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Titolo	Quantum Many-Body Physics [[electronic resource]] : A Perspective on Strong Correlations / / by Yoshio Kuramoto
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ISBN	4-431-55393-2
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Descrizione fisica	1 online resource (XI, 261 p. 41 illus., 3 illus. in color.)
Collana	Lecture Notes in Physics, , 0075-8450 ; ; 934
Disciplina	530.144
Soggetti	Superconductivity Superconductors Solid state physics Magnetism Magnetic materials Low temperature physics Low temperatures Statistical physics Strongly Correlated Systems, Superconductivity Solid State Physics Magnetism, Magnetic Materials Low Temperature Physics Statistical Physics and Dynamical Systems
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Includes index.
Nota di contenuto	Perturbation theory and eective Hamiltonian -- Itinerant and localized characters of electrons -- Linear response and Green functions -- Fermi liquid theory -- Superconductivity -- Kondo eect -- One-dimensional fermions and bosonization -- Fractionalization of charge and statistics -- Many-body perturbation theory -- Dynamical mean field theory.
Sommario/riassunto	This book offers a compact tutorial on basic concepts and tools in quantum many-body physics, and focuses on the correlation effects produced by mutual interactions. The content is divided into three parts, the first of which introduces readers to perturbation theory. It

begins with the simplest examples—hydrogen and oxygen molecules—based on their effective Hamiltonians, and looks into basic properties of electrons in solids from the perspective of localized and itinerant limits. Readers will also learn about basic theoretical methods such as the linear response theory and Green functions. The second part focuses on mean-field theory for itinerant electrons, e.g. the Fermi liquid theory and superconductivity. Coulomb repulsion among electrons is addressed in the context of high-Tc superconductivity in cuprates and iron pnictides. A recent discovery concerning hydride superconductors is also briefly reviewed. In turn, the third part highlights quantum fluctuation effects beyond the mean-field picture. Discussing the dramatic renormalization effect in the Kondo physics, it provides a clear understanding of nonperturbative interaction effects. Further it introduces readers to fractionally charged quasi-particles in one and two dimensions. The last chapter addresses the dynamical mean field theory (DMFT). The book is based on the author’s long years of experience as a lecturer and researcher. It also includes reviews of recent focus topics in condensed matter physics, enabling readers to not only grasp conventional condensed matter theories but also to catch up on the latest developments in the field.