interfaces - W. Ronald Fawcett 2004-07-01 Fifty years ago solution chemistry occupied a major fraction of physical chemistry textbooks, and dealt mainly with classical thermodynamics, phase equilibria, and non-equilibrium phenomena, especially those related to electrochemistry. Much has happened in the intervening period, with tremendous advances in theory and the development of important new experimental techniques. This book brings the reader through the developments from classical macroscopic descriptions to more modern microscopic details.

Statistical Mechanics in a Nutshell - Luca Peliti 2011-08-28 A concise introduction to statistical mechanics Statistical mechanics is one of the most exciting areas of physics today, and it also has applications to subjects as diverse as economics, social behavior, algorithmic theory, and evolutionary biology. Statistical Mechanics in a Nutshell offers the most concise, self-contained introduction to this rapidly developing field. Requiring only a background in elementary calculus and elementary mechanics, this book starts with the basics, introduces the most important developments in classical statistical mechanics over the last thirty years, and guides readers to the very threshold of today's cutting-edge research. Statistical Mechanics in a Nutshell zeroes in on the most relevant and

promising advances in the field, including the theory of phase transitions, generalized Brownian motion and stochastic dynamics, the methods underlying Monte Carlo simulations, complex systems—and much, much more. The essential resource on the subject, this book is the most up-to-date and accessible introduction available for graduate students and advanced undergraduates seeking a succinct primer on the core ideas of statistical mechanics. Provides the most concise, self-contained introduction to statistical mechanics Focuses on the most promising advances, not complicated calculations Requires only elementary calculus and elementary mechanics Guides readers from the basics to the threshold of modern research Highlights the broad scope of applications of statistical mechanics

Statistical Mechanics - Donald Allan McQuarrie 2003

Mathematics for Physical Chemistry: Opening Doors - Donald A. McQuarrie 2008-07-21
This text provides students with concise reviews of mathematical topics that are used throughout physical chemistry. By reading these reviews before the mathematics is applied to physical chemical problems, a student will be able to spend less time worrying about the math and more time learning the physical chemistry.

Statistical Mechanics of Nonequilibrium Liquids - Denis J. Evans 2007-08-01
"There is a symbiotic relationship between theoretical nonequilibrium statistical mechanics on the one hand and the theory and practice of computer simulation on the other. Sometimes, the initiative for progress has been with the pragmatic requirements of computer simulation and at other times, the initiative has been with the fundamental theory of nonequilibrium processes. This book summarises progress in this field up to 1990"--Publisher's description.

Molecular Driving Forces - Ken A. Dill 2003
This text shows how many complex behaviors of molecules can result from a few simple physical processes. A central theme is the idea that simplistic models can give surprisingly accurate insights into the workings of the molecular world. Written in a clear and student-friendly style, the book gives an excellent introduction to

the field for novices. It should also be useful to those who want to refresh their understanding of this important field, and those interested in seeing how physical principles can be applied to the study of problems in the chemical, biological, and material sciences. Furthermore, Molecular Driving Forces contains a number of features including: 449 carefully produced figures illustrating the subject matter; 178 worked examples in the chapters which explain the key concepts and show their practical applications; The text is mathematically self-contained, with 'mathematical toolkits' providing the required maths; Advanced material that might not be suitable for some elementary courses is clearly delineated in the text; End-of-chapter references and suggestions for further reading.

Statistical Mechanics - Ryogo Kubo 1990

Statistical Thermodynamics for Beginners - Howard D Stidham 2017-02-07
This book is the distilled essence of the author teaching statistical mechanics to juniors, seniors and graduate students for over 50 years in various course settings. It uses a unique approach that leads naturally into the development of all possible ensembles. Much of the later chapters on polymers has previously been available only in the literature. Throughout the book, the assumption is made that the reader is still relatively raw, and mathematical detail is provided that other books leave to the abilities of the reader. While this produces a plethora of equations that mature scientists would regard as unnecessary, it is intended to help those just coming into the field and who want to get the idea without suffering hours of agony wondering, "where did that come from?". Request Inspection Copy

Molecular Driving Forces - Ken Dill 2010-10-21
Molecular Driving Forces, Second Edition E-book is an introductory statistical thermodynamics text that describes the principles and forces that drive chemical and biological processes. It demonstrates how the complex behaviors of molecules can result from a few simple physical processes, and how simple models provide surprisingly accurate insights into the workings of the molecular world. Widely adopted in its First Edition, Molecular Driving

Forces is regarded by teachers and students as an accessible textbook that illuminates underlying principles and concepts. The Second Edition includes two brand new chapters: (1) "Microscopic Dynamics" introduces single molecule experiments; and (2) "Molecular Machines" considers how nanoscale machines and engines work. "The Logic of Thermodynamics" has been expanded to its own chapter and now covers heat, work, processes, pathways, and cycles. New practical applications, examples, and end-of-chapter questions are integrated throughout the revised and updated text, exploring topics in biology, environmental and energy science, and nanotechnology. Written in a clear and reader-friendly style, the book provides an excellent introduction to the subject for novices while remaining a valuable resource for experts.

