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## NOELLE IVY

Oxford University Press
Ginzburg-Landau Phase Transition Theory and SuperconductivityBirkhäuser
A Primer to the Theory of Critical Phenomena Oxford University Press
A Nobel Laureate presents his view of developments in the field of superconductivity, superfluidity and related theory. The book contains Ginzburg’s amended version of the Nobel lecture in Physics 2003, as well as his expanded autobiography.
*Phase Transition Dynamics* Springer Science & Business Media
Der Grundkurs Theoretische Physik deckt in 7 Bänden alle für das Diplom und für Bachelor/Master-Studiengänge maßgeblichen Gebiete ab. Jeder Band vermittelt das im jeweiligen Semester notwendige theoretisch-physikalische Rüstzeug. Übungsaufgaben mit ausführlichen Lösungen dienen der Vertiefung des Stoffs. Der 6. Band zur Statistischen Physik wurde für die Neuauflage grundlegend überarbeitet und um aktuelle Entwicklungen ergänzt. Durch die zweifarbige Gestaltung ist der Stoff jetzt noch übersichtlicher gegliedert.
A Modern Approach to Critical Phenomena Springer Science & Business Media
Topological defects formed at symmetry-breaking phase transitions play an important role in many different fields of physics. They appear in many condensed-matter systems at low temperature; examples include vortices in superfluid helium-4, a rich variety of defects in helium-3, quantized mag netic flux tubes in type-II superconductors, and disclination lines and other defects in liquid crystals. In cosmology, unified gauge theories of particle interactions suggest a sequence of phase transitions in the very early uni verse some of which may lead to defect formation. In astrophysics, defects play an important role in the dynamics of neutron stars. In 1997 the European Science Foundation started the scientific network "Topological defects" headed by Tom Kibble. This network has provided us with a unique opportunity of establishing a collaboration between the representatives of these very different branches of modern physics. The NATO-ASI (Advanced Study Institute), held in Les Houches in February 1999 thanks to the support of the Scientific Division of NATO, the European Science Foundation and the CNRS, represents a key event of this ESF network. It brought together participants from widely different fields, with diverse expertise and vocabulary, fostering the exchange of ideas. The lectures given by particle physicists, cosmologists and condensed matter physicists are the result of the fruitful collaborations established since 1997 between groups in several European countries and in the U.S.A.
Phase Transitions in Liquid Crystals Springer Science & Business Media
This book reviews some of the classic aspects in the theory of phase transitions and critical phenomena, which has a long history. Recently, these aspects are attracting much attention due to essential new contributions. The topics presented in this book include: mathematical theory of the Ising model; equilibrium and non-equilibrium criticality of one-dimensional quantum spin chains; influence of structural disorder on the critical behaviour of the Potts model; criticality, fractality and multifractality of linked polymers; field-theoretical approaches in the superconducting phase transitions. The book is based on the review lectures that were given in Lviv (Ukraine) in March 2002 at the “Ising lectures” — a traditional annual workshop on phase transitions and critical phenomena which aims to bring together scientists working in the field of phase transitions with university students and those who are interested in the subject. Contents:Mathematical Theory of the Ising Model and Its Generalizations: An Introduction (Y Kozitsky)Relaxation in Quantum Spin Chains: Free Fermionic Models (D Karevski)Quantum Phase Transitions in Alternating Transverse Ising Chains (O Derzhko)Phase Transitions in Two-Dimensional Random Potts Models (B Berche & C Chatelain)Scaling of Miktoarm Star Polymers (C von Ferber)Field Theoretic Approaches to the Superconducting Phase Transition (F S Nogueira & H Kleinert) Readership: Researchers, academics and graduate students in condensed matter physics. Keywords:Phase Transitions;Disorder;Critical Phenomena;Renormalization Group;Ising Model;Potts Model
*Finite-Size Scaling* OUP Oxford
The first part of the book provides a pedagogical introduction to the physics of complex systems driven far from equilibrium. In this part we discuss the basic concepts and theoretical techniques which are commonly used to study classical stochastic transport in systems of interacting driven

particles. The analytical techniques include mean-field theories, matrix product ansatz, renormalization group, etc. and the numerical methods are mostly based on computer simulations. In the second part of the book these concepts and techniques are applied not only to vehicular traffic but also to transport and traffic-like phenomena in living systems ranging from collective movements of social insects (for example, ants) on trails to intracellular molecular motor transport. These demonstrate the conceptual unity of the fundamental principles underlying the apparent diversity of the systems and the utility of the theoretical toolbox of non-equilibrium statistical mechanics in interdisciplinary research far beyond the traditional disciplinary boundaries of physics. Leading industry experts provide a broad overview of the interdisciplinary nature of physics Presents unified descriptions of intracellular, ant, and vehicular traffic from a physics point of view Applies theoretical methods in practical everyday situations Reference and guide for physicists, engineers and graduate students

**Statistical Mechanics of Phase Transitions** CRC Press

This textbook series has been designed for final year undergraduate and first year graduate students, providing an overview of the entire field showing how specialized topics are part of the wider whole, and including references to current areas of literature and research.

