Non-equilibrium thermodynamics and physical kinetics

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.

Nonequilibrium Statistical Mechanics in One Dimension

This is the first unified treatment of the properties of thermodynamically open and closed systems. It provides the theory and methodology that are necessary to understand nonlinear processes. The section on Classical Systems covers topics ranging from the evolution of probability to open and closed systems and non-Hamiltonian systems. The concluding section on Quantum Systems is equally detailed, treating the evolution of quantum systems, c-number fluctuations and operator fluctuations. The material covered is applicable to weather systems, ocean currents, dye lasers and many other nonequilibrium systems. The text is also suitable for students in graduate course. Numerous physical chemical examples facilitate self-study.

Nonequilibrium Statistical Mechanics

This book presents a united approach to the statistical physics of systems near equilibrium: it brings out the profound unity of the laws which govern them and gathers together results usually fragmented
in the literature. It will be useful both as a textbook about irreversible phenomena and as a reference book for researchers.

Nonequilibrium Statistical Thermodynamics

Self-contained and up-to-date guide to one-dimensional reactions, dynamics, diffusion and adsorption.

Microscopic Chaos, Fractals and Transport in Nonequilibrium Statistical Mechanics

Computational biology has developed rapidly during the last two decades following the genomic revolution which culminated in the sequencing of the human genome. More than ever it has developed into a field which embraces computational methods from different branches of the exact sciences: pure and applied mathematics, computer science, theoretical physics. This Second Edition provides a solid introduction to the techniques of statistical mechanics for graduate students and researchers in computational biology and biophysics. Material has been reorganized to clarify equilibrium and nonequilibrium aspects of biomolecular systems. Content has been expanded, in particular in the treatment of the electrostatic interactions of biomolecules and the application of non-equilibrium statistical mechanics to biomolecules. New network-based approaches for the study of proteins are presented. All treated topics are put firmly in the context of the current research literature, allowing the reader to easily follow an individual path into a specific research field. Exercises and Tasks accompany the presentations of the topics with the intention of enabling the readers to test their comprehension of the developed basic concepts.

Equilibrium and Non-Equilibrium Statistical Mechanics

Publisher Description

Statistical Mechanics

Building on the material learned by students in their first few years of study, Topics in Statistical Mechanics (Second Edition) presents an advanced level course on statistical and thermal physics. It begins with a review of the formal structure of statistical mechanics and thermodynamics considered from a unified viewpoint. There is a brief revision of non-interacting systems, including quantum gases and a discussion of negative temperatures. Following this, emphasis is on interacting systems. First, weakly interacting systems are considered, where the interest is in seeing how small interactions cause small deviations from the non-interacting case. Second, systems are examined where interactions lead to drastic changes, namely phase transitions. A number of specific examples is given, and these are unified within the Landau theory of phase transitions. The final chapter of the book looks at non-equilibrium systems, in particular the way they evolve towards equilibrium. This is framed within the context of linear response theory. Here fluctuations play a vital role, as is formalised in the fluctuation-dissipation theorem. The second edition has been revised particularly to help students use this book for self-study. In addition, the section on non-ideal gases has been expanded, with a treatment of the hard-sphere gas, and an accessible discussion of interacting quantum gases. In many cases there are details of Mathematica calculations, including Mathematica Notebooks, and expression of some results in terms of Special Functions.

Nonequilibrium Statistical Mechanics of Heterogeneous Fluid Systems
Groundbreaking monograph by Nobel Prize winner for researchers and graduate students covers Liouville equation, anharmonic solids, Brownian motion, weakly coupled gases, scattering theory and short-range forces, general kinetic equations, more. 1962 edition.

