

| | |
|-------------------------|--|
| 1. Record Nr. | UNINA9910146557303321 |
| Titolo | Computational many-particle physics // edited by H. Fehske, R. Schneider, A. Weiße |
| Pubbl/distr/stampa | Berlin, Germany ; ; New York, United States : , : Springer, , [2008] ©2008 |
| ISBN | 3-540-74686-2 |
| Edizione | [1st ed. 2008.] |
| Descrizione fisica | 1 online resource (XV, 780 p.) |
| Collana | Lecture Notes in Physics, , 0075-8450 ; ; 739 |
| Disciplina | 530.144 |
| Soggetti | Many-body problem - Numerical solutions High performance computing |
| Lingua di pubblicazione | Inglese |
| Formato | Materiale a stampa |
| Livello bibliografico | Monografia |
| Note generali | "A summer school on 'computational many-body physics' [was organized] in September 2006, during the 550th anniversary of the University Greifswald"--Pref. |
| Nota di bibliografia | Includes bibliographical references and index. |
| Nota di contenuto | Molecular Dynamics -- to Molecular Dynamics -- Wigner Function Quantum Molecular Dynamics -- Classical Monte Carlo -- The Monte Carlo Method, an Introduction -- Monte Carlo Methods in Classical Statistical Physics -- The Monte Carlo Method for Particle Transport Problems -- Kinetic Modelling -- The Particle-in-Cell Method -- Gyrokinetic and Gyrofluid Theory and Simulation of Magnetized Plasmas -- Semiclassical Approaches -- Boltzmann Transport in Condensed Matter -- Semiclassical Description of Quantum Many-Particle Dynamics in Strong Laser Fields -- Quantum Monte Carlo -- World-line and Determinantal Quantum Monte Carlo Methods for Spins, Phonons and Electrons -- Autocorrelations in Quantum Monte Carlo Simulations of Electron-Phonon Models -- Diagrammatic Monte Carlo and Stochastic Optimization Methods for Complex Composite Objects in Macroscopic Baths -- Path Integral Monte Carlo Simulation of Charged Particles in Traps -- Ab-Initio Methods in Physics and Chemistry -- Ab-Initio Approach to the Many-Electron Problem -- Ab-Initio Methods Applied to Structure Optimization and Microscopic Modelling -- Effective Field Approaches -- Dynamical Mean-Field Approximation and Cluster Methods for Correlated Electron Systems -- Local Distribution Approach -- Iterative Methods for Sparse Eigenvalue |

Problems -- Exact Diagonalization Techniques -- Chebyshev Expansion
Techniques -- The Density Matrix Renormalisation Group: Concepts
and Applications -- The Conceptual Background of Density-Matrix
Renormalization -- Density-Matrix Renormalization Group Algorithms
-- Dynamical Density-Matrix Renormalization Group -- Studying Time-
Dependent Quantum Phenomena with the Density-Matrix
Renormalization Group -- Applications of Quantum Information in the
Density-Matrix Renormalization Group -- Density-Matrix
Renormalization Group for Transfer Matrices: Static and Dynamical
Properties of 1D Quantum Systems at Finite Temperature -- Concepts
of High Performance Computing -- Architecture and Performance
Characteristics of Modern High Performance Computers --
Optimization Techniques for Modern High Performance Computers.

Sommario/riassunto

Complicated many-particle problems abound in nature and in research alike. Plasma physics, statistical physics and condensed matter physics, as primary examples, are all heavily dependent on efficient methods for solving such problems. Addressing graduate students and young researchers, this book presents an overview and introduction to state-of-the-art numerical methods for studying interacting classical and quantum many-particle systems. A broad range of techniques and algorithms are covered, and emphasis is placed on their implementation on modern high-performance computers.
