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| Nota di contenuto | Dynamics and Thermodynamics of Systems with Long-Range Interactions: An Introduction -- Dynamics and Thermodynamics of Systems with Long-Range Interactions: An Introduction -- Statistical Mechanics -- Thermo-statistics or Topology of the Microcanonical Entropy Surface -- Ensemble Inequivalence in Mean-Field Models of Magnetism -- Phase Transitions in Finite Systems -- Phase Transitions in Systems with 1/r ? Attractive Interactions -- Nonextensivity: From Low-Dimensional Maps to Hamiltonian Systems -- Astrophysics -- Statistical Mechanics of Gravitating Systems in Static and Cosmological Backgrounds -- Statistical Mechanics of Two-Dimensional Vortices and Stellar Systems -- Bose-Einstein Condensation -- Coherence and Superfluidity of Gaseous Bose-Einstein Condensates -- Ultracold Atoms and Bose-Einstein Condensates in Optical Lattices -- Canonical |

Statistics of Occupation Numbers for Ideal and Weakly Interacting Bose-Einstein Condensates -- New Regimes in Cold Gases via Laser-Induced Long-Range Interactions -- Nonlinear Dynamics -- Dynamics and Self-consistent Chaos in a Mean Field Hamiltonian Model -- Kinetic Theory for Plasmas and Wave-Particle Hamiltonian Dynamics -- Emergence of Fractal Clusters in Sequential Adsorption Processes -- The Hamiltonian Mean Field Model: From Dynamics to Statistical Mechanics and Back.

Sommario/riassunto

Properties of systems with long range interactions are still poorly understood despite being of importance in most areas of physics. The present volume introduces and reviews the effort of constructing a coherent thermodynamic treatment of such systems by combining tools from statistical mechanics with concepts and methods from dynamical systems. Analogies and differences between various systems are examined by considering a large range of applications, with emphasis on Bose--Einstein condensates. Written as a set of tutorial reviews, the book will be useful for both the experienced researcher as well as the nonexpert scientist or postgraduate student.