Topics In Statistical Mechanics (Second Edition)

Authored by a well-known expert in the field of nonequilibrium statistical physics, this book is a coherent presentation of the subject suitable for masters and PhD students, as well as postdocs in physics and related disciplines. Starting from a general discussion of irreversibility and entropy, the method of nonequilibrium statistical operator is presented as a general concept. Stochastic processes are introduced as a necessary prerequisite to describe the evolution of a nonequilibrium state. Different standard approaches such as master equations, kinetic equations and linear response theory, are derived after special assumptions. This allows for an insight into the problems of nonequilibrium physics, a discussion of the limits of the approaches, and suggestions for improvements. The method of thermodynamic Green's function is outlined that allows for the systematic quantum statistical treatment of many-body systems. Applications and typical examples are given, as well as fully worked problems.

Mathematical Foundations of Classical Statistical Mechanics

A Kinetic View of Statistical Physics

This monograph considers systems of infinite number of particles, in particular the justification of the procedure of thermodynamic limit transition. The authors discuss the equilibrium and non-equilibrium states of infinite classical statistical systems. Those states are defined in terms of stationary and nonstationary solutions to the Bogolyubov equations for the sequences of correlation functions in the thermodynamic limit. This is the first detailed investigation of the thermodynamic limit for non-equilibrium systems and of the states of infinite systems in the cases of both canonical and grand canonical ensembles, for which the thermodynamic equivalence is proved. A comprehensive survey of results is also included; it concerns the properties of correlation functions for infinite systems and the corresponding equations. For this new edition, the authors have made changes to reflect the development of theory in the last ten years. They have also simplified certain sections, presenting them more systematically, and greatly increased the number of references. The book is aimed at theoretical physicists and mathematicians and will also be of use to students and postgraduate students in the field.

Statistical Mechanics of Nonequilibrium Liquids

Classic monograph treats irreversible processes and phenomena of thermodynamics: non-equilibrium thermodynamics. Covers statistical foundations and applications with chapters on fluctuation theory, theory of stochastic processes, kinetic theory of gases, more.

Computational Biology

This textbook provides a comprehensive, yet accessible, introduction to statistical mechanics. Crafted and class-tested over many years of teaching, it carefully guides advanced undergraduate and graduate students who are encountering statistical mechanics for the first time through this sometimes intimidating subject. The book provides a strong foundation in thermodynamics and the ensemble
formalism of statistical mechanics. An introductory chapter on probability theory is included. Applications include degenerate Fermi systems, Bose-Einstein condensation, cavity radiation, phase transitions, and critical phenomena. The book concludes with a treatment of scaling theories and the renormalization group. In addition, it provides clear descriptions of how to understand the foundational mathematics and physics involved and includes exciting case studies of modern applications of the subject in physics and wider interdisciplinary areas. Key Features: Presents the subject in a clear and entertaining style which enables the author to take a sophisticated approach whilst remaining accessible. Contains contents that have been carefully reviewed with a substantial panel to ensure that coverage is appropriate for a wide range of courses, worldwide. Accompanied by volumes on thermodynamics and non-equilibrium statistical mechanics, which can be used in conjunction with this book, on courses which cover both thermodynamics and statistical mechanics.

**Statistical Mechanics**

This book develops in detail the statistical foundations of nonequilibrium thermodynamics, based on the mathematical theory of Brownian motion. Author Bernard H. Lavenda demonstrates that thermodynamic criteria emerge in the limit of small thermal fluctuations and in the Gaussian limit where means and modes of the distribution coincide. His treatment assumes the theory of Brownian motion to be a general and practical model of irreversible processes that are inevitably influenced by random thermal fluctuations. This unifying approach permits the extraction of widely applicable principles from the analysis of specific models. Arranged by argument rather than theory, the text is based on the premises that random thermal fluctuations play a decisive role in governing the evolution of nonequilibrium thermodynamic processes and that they can be viewed as a dynamic superposition of many random events. Intended for nonmathematicians working in the areas of nonequilibrium thermodynamics and statistical mechanics, this book will also be of interest to chemical physicists, condensed matter physicists, and readers in the area of nonlinear optics.

**Projection Operator Techniques in Nonequilibrium Statistical Mechanics**

Introduction to applications and techniques in non-equilibrium statistical mechanics of chaotic dynamics.