Statistical Mechanics - R K Pathria 2017-02-21 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.

General Chemistry - Donald Allan McQuarrie 2011
"Atoms First seems to be the flavor of the year in chemistry textbooks, but many of them seem to be little more than rearrangement of the chapters. It takes a master like McQuarrie to go back to the drawing board and create a logical development from smallest to largest that makes sense to students."---Hal Harris, University of Missouri-St. Louis "McQuarrie's book is extremely well written, the order of topics is logical, and it does a great job with both introductory material and more advanced concepts. Students of all skill levels will be able to learn from this book."---Mark Kearley, Florida State University This new fourth edition of General Chemistry takes an atoms-first approach from beginning to end. In the tradition of McQuarrie's many previous works, it promises to be another ground-breaking text. This superb new book combines the clear writing and wonderful problems that have made McQuarrie famous among chemistry professors and students worldwide. Presented in an elegant design with all-new illustrations, it is available in a soft-cover edition to offer professors a fresh choice at an outstanding value. Student supplements include an online series of descriptive chemistry Interchapters, a Student Solutions Manual, and an optional state-of-the-art Online Homework program. For adopting professors, an Instructor's Manual and a CD of the art are also available.

Statistical Mechanics: Theory and Molecular Simulation - Mark Tuckerman 2010-02-11
Complex systems that bridge the traditional disciplines of physics, chemistry, biology, and materials science can be studied at an unprecedented level of detail using increasingly sophisticated theoretical methodology and high-speed computers. The aim of this book is to prepare burgeoning users and developers to become active participants in this exciting and rapidly advancing research area by uniting for the first time, in one monograph, the basic concepts of equilibrium and time-dependent statistical mechanics with the modern techniques used to solve the complex problems that arise in real-world applications. The book contains a detailed review of classical and quantum mechanics, in-depth discussions of the most commonly used ensembles simultaneously with modern computational techniques such as molecular dynamics and Monte Carlo, and important topics including free-energy calculations, linear-response theory, harmonic baths and the generalized Langevin equation,

critical phenomena, and advanced conformational sampling methods. Burgeoning users and developers are thus provided firm grounding to become active participants in this exciting and rapidly advancing research area, while experienced practitioners will find the book to be a useful reference tool for the field.
Thermodynamics and Statistical Mechanics - M. Scott Shell 2015-04-16
Learn classical thermodynamics alongside statistical mechanics and how macroscopic and microscopic ideas interweave with this fresh approach to the subjects.
Statistical Mechanics - Donald Allan McQuarrie 1975

Statistical Thermodynamics - Normand M. Laurendeau 2005-11-21
This 2006 textbook discusses the fundamentals and applications of statistical thermodynamics for beginning graduate students in the physical and engineering sciences. Building on the prototypical Maxwell–Boltzmann method and maintaining a step-by-step development of the subject, this book assumes the reader has no previous exposure to statistics, quantum mechanics or spectroscopy. The book begins with the essentials of statistical thermodynamics, pauses to recover needed knowledge from quantum mechanics and spectroscopy, and then moves on to applications involving ideal gases, the solid state and radiation. A full introduction to kinetic theory is provided, including its applications to transport phenomena and chemical kinetics. A highlight of the textbook is its discussion of modern applications, such as laser-based diagnostics. The book concludes with a thorough presentation of the ensemble method, featuring its use for real gases. Numerous examples and prompted homework problems enrich the text.
Quantum Chemistry - Donald A. McQuarrie 2008
The biggest change in the years since the first edition is the proliferation of computational chemistry programs that calculate molecular properties. McQuarrie presents step-by-step SCF calculations of a helium atom and a hydrogen molecule, in addition to including the Hartree-Fock method and post-Hartree-Fock methods.
Problems on Statistical Mechanics - D.A.R Dalvit 1999-01-01

