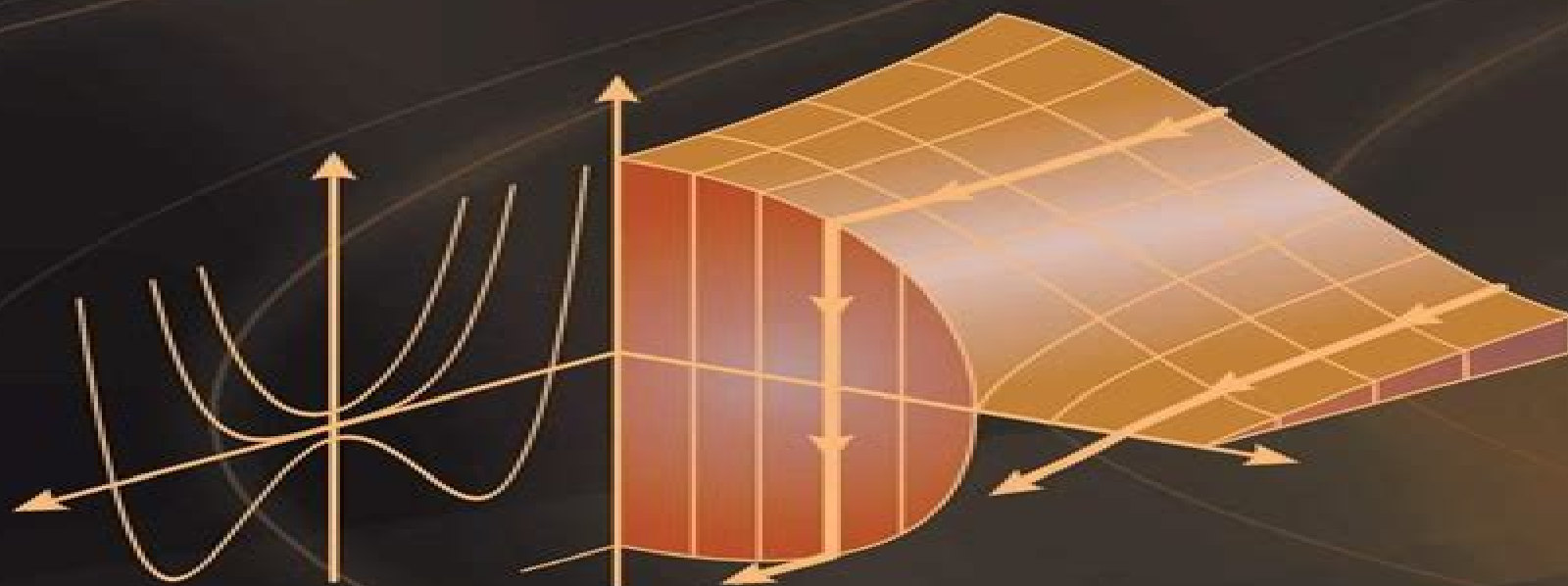


TOPICS IN STATISTICAL MECHANICS



Brian Cowan

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Statistical Physics Ian Ford, 2013-03-27 This undergraduate textbook provides a statistical mechanical foundation to the classical laws of thermodynamics via a comprehensive treatment of the basics of classical thermodynamics equilibrium statistical mechanics irreversible thermodynamics and the statistical mechanics of non equilibrium phenomena This timely book has a unique focus on the concept of entropy which is studied starting from the well known ideal gas law employing various thermodynamic processes example systems and interpretations to expose its role in the second law of thermodynamics This modern treatment of statistical physics includes studies of neutron stars superconductivity and the

recently developed fluctuation theorems It also presents figures and problems in a clear and concise way aiding the student s understanding *Mathematical Reviews* ,2007 Complexity and Criticality Kim Christensen,Nicholas R. Moloney,2005 This book provides a challenging and stimulating introduction to the contemporary topics of complexity and criticality and explores their common basis of scale invariance a central unifying theme of the book Criticality refers to the behaviour of extended systems at a phase transition where scale invariance prevails The many constituent microscopic parts bring about macroscopic phenomena that cannot be understood by considering a single part alone The phenomenology of phase transitions is introduced by considering percolation a simple model with a purely geometrical phase transition thus enabling the reader to become intuitively familiar with concepts such as scale invariance and renormalisation The Ising model is then introduced which captures a thermodynamic phase transition from a disordered to an ordered system as the temperature is lowered in zero external field By emphasising analogies between percolation and the Ising model the reader s intuition of phase transitions is developed so that the underlying theoretical formalism may be appreciated fully These equilibrium systems undergo a phase transition only if an external agent finely tunes certain external parameters to particular values Besides fractals and phase transitions there are many examples in Nature of the emergence of such complex behaviour in slowly driven non equilibrium systems earthquakes in seismic systems avalanches in granular media and rainfall in the atmosphere A class of non equilibrium systems not constrained by having to tune external parameters to obtain critical behaviour is addressed in the framework of simple models revealing that the repeated application of simple rules may spontaneously give rise to emergent complex behaviour not encoded in the rules themselves The common basis of complexity and criticality is identified and applied to a range of non equilibrium systems Finally the reader is invited to speculate whether self organisation in non equilibrium systems might be a unifying concept for disparate fields such as statistical mechanics geophysics and atmospheric physics Visit <http://www.complexityandcriticality.com> for animations for the models in the book available for Windows and Linux solutions to exercises as well as a list with corrections Electrical Conduction in Graphene and Nanotubes Shigeji Fujita,Akira Suzuki,2013-10-25 Written in a self contained manner this textbook allows both advanced students and practicing applied physicists and engineers to learn the relevant aspects from the bottom up All logical steps are laid out without omitting steps The book covers electrical transport properties in carbon based materials by dealing with statistical mechanics of carbon nanotubes and graphene presenting many fresh and sometimes provoking views Both second quantization and superconductivity are covered and discussed thoroughly An extensive list of references is given in the end of each chapter while derivations and proofs of specific equations are discussed in the appendix The experienced authors have studied the electrical transport in carbon nanotubes and graphene for several years and have contributed relevantly to the understanding and further development of the field The content is based on the material taught by one of the authors Prof Fujita for courses in quantum theory of solids and quantum statistical mechanics at the University at Buffalo

and some topics have also been taught by Prof Suzuki in a course on advanced condensed matter physics at the Tokyo University of Science For graduate students in physics chemistry electrical engineering and material sciences with a knowledge of dynamics quantum mechanics electromagnetism and solid state physics at the senior undergraduate level Includes a large numbers of exercise type problems *John Stewart Bell and Twentieth Century Physics* Andrew Whitaker,2016 John Stewart Bell 1928 1990 was one of the most important figures in twentieth century physics famous for his work on the fundamental aspects of the century s most important theory quantum mechanics While the debate over quantum theory between the supremely famous physicists Albert Einstein and Niels Bohr appeared to have become sterile in the 1930s Bell was able to revive it and to make crucial advances Bell s Theorem or Bell s Inequalities He was able to demonstrate a contradiction between quantum theory and essential elements of pre quantum theory locality and causality The book gives a non mathematical account of Bell s relatively impoverished upbringing in Belfast and his education It describes his major contributions to quantum theory but also his important work in the physics of accelerators and nuclear and elementary particle physics **Physics Briefs** ,1992 **Books in Series** ,1985 Vols for 1980 issued in three parts Series Authors and Titles Subject Guide to Books in Print ,1991

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