**Frontiers of Nonequilibrium Statistical Physics**

There is a wide variety of heterogeneous fluid systems that possess interphase surfaces. This monograph is devoted to pioneering studies in nonequilibrium statistical mechanics of such systems. Starting from the Liouville equation, the equations of surface hydrodynamics are derived with allowance for discontinuities of thermodynamic parameters of interphase boundaries. Brownian motion of a large solid particle in a fluid and nucleation are treated as results of fluctuations of flows across particle surfaces. With the use of the Gibbs method, a shock wave in a gas is considered as a sort of an interphase surface, and the surface tension of a shock front is introduced for the first time.

**Non-Equilibrium Statistical Mechanics**

This book offers a comprehensive picture of nonequilibrium phenomena in nanoscale systems. Written by internationally recognized experts in the field, this book strikes a balance between theory and experiment, and includes in-depth introductions to nonequilibrium fluctuation relations, nonlinear dynamics and transport, single molecule experiments, and molecular diffusion in nanopores. The authors explore the application of these concepts to nano- and biosystems by cross-linking key methods and ideas from nonequilibrium statistical physics, thermodynamics, stochastic theory, and
dynamical systems. By providing an up-to-date survey of small systems physics, the text serves as both a valuable reference for experienced researchers and as an ideal starting point for graduate-level students entering this newly emerging research field.

**Statistical Physics II**

In this monograph, nonequilibrium statistical mechanics is developed by means of ensemble methods on the basis of the Boltzmann equation, the generic Boltzmann equations for classical and quantum dilute gases, and a generalised Boltzmann equation for dense simple fluids. The theories are developed in forms parallel with the equilibrium Gibbs ensemble theory in a way fully consistent with the laws of thermodynamics. The generalised hydrodynamics equations are the integral part of the theory and describe the evolution of macroscopic processes in accordance with the laws of thermodynamics of systems far removed from equilibrium. Audience: This book will be of interest to researchers in the fields of statistical mechanics, condensed matter physics, gas dynamics, fluid dynamics, rheology, irreversible thermodynamics and nonequilibrium phenomena.

**An Introduction to Stochastic Processes and Nonequilibrium Statistical Physics**

This is a presentation of the main ideas and methods of modern nonequilibrium statistical mechanics. It is the perfect introduction for anyone in chemistry or physics who needs an update or background in this time-dependent field. Topics covered include fluctuation-dissipation theorem; linear response theory; time correlation functions, and projection operators. Theoretical models are illustrated by real-world examples and numerous applications such as chemical reaction rates and spectral line shapes are covered. The mathematical treatments are detailed and easily understandable and the appendices include useful mathematical methods like the Laplace transforms, Gaussian random variables and phenomenological transport equations.

**Statistical Physics**

This book encompasses our current understanding of the ensemble approach to many-body physics, phase transitions and other thermal phenomena, as well as the quantum foundations of linear response theory, kinetic equations and stochastic processes. It is destined to be a standard text for graduate students, but it will also serve the specialist-researcher in this fascinating field; some more elementary topics have been included in order to make the book self-contained. The historical methods of J. Willard Gibbs and Ludwig Boltzmann, applied to the quantum description rather than phase space, are featured. The tools for computations in the microcanonical, canonical and grand-canonical ensembles are carefully developed and then applied to a variety of classical and standard quantum situations. After the language of second quantization has been introduced, strongly interacting systems, such as quantum liquids, superfluids and superconductivity, are treated in detail. For the connoisseur, there is a section on diagrammatic methods and applications. In the second part dealing with non-equilibrium processes, the emphasis is on the quantum foundations of Markovian behaviour and irreversibility via the Pauli–Van Hove master equation. Justifiable linear response expressions and the quantum-Boltzmann approach are discussed and applied to various condensed matter problems. From this basis the Onsager–Casimir relations are derived, together with the mesoscopic master equation, the Langevin equation and the Fokker–Planck truncation procedure. Brownian motion and modern stochastic problems such as fluctuations in optical signals and radiation fields briefly make the round.