A thorough understanding of statistical mechanics depends strongly on the insights and manipulative skills that are acquired through the solving of problems. Problems on Statistical Mechanics provides over 120 problems with model solutions, illustrating both basic principles and applications that range from solid-state physics to cosmology. An introductory chapter provides a summary of the basic concepts and results that are needed to tackle the problems, and also serves to establish the notation that is used throughout the book. The problems themselves occupy five chapters, progressing from the simpler aspects of thermodynamics and equilibrium statistical ensembles to the more challenging ideas associated with strongly interacting systems and nonequilibrium processes. Comprehensive solutions to all of the problems are designed to illustrate efficient and elegant problem-solving techniques. Where appropriate, the authors incorporate extended discussions of the points of principle that arise in the course of the solutions. The appendix provides useful mathematical formulae.
Computational Statistical Mechanics - W.G. Hoover 2012-12-02
Computational Statistical Mechanics describes the use of fast computers to simulate the equilibrium and nonequilibrium properties of gases, liquids, and solids at, and away from equilibrium. The underlying theory is developed from basic principles and illustrated by applying it to the simplest possible examples. Thermodynamics, based on the ideal gas thermometer, is related to Gibb's statistical mechanics through the use of Nosé-Hoover heat reservoirs. These reservoirs use integral feedback to control temperature. The same approach is carried through to the simulation and analysis of nonequilibrium mass, momentum, and energy flows. Such a unified approach makes possible consistent mechanical definitions of temperature, stress, and heat flux which lead to a microscopic demonstration of the Second Law of Thermodynamics directly from mechanics. The intimate connection linking Lyapunov-unstable microscopic motions to macroscopic dissipative flows through multifractal phase-space structures is illustrated with many examples from the recent literature.

The book is well-suited for undergraduate courses in advanced thermodynamics, statistical mechanic and transport theory, and graduate courses in physics and chemistry.

Statistical Physics of Particles - Mehran Kardar 2007-06-07
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.

Equilibrium Statistical Physics - M. Baus 2007-11-15
This is a textbook which gradually introduces the student to the statistical mechanical study of the different phases of matter and to the phase transitions between them. Throughout, only simple models of both ordinary and soft matter are used but these are studied in full detail. The subject is developed in a pedagogical manner, starting from the basics, going from the simple ideal systems to the interacting systems, and ending with the more modern topics. The textbook provides the student with a complete overview, intentionally at an introductory level, of the theory of phase transitions. All equations and deductions are included.

Statistical Mechanics - Norman Davidson 2013-01-23
Sufficiently rigorous for introductory or intermediate graduate courses, this text offers a comprehensive treatment of the techniques and limitations of statistical mechanics. 82 figures. 15 tables. 1962 edition.

Stochastic Processes in Physics and Chemistry - N.G. Van Kampen 1992-11-20
This new edition of Van Kampen's standard work has been completely revised and updated. Three major changes have also been made. The Langevin equation receives more attention in a separate chapter in which non-Gaussian and colored noise are introduced. Another additional chapter contains old and new material on first-passage times and related subjects which lay the foundation for the chapter on unstable systems. Finally a completely new chapter has been written on the quantum mechanical foundations of noise. The references have also been expanded and updated.

Thermodynamics and Statistical Mechanics - M. Scott Shell 2015-04-16
Learn classical thermodynamics alongside statistical mechanics with this fresh approach to the subjects. Molecular and macroscopic principles are explained in an integrated, side-by-side manner to give students a deep, intuitive understanding of thermodynamics and equip them to tackle future research topics that focus on the nanoscale. Entropy is introduced from the get-go, providing a clear explanation of how the classical laws connect to the molecular principles, and closing the gap between the atomic world and thermodynamics. Notation is streamlined throughout, with a focus on general concepts and simple models, for building basic physical intuition and gaining confidence in problem analysis and model development. Well over 400 guided end-of-chapter problems are included, addressing conceptual, fundamental, and applied skill sets. Numerous worked examples are also provided together with handy shaded boxes to emphasize key concepts, making this the complete teaching package for students in chemical engineering and the chemical sciences.

Statistical Physics - Josef Honerkamp 2013-03-09
The book is divided into two parts. The first part looks at the modeling of statistical systems before moving on to an analysis of these systems. This second edition contains new material on: estimators based on a probability distribution for the parameters; identification of stochastic models from observations; and statistical tests and classification methods.

Equilibrium Statistical Physics - Marc Baus

2021-06-04
This is a textbook which gradually introduces the student to the statistical mechanical study of the different phases of matter and to the phase transitions between them. Throughout, only simple models of both ordinary and soft matter are used but these are studied in full detail. The subject is developed in a pedagogical manner, starting from the basics, going from the simple ideal systems to the interacting systems, and ending with the more modern topics. The textbook provides the student with a complete overview, intentionally at an introductory level, of the theory of phase transitions. All equations and deductions are included.

