

STATISTICAL MECHANICS AND THE PHYSICS OF MANY-PARTICLE MODEL SYSTEMS

By Alexander Leonidovich Kuzemsky (*Joint Institute for Nuclear Research, Russia*)

Key Features:

- The book is a self-contained treatise which is useful for a broad audience of students and researchers
- The presentation and material included in the book is unique. It includes a lot of topics and techniques which are difficult to find in other sources
- The book contains both theoretical aspects and concrete application examples

Description:

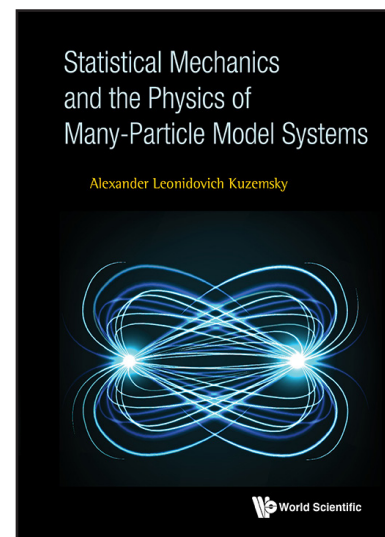
The book is devoted to the study of the correlation effects in many-particle systems. It presents the advanced methods of quantum statistical mechanics (equilibrium and nonequilibrium), and shows their effectiveness and operational ability in applications to problems of quantum solid-state theory, quantum theory of magnetism and the kinetic theory. The book includes description of the fundamental concepts and techniques of analysis following the approach of N N Bogoliubov's school, including recent developments. It provides an overview that introduces the main notions of quantum many-particle physics with the emphasis on concepts and models.

This book combines the features of textbook and research monograph. For many topics the aim is to start from the beginning and to guide the reader to the threshold of advanced researches. Many chapters include also additional information and discuss many complex research areas which are not often discussed in other places. The book is useful for established researchers to organize and present the advanced material disseminated in the literature. The book contains also an extensive bibliography.

The book serves undergraduate, graduate and postgraduate students, as well as researchers who have had prior experience with the subject matter at a more elementary level or have used other many-particle techniques.

Author:

A L Kuzemsky is one of the leading researchers at the Bogoliubov Laboratory of Theoretical Physics, Joint Institute for Nuclear Research, Dubna, Russia. He published more than 200 scientific papers, including 20 extended review papers on statistical mechanics and quantum theory of solid state.



Pub Date: May 2017

Binding: Hardcover

ISBN: 978-981-3145-62-7

Price: £187

Binding: Softcover

ISBN: 978-981-3145-63-4

Price: £75

Page Extent: 1260pp

Type: Monograph (Treat as Textbook)

Main Subject: Physics

Sub-subjects: Statistical Physics, Complexity and Nonlinear Dynamical Systems (Including Heat and Thermodynamics); Statistical Mechanics; Condensed Matter Physics; Quantum Mechanics and Quantum Information

BIC: PHS

BISAC: SCI057000; SCI077000

Keywords: Quantum Statistical Physics; Many-particle System; Quantum Theory of Magnetism; Condensed Matter Physics; Quantum Solid State Theory; N N Bogoliubov

Readership: Graduate students and researchers interested in the field of statistical mechanics, condensed matter physics and many-particle systems

Imprint: World Scientific Publishing Company

Contents:

- Probability, Information and Physics
- Dynamics of Particles
- Perturbation Theory
- Scattering Theory
- Green Functions Method in Mathematical Physics
- Symmetry and Invariance
- The Angular Momentum and Spin
- Equilibrium Statistical Thermodynamics
- Dynamics and Statistical Mechanics
- Thermodynamic Limit in Statistical Mechanics
- Maximum Entropy Principle
- Band Theory and Electronic Properties of Solids
- Magnetic Properties of Substances and Materials
- Statistical Physics of Many-Particle Systems
- Thermodynamic Green Functions
- Applications of the Green Functions Method
- Spin Systems and the Green Functions Method
- Correlated Fermion Systems on a Lattice. Hubbard Model
- Correlated Fermion Systems on a Lattice. Anderson Model
- Spin-Fermion Model of Magnetism: Quasiparticle Many-Body Dynamics
- Spin-Fermion Model of Magnetism: Theory of Magnetic Polaron
- Quantum Protectorate and Microscopic Models of Magnetism
- Quasiaverages and Symmetry Breaking
- Emergence and Emergent Phenomena
- Electron-Lattice Interaction in Metals and Alloys
- Superconductivity in Transition Metals and their Disordered Alloys
- Spectral Properties of the Generalized Spin-Fermion Models
- Correlation Effects in High- T_c Superconductors and Heavy Fermion Compounds
- Generalized Mean Fields and Variational Principle of Bogoliubov
- Nonequilibrium Statistical Thermodynamics
- Method of the Nonequilibrium Statistical Operator
- Nonequilibrium Statistical Operator and Transport Equations
- Applications of the Nonequilibrium Statistical Operator
- Generalized Van Hove Formula for Scattering of Particles by Statistical Medium
- Electronic Transport in Metallic Systems