Crystal Plasticity Finite Element Methods Elsevier

Superconductivity: Physics and Applications brings together major developments that have occurred within the field over the past twenty years. Taking a truly modern approach to the subject the authors provide an interesting and accessible introduction. Brings a fresh approach to the physics of superconductivity based both on the well established and convergent picture for most low-Tc superconductors, provided by the BCS theory at the microscopic level, and London and Ginzburg-Landau theories at the phenomenological level, as well as on experiences gathered in high-Tc research in recent years. Includes end of chapter problems and numerous relevant examples Features brief interviews with key researchers in the field A prominent feature of the book is the use of SI units throughout, in contrast to many of the current textbooks on the subject which tend to use cgs units and are considered to be outdated

Ginzburg-Landau Phase Transition Theory and Superconductivity Elsevier

The book provides an introduction to the physics which underlies phase transitions and to the theoretical techniques currently at our disposal for understanding them. It will be useful for advanced undergraduates, for post-graduate students undertaking research in related fields, and for established researchers in experimental physics, chemistry, and metallurgy as an exposition of current theoretical understanding. - ;Recent developments have led to a good understanding of universality; why phase transitions in systems as diverse as magnets, fluids, liquid crystals, and superconductors can be brought under the same theoretical umbrella and well described by simple models. This book describes the physics underlying universality and then lays out the theoretical approaches now available for studying phase transitions. Traditional techniques, mean-field theory, series expansions, and the transfer matrix, are described; the Monte Carlo method is covered, and two chapters are devoted to the renormalization group, which led to a break-through in the field. The book will be useful as a textbook for a course in `Phase Transitions', as an introduction for graduate students undertaking research in related fields, and as an overview for scientists in other disciplines who work with phase transitions but who are not aware of the current tools in the armoury of the theoretical physicist. - ;Introduction; Statistical mechanics and thermodynamics; Models; Mean-field theories; The transfer matrix; Series expansions; Monte Carlo simulations; The renormalization group; Implementations of the renormalization group. -

*Lectures On Phase Transitions And The Renormalization Group* World Scientific

Covering the elementary aspects of the physics of phases transitions and the renormalization group, this popular book is widely used both for core graduate statistical mechanics courses as well as for more specialized courses. Emphasizing understanding and clarity rather than technical manipulation, these lectures de-mystify the subject and show precisely "how things work." Goldenfeld keeps in mind a reader who wants to understand why things are done, what the results are, and what in principle can go wrong. The book reaches both experimentalists and theorists, students and even active researchers, and assumes only a prior knowledge of statistical mechanics at the introductory graduate level.Advanced, never-before-printed topics on the applications of renormalization group far from equilibrium and to partial differential equations add to the uniqueness of this book.

Stochastic Transport in Complex Systems CRC Press

Written by the leading experts in computational materials science, this handy reference concisely reviews the most important aspects of plasticity modeling: constitutive laws, phase transformations, texture methods, continuum approaches and damage mechanisms. As a result, it provides the knowledge needed to avoid failures in critical systems udner mechanical load. With its various application examples to micro- and macrostructure mechanics, this is an invaluable resource for mechanical engineers as well as for researchers wanting to improve on this method and extend its outreach.

Introduction to Unconventional Superconductivity Cambridge University Press

Superconductivity of Metals and Cuprates covers the basic physics of superconductivity, both the theoretical and experimental aspects. The book concentrates on important facts and ideas, including Ginzburg-Landau equations, boundary energy, Green's function methods, and spectroscopy. Avoiding lengthy or difficult presentations of theory, it is written in a clear and lucid style with many useful, informative diagrams. The book is designed to be accessible to senior undergraduate students, making it a helpful tool for teaching superconductivity as well as serving as an introduction to those entering the field.

*Ginzburg–Landau Theory of Condensates* Springer

This monograph compiles, rearranges, and refines recent research results in the complex G-L theory with or without immediate applications to the theory of superconductivity. An authoritative reference for applied mathematicians, theoretical physicists and engineers interested in the quantitative description of superconductivity using Ginzburg-Landau theory.

Real State Variables, Complex Order Parameters, and Circulating Currents of the Infinite Square Microladder John Wiley & Sons

The existence of liquid crystals has been known for nearly a centu ry; yet it is only in the last ten years that their unique optical, electri cal, electro-optic, and thermal properties have been exploited to any significant extent in such technological applications as digital d~ plays and thermography.