Lectures in Classical Thermodynamics with an Introduction to Statistical Mechanics - Daniel Blankschtein 2021-03-15
This textbook facilitates students' ability to apply fundamental principles and concepts in classical thermodynamics to solve challenging problems relevant to industry and everyday life. It also introduces the reader to the fundamentals of statistical mechanics, including understanding how the microscopic properties of atoms and molecules, and their associated intermolecular interactions, can be accounted for to calculate various average properties of macroscopic systems. The author emphasizes application of the fundamental principles outlined above to the calculation of a variety of thermodynamic properties, to the estimation of conversion efficiencies for work production by heat interactions, and to the solution of practical thermodynamic problems related to the behavior of non-ideal pure fluids and fluid mixtures, including phase equilibria and chemical reaction equilibria. The book contains detailed solutions to many challenging sample problems in classical thermodynamics and statistical mechanics that will help the reader crystallize the material taught. Class-tested and perfected over 30 years of use by nine-time Best Teaching Award recipient Professor Daniel Blankschtein of the Department of Chemical Engineering at MIT, the book is ideal for students of Chemical and Mechanical Engineering, Chemistry, and Materials Science, who will benefit greatly from in-depth discussions and pedagogical explanations of key concepts. Distills critical concepts, methods, and applications from leading full-length textbooks, along with the author's own deep understanding of the material taught, into a concise yet rigorous graduate and advanced undergraduate text; Enriches the standard curriculum with succinct, problem-based learning strategies derived from the content of 50 lectures given over the years in the Department of Chemical Engineering at MIT; Reinforces concepts covered with detailed solutions to illuminating and challenging homework problems.

Statistical Physics - Gregory H. Wannier 2012-08-09
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 and Thermal Physics - Harvey Gould 2021-09-14
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)

Equilibrium and Non-Equilibrium Statistical Thermodynamics - Michel Le Bellac 2004-04-08 Publisher Description

Quantum Chemistry - Donald A Mcquarrie 2007-01-01

Problems and Solutions on Thermodynamics and Statistical Mechanics - Yung-kuo Lim 1990 Volume 5.

Reviews in Computational Chemistry - Kenny B. Lipkowitz 2003-10-21 The Reviews in Computational Chemistry series bringstogether leading authorities in the field. The chapters in thisbook series are written to teach the newcomer and update theexpert. Topics include computational chemistry, molecular modeling,computer-assisted molecular design (CAMD), quantum chemistry,molecular mechanics and dynamics, and quantitativestructure-activity relationships (QSAR). Detailed author and subject indices on each volume help thereader to quickly discover particular topics. The chapters are approached in a tutorial manner and written ina non-mathematical style allowing students and researchers toaccess computational methods outside their immediate area ofexpertise.

Physical Chemistry: A Molecular Approach - Donald A. McQuarrie 1997-08-20 Emphasizes a molecular approach to physical chemistry, discussing principles of quantum mechanics first and then using those ideas in development of thermodynamics and kinetics. Chapters on quantum subjects are interspersed with ten math chapters reviewing mathematical topics used in subsequent chapters. Includes material on current physical chemical research, with chapters on computational quantum chemistry, group theory, NMR spectroscopy, and lasers. Units and symbols used in the text follow IUPAC recommendations. Includes exercises. Annotation copyrighted by Book News, Inc., Portland, OR

Statistical Mechanics - Donald A. McQuarrie

2000-06-16 Statistical Mechanics is a renowned and accessible introduction to the subject, containing a large number of chapter-ending problems for students.

Elementary Lectures in Statistical Mechanics - George D.J. Phillies 2012-12-06 This textbook for graduates and advanced undergraduates in physics and physical chemistry covers the major areas of statistical mechanics and concludes with the level of current research. It begins with the fundamental ideas of averages and ensembles, focusing on classical systems described by continuous variables such as position and momentum, and using the ideal gas as an example. It then turns to quantum systems, beginning with diatomic molecules and working up through blackbody radiation and chemical equilibria. The discussion of equilibrium properties of systems of interacting particles includes such techniques as cluster expansions and distribution functions and uses non-ideal gases, liquids, and solutions. Dynamic behavior -- treated here more extensively than in other texts -- is discussed from the point of view of correlation functions. The text concludes with the problem of diffusion in a suspension of interacting hard spheres and what can be learned about such a system from scattered light. Intended for a one-semester course, the text includes several "asides" on topics usually omitted from introductory courses, as well as numerous exercises.

Essentials of Computational Chemistry - Christopher J. Cramer 2013-04-29 Essentials of Computational Chemistry provides a balanced introduction to this dynamic subject. Suitable for both experimentalists and theorists, a wide range of samples and applications are included drawn from all key areas. The book carefully leads the reader thorough the necessary equations providing information explanations and reasoning where necessary and firmly placing each equation in context.

Physical Chemistry - Peter Atkins 2002 New edition of the overwhelmingly favorite text for the physical chemistry course.