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Nota di contenuto	Quantum Approach to Classical Thermodynamics and Optimization -- Non-equilibrium Dynamics of Quantum Systems: Order Parameter Evolution, Defect Generation, and Qubit Transfer -- Defect Production Due to Quenching Through a Multicritical Point and Along a Gapless Line -- Adiabatic Perturbation Theory: From Landau–Zener Problem to Quenching Through a Quantum Critical Point -- Quench Dynamics of Quantum and Classical Ising Chains: From the Viewpoint of the Kibble–

Zurek Mechanism -- Quantum Phase Transition in the Spin Boson Model -- Influence of Local Moment Fluctuations on the Mott Transition -- Signatures of Quantum Phase Transitions via Quantum Information Theoretic Measures -- How Entangled Is a Many-Electron State? -- Roles of Quantum Fluctuation in Frustrated Systems -- Order by Disorder and Reentrant Phase Transition -- Exploring Ground States of Quantum Spin Glasses by Quantum Monte Carlo Method -- Phase Transition in a Quantum Ising Model with Long-Range Interaction -- Length Scale-Dependent Superconductor–Insulator Quantum Phase Transitions in One Dimension: Renormalization Group Theory of Mesoscopic SQUIDS Array -- Quantum-Mechanical Variant of the Thouless–Anderson–Palmer Equation for Error-Correcting Codes -- Probabilistic Model of Fault Detection in Quantum Circuits.

Sommario/riassunto

The process of realizing the ground state of some typical (frustrated) quantum many-body systems, starting from the 'disordered' or excited states, can formally be mapped onto the search of solutions for computationally hard problems. The dynamics through quantum critical points are especially crucial in the context of such computational optimization problems and have been investigated intensively in recent times. Several successful methods are now well-established, and this volume compiles a collection of introductory reviews on such developments and related aspects. Written by well known experts, these lectures concentrate on quantum phase transitions and their dynamics as the transition or critical points are crossed. Both the quenching and annealing dynamics are extensively covered. The style has been kept as tutorial as possible in order to make this volume a suitable reference for young researchers joining this exciting and burgeoning field of research. .