Digital watches equipped with liquid-crys tal displays (LCD's) have recently made their debut in the electronic watch market, and the large-scale use of LCD's in a variety of other applications requiring reliable, low-power digital displays is immi nent. There is good reason to believe that liquid crystals will be the first electro-optic materials to find widespread commercial use. Apart from applications, liquid crystals are unique among the phases of matter. Lurking beneath their garish display of color and texture is a great complexity of physical and chemical interaction that is only now beginning to unfold in the face of a decade-old resurgence in all aspects of liquid~rystal research. RCA Laboratories has participated in this resurgence from its beginning in the early 1960's and at present maintains active liquid-crystal programs both in basic re search and in device engineering. In view of the widespread interest in liquid crystals at RCA Labo ratories, an in-house weekly seminar devoted to the subject of liquid crystals was organized in the fall of 1973. The resulting lectures were subsequently published in three issues of the RCA Review and, with the incorporation of much additional material, eventually grew into the present volume.

*Introduction to Liquid Crystals* Springer Science & Business Media

Collected Papers of L. D. Landau brings together the collected papers of L. D. Landau in the field of physics. The discussion is divided into the following sections: low-temperature physics (including superconductivity); solid-state physics; plasma physics; hydrodynamics; astrophysics; nuclear physics and cosmic rays; quantum mechanics; quantum field theory; and miscellaneous works. Topics covered include the intermediate state of supraconductors; the absorption of sound in solids; the properties of metals at very low temperatures; and production of showers by heavy particles. This volume is comprised of 100 chapters and begins with Landau's paper on the theory of the spectra of diatomic molecules, followed by his studies on the damping problem in wave mechanics; quantum electrodynamics in configuration space; electron motion in crystal lattices; and the internal temperature of stars. Some of Landau's theories, such as those of stars, energy transfer on collisions, phase transitions, and specific heat anomalies are discussed. Subsequent chapters focus on the structure of the undisplaced scattering line; the transport equation in the case of Coulomb interactions; scattering of light by light; and the origin of stellar energy. This book will be a valuable resource for physicists as well as physics students and researchers.

*Electrodynamics of Continuous Media* Clarendon Press

Theory of Superconductivity is primarily intended to serve as a background for reading the literature in which detailed applications of the microscopic theory of superconductivity are made to specific problems.

Past, Present and Future Springer Science & Business Media

Building on Wilson's renormalization group, the authors have developed a unified approach that not only reproduces known results but also yields new results. A systematic exposition of the contemporary theory of phase transitions, the book includes detailed discussions of phenomena in Heisenberg magnets, granular super-conducting alloys, anisotropic systems of dipoles, and liquid-vapor transitions. Suitable for advanced undergraduates as well as graduate students in physics, the text assumes some knowledge of statistical mechanics, but is otherwise self-contained.

*A Scientific Autobiography* Springer

The experimental discovery of the fractional quantum Hall effect (FQHE) at the end of 1981 by Tsui, Stormer and Gossard was absolutely unexpected since, at this time, no theoretical work existed that could predict new struc tures in the magnetotransport coefficients under conditions representing the extreme quantum limit. It is more than thirty years since investigations of bulk semiconductors in very strong magnetic fields were begun. Under these conditions, only the lowest Landau level is occupied and the theory predicted a monotonic variation of the resistivity with increasing magnetic field, depending sensitively on the scattering mechanism. However, the ex perimental data could not be analyzed accurately since magnetic freeze-out effects and the transitions from a degenerate to a nondegenerate system complicated the interpretation of the data. For a two-dimensional electron gas, where the positive background charge is well separated from the two dimensional system, magnetic freeze-out effects are barely visible and an analysis of the data in the extreme quantum limit seems to be easier. First measurements in this magnetic field region on silicon field-effect transistors were not successful because the disorder in these devices was so large that all electrons in the lowest Landau level were localized. Consequently, models of a spin glass and finally of a Wigner solid were developed and much effort was put into developing the technology for improving the quality of semi conductor materials and devices, especially in the field of two-dimensional electron systems.

Theory of Fluctuations in Superconductors Academic Press

What is superconductivity? How was it discovered? What are the properties of superconductors, how are they applied now, and how are they likely to become widely used in the near future? These are just some of the questions which this important book sets out to answer. Starting with the discovery of superconductivity over ninety years ago, the book guides the readers through the many years of subsequent exploration, right up to the latest sensational findings. Written in a lively, nontechnical style, this book makes ideal background reading for any school or college level study of superconductivity. The authors, who are leading authorities in the field, paint detailed pictures of the phenomena involved without mathematical formalism, appealing instead to physical intuition.

Application to Structural, Incommensurate, Magnetic and Liquid Crystal Systems CRC Press

An extensive summary of mathematical functions that occur in physical and engineering problems