**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.

Nonequilibrium Statistical Physics

A valuable introduction for newcomers as well as an important reference and source of inspiration for established researchers, this book provides an up-to-date summary of central topics in the field of nonequilibrium statistical mechanics and dynamical systems theory. Understanding macroscopic properties of matter starting from microscopic chaos in the equations of motion of single atoms or molecules is a key problem in nonequilibrium statistical mechanics. Of particular interest both for theory and applications are transport processes such as diffusion, reaction, conduction and viscosity. Recent advances towards a deterministic theory of nonequilibrium statistical physics are summarized: Both Hamiltonian dynamical systems under nonequilibrium boundary conditions and non-Hamiltonian modelings of nonequilibrium steady states by using thermal reservoirs are considered. The surprising new results include transport coefficients that are fractal functions of control parameters, fundamental relations between transport coefficients and chaos quantities, and an understanding of nonequilibrium entropy production in terms of fractal measures and attractors. The theory is particularly useful for the description of many-particle systems with properties in-between conventional thermodynamics and nonlinear science, as they are frequently encountered on nanoscales.

The Nonequilibrium Statistical Mechanics of Open and Closed Systems

This graduate textbook covers contemporary directions of non-equilibrium statistical mechanics as well as classical methods of kinetics. Starting from phenomenological non-equilibrium thermodynamics, the kinetic equation method discussed and demonstrated with electrons and phonons in conducting crystals. Linear response theory as well as the non-equilibrium statistical operator and the master equation approach are discussed in the course of the book. With one of the main propositions being to avoid terms such as "obviously" and "it is easy to show", this treatise is an easy-to-read introduction into this traditional, yet vibrant field. Problems and their well-documented solutions included at appropriate points of the narrative allow the reader to actively develop essential parts of the theory himself. From the content: Phenomenological thermodynamics of irreversible processes Brownian motion Kinetic equations in non-equilibrium thermodynamics Kinetic equation for electrons and phonons in conducting crystals Theory of non-linear response to an external mechanical perturbation Non-equilibrium statistical operator method Response of a highly non-equilibrium system to a weakly measuring field Master equation approach

Non-Equilibrium Thermodynamics
Non-equilibrium Statistical Mechanics

Statistical Physics provides an introduction to the basic principles of statistical mechanics. Statistical mechanics is one of the fundamental branches of theoretical physics and chemistry, and deals with many systems such as gases, liquids, solids, and even molecules which have many atoms. The book consists of three parts. Part I gives the principles, with elementary applications to noninteracting systems. It begins with kinetic theory and discusses classical and quantum systems in equilibrium and nonequilibrium. In Part II, classical statistical mechanics is developed for interacting systems in equilibrium and nonequilibrium. Finally, in Part III, quantum statistics is presented to an extent which enables the reader to proceed to advanced many-body theories. This book is written for a one-year graduate course in statistical mechanics or a half-year course followed by a half-year course on related subjects, such as special topics and applications or elementary many-body theories. Efforts are made such that discussions of each subject start with an elementary level and end at an advanced level.

Non-equilibrium Thermodynamics and Statistical Mechanics

The four-week period from May 20 to June 16, 1984 was an intensive period of advanced study on the foundations and frontiers of nonequilibrium statistical physics (NSP). During the first two weeks of this period, an advanced-study course on the "Foundations of NSP" was conducted in Albuquerque under the sponsorship of the University of New Mexico Center for High-Technology Materials. This was followed by a two-week NATO Advanced Study Institute on the "Frontiers of NSP" in Santa Fe under the same directorship. Many Students attended both meetings. This book comprises proceedings based on those lectures and covering a broad spectrum of topics in NSP ranging from basic problems in quantum measurement theory to analogies between lasers and Darwinian evolution. The various types of quantum distribution functions and their uses are treated by several authors. Other tools of NSP, such as Langevin equations, Fokker-Planck equations, and master equations, are developed and applied to areas such as laser physics, plasma physics, Brownian motion, and hydrodynamic instabilities. The properties and experimental detection of squeezed states and antibunching are described, as well as experimental tests of the violation of Bell's inequality. Information theory, mean-field theory, reservoir theory, entropy maximization, and even a novel nonlinear generalization of quantum mechanics are used to discuss nonequilibrium phenomena and the approach toward thermodynamic equilibrium.

