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Nota di contenuto	Preface; Organizing Committees; CONTENTS; Dynamical Mean-Field Theory for Correlated Lattice Fermions K. Byczuk; 1. Introduction; 2. Correlation and correlated electron systems; 2.1. Correlations; 2.2. Weakly correlated many-particle systems; 2.3. Strongly correlated many-particle systems; 2.4. Correlated fermions and inhomogeneous potentials; 3. Disorder and disordered electron systems; 4. Models for correlated, disordered lattice fermions with inhomogeneous potentials; 4.1. Hubbard model; 4.2. Models for external inhomogeneous potential; 4.3. Anderson model; 4.4. Models for disorders 4.5. Anderson-Hubbard model4.6. Anderson-Falicov-Kimball model; 5. Average over disorder; 5.1. Average and most probable value; 5.2. Generalized mean; 6. Static mean-field theory; 6.1. Exchange Hamiltonian; 6.2. Static mean-field approximation; 6.3. Large dimensional limit; 7. The Holy Grail for lattice fermions or bosons; 8. DMFT - practical and quick formulation; 8.1. Exact partition function, Green function, and self-energy; 8.2. DMFT approximation; 8.3. Local Green function; 8.4. Local approximation to Dyson equation; 8.5.

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4. Quantum dot as a two-level system

Sommario/riassunto

This is a collection of lectures by 11 active researchers, renowned specialists in a number of modern, promising, dynamically-developing research directions in condensed matter/solid state theory. The lectures are concerned with phenomena, materials and ideas, discussing theoretical and experimental features, as well as with methods of calculation.Readers will find up-to-date presentations of the methods of carrying out efficient calculations for electronic systems and quantum spin systems, together with applications to describe phenomena and to design new materials. These applications include