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Titolo	Statistical Mechanics : An Introductory Graduate Course / / by A. J. Berlinsky, A. B. Harris
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Descrizione fisica	1 online resource (XXI, 602 p. 169 illus., 28 illus. in color.)
Collana	Graduate Texts in Physics, , 1868-4513
Disciplina	530.13
Soggetti	Statistical physics Thermodynamics Heat engineering Heat - Transmission Mass transfer Quantum theory Statistical Physics and Dynamical Systems Engineering Thermodynamics, Heat and Mass Transfer Quantum Physics
Lingua di pubblicazione	Inglese
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Nota di contenuto	I Preliminaries -- Introduction -- Phase Diagrams -- Thermodynamic Properties and Relations -- II Basic Formalism -- Basic Principles -- Examples -- Basic Principles (Continued) -- Noninteracting Gases -- III Mean Field Theory, Landau Theory -- Mean-Field Approximation for the Free Energy -- Density Matrix Mean-Field Theory and Landau Expansions -- Landau Theory for Two or More Order Parameters -- Quantum Fluids -- Theory of Superconductivity -- Qualitative Discussion of Fluctuations -- The Cayley Tree -- IV Beyond Mean Field Theory -- Exact Mappings -- Series Expansions -- The Ising Model: Exact Solutions -- Monte Carlo -- Real Space Renormalization Group -- The Epsilon Expansion -- Kosterlitz-Thouless Physics.
Sommario/riassunto	In a comprehensive treatment of Statistical Mechanics from thermodynamics through the renormalization group, this book serves

as the core text for a full-year graduate course in statistical mechanics at either the Masters or Ph.D. level. Each chapter contains numerous exercises, and several chapters treat special topics which can be used as the basis for student projects. The concept of scaling is introduced early and used extensively throughout the text. At the heart of the book is an extensive treatment of mean field theory, from the simplest decoupling approach, through the density matrix formalism, to self-consistent classical and quantum field theory as well as exact solutions on the Cayley tree. Proceeding beyond mean field theory, the book discusses exact mappings involving Potts models, percolation, self-avoiding walks and quenched randomness, connecting various athermal and thermal models. Computational methods such as series expansions and Monte Carlo simulations are discussed, along with exact solutions to the 1D quantum and 2D classical Ising models. The renormalization group formalism is developed, starting from real-space RG and proceeding through a detailed treatment of Wilson's epsilon expansion. Finally the subject of Kosterlitz-Thouless systems is introduced from a historical perspective and then treated by methods due to Anderson, Kosterlitz, Thouless and Young. Altogether, this comprehensive, up-to-date, and engaging text offers an ideal package for advanced undergraduate or graduate courses or for use in self study.