Introduction to Nonequilibrium Statistical Mechanics

"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.

Non-equilibrium Statistical Mechanics and Turbulence

Statistical mechanics has been proven to be successful at describing physical systems at thermodynamic equilibrium. Since most natural phenomena occur in nonequilibrium conditions, the present challenge is to find suitable physical approaches for such conditions: this book provides a pedagogical pathway that explores various perspectives. The use of clear language, and explanatory figures and diagrams to describe models, simulations and experimental findings makes the book a
valuable resource for undergraduate and graduate students, and also for lecturers organizing teaching at varying levels of experience in the field. Written in three parts, it covers basic and traditional concepts of nonequilibrium physics, modern aspects concerning nonequilibrium phase transitions, and application-orientated topics from a modern perspective. A broad range of topics is covered, including Langevin equations, Levy processes, directed percolation, kinetic roughening and pattern formation.

An Introduction to Chaos in Nonequilibrium Statistical Mechanics

This book aims to provide a compact and unified introduction to the most important aspects in the physics of non-equilibrium systems. It first introduces stochastic processes and some modern tools and concepts that have proved their usefulness to deal with non-equilibrium systems from a purely probabilistic angle. The aim is to show the important role played by fluctuations in far-from-equilibrium situations, where noise can promote order and organization, switching among non-equilibrium states, etc. The second part adopts a more historical perspective, retracing the first steps taken from the purely thermodynamic as well as from the kinetic points of view to depart (albeit slightly) from equilibrium. The third part revisits the path outlined in the first one, but now undertakes the mesoscopic description of extended systems, where new phenomena (patterns, long-range correlations, scaling far from equilibrium, etc.) are observed. This book is a revised and extended version of an earlier edition published in 1994. It includes topics of current research interest in far-from-equilibrium situations like noise-induced phenomena and free energy-like functionals, surface growth and roughening, etc. It can be used as an advanced textbook by graduate students in physics. It also covers topics of current interest in other disciplines and interdisciplinary approaches in engineering, biophysics, and economics, among others. The level of detail in the book is enough to capture the interest of the reader and facilitate the path to more learning by exploring the modern research literature provided. At the same time, the book is also complete enough to be self-contained for those readers who just need an overview of the subject.

Nonequilibrium Statistical Mechanics

This volume of Statistical Physics constitutes the second part of Statistical Physics (Springer Series in Solid-State Science, Vols. 30, 31) and is devoted to nonequilibrium theories of statistical mechanics. We start with an introduction to the stochastic treatment of Brownian motion and then proceed to general problems involved in deriving a physical process from an underlying more basic process. Relaxation from nonequilibrium to equilibrium states and the response of a system to an external disturbance form the central problems of nonequilibrium statistical mechanics. These problems are treated both phenomenologically and microscopically along the lines of recent developments. Emphasis is placed on fundamental concepts and methods rather than on applications which are too numerous to be treated exhaustively within the limited space of this volume. For information on the general aim of this book, the reader is referred to the Foreword. For further reading, the reader should consult the bibliographies, although these are not meant to be exhaustive.

Nonequilibrium Statistical Physics of Small Systems

The present text offers a graduate level treatment of time dependent phenomena in condensed matter physics. Conventional ideas of linear response theory and kinetic theory are treated in detail. The general emphasis, however, is on the development of generalized Langevin equations for treating nonlinear behaviour in a wide variety of systems. A full treatment is given for the underpinnings of hydrodynamics for fluids. This is the third volume of a four volume set of texts by the same author, two of which have already been published (“Fluctuations, Order, and Defects” 0-471-32840-5, “Equilibrium Statistical Mechanics” 0-471-32839-1). While the preceding volume contains material
that is a prerequisite for fully understanding the material presented here, this volume is self-contained and can stand alone from the preceding volume.

Statistical Physics

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.

An Introduction to Stochastic Processes and Nonequilibrium Statistical Physics

This completely revised edition of the classical book on Statistical Mechanics covers the basic concepts of equilibrium and non-equilibrium statistical physics. In addition to a deductive approach to equilibrium statistics and thermodynamics based on a single hypothesis this book treats the most important elements of non-equilibrium phenomena. Intermediate calculations are presented in complete detail. Problems at the end of each chapter help students to consolidate their understanding of the material. Beyond the fundamentals, this text demonstrates the breadth of the field and its great variety of applications.

Nonequilibrium Statistical Physics

This title builds from basic principles to advanced techniques, and covers the major phenomena, methods, and results of time-dependent systems. It is a pedagogic introduction, a comprehensive reference manual, and an original research monograph--

The Principles of Statistical Mechanics

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.
Nonequilibrium Statistical Physics

Non-equilibrium Statistical Physics with Application to Disordered Systems

The purpose of this textbook is to bring together, in a self-contained introductory form, the scattered material in the field of stochastic processes and statistical physics. It offers the opportunity of being acquainted with stochastic, kinetic and nonequilibrium processes. Although the research techniques in these areas have become standard procedures, they are not usually taught in the normal courses on statistical physics. For students of physics in their last year and graduate students who wish to gain an invaluable introduction on the above subjects, this book is a necessary tool. Contents: Stochastic Processes and the Master Equation; Stochastic Processes; Markovian Processes; Master Equations; Kramers Moyal Expansion; Brownian Motion, Langevin and Fokker-Planck Equations; Distributions, BBGKY Hierarchy, Density Operator; Probability Density as a Fluid; BBGKY Hierarchy; Microscopic Balance Equations; Density Operator; Linear Nonequilibrium Thermodynamics; and Onsager Relations; Onsager Regression to Equilibrium Hypothesis; Onsager Relations; Minimum Production of Entropy; Linear Response Theory, Fluctuation-Dissipation Theorem; Correlation Functions; Definitions and Properties; Linear Response Theory; Fluctuation-Dissipation Theorem; Instabilities and Far from Equilibrium Phase-Transitions; Limit Cycles, Bifurcations, Symmetry Breaking; Noise Induced Transitions; Formation and Propagation of Patterns in Far from Equilibrium Systems; Reaction-Diffusion Descriptions and Pattern Propagation Pattern Propagation Readership: Graduate students in physics and chemistry. Keywords: Stochastic Processes; Langevin and Fokker-Planck Equations; Statistical Physics; Onsager Relations; Linear Response; Nonequilibrium Statistical Physics; Transport Processes; Noise Induced Transitions; Instabilities; Pattern Formation and Propagation

This book introduces ways to investigate nonequilibrium statistical physics, mainly via stochastic processes, and presents results achieved with such methodology – it is suitable for seminars directed towards relatively mature students in theoretical physics or applied mathematics. H Muthsam – The present book is a good choice for a single book covering the field – suitable for undergraduate students in the last year and graduate students. They will find in it a suggestive introduction that motivates them to dig deeper into the field and to look for those topics omitted from the text – highly recommended to anyone interested in becoming acquainted with nonequilibrium statistical physics. Journal of Statistical Physics

Equilibrium and Non-Equilibrium Statistical Thermodynamics

Statistical Mechanics of Nonequilibrium Processes: Relaxation and hydrodynamic processes

This self-contained volume introduces modern methods of statistical mechanics in turbulence, with three harmonised lecture courses by world class experts.

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