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Titolo	Markov Chain Monte Carlo Methods in Quantum Field Theories [[electronic resource]] : A Modern Primer / / by Anosh Joseph
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Soggetti	Physics Elementary particles (Physics) Quantum field theory String theory Numerical and Computational Physics, Simulation Elementary Particles, Quantum Field Theory Quantum Field Theories, String Theory
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Nota di contenuto	Monte Carlo Method for Integration -- Monte Carlo with Importance Sampling -- Markov Chains -- Markov Chain Monte Carlo -- MCMC and Feynman Path Integrals -- Reliability of Simulations -- Hybrid (Hamiltonian) Monte Carlo -- MCMC and Quantum Field Theories on a Lattice -- Machine Learning and Quantum Field Theories -- C++ Programs.
Sommario/riassunto	This primer is a comprehensive collection of analytical and numerical techniques that can be used to extract the non-perturbative physics of quantum field theories. The intriguing connection between Euclidean Quantum Field Theories (QFTs) and statistical mechanics can be used to apply Markov Chain Monte Carlo (MCMC) methods to investigate strongly coupled QFTs. The overwhelming amount of reliable results coming from the field of lattice quantum chromodynamics stands out as an excellent example of MCMC methods in QFTs in action. MCMC methods have revealed the non-perturbative phase structures, symmetry breaking, and bound states of particles in QFTs. The

applications also resulted in new outcomes due to cross-fertilization with research areas such as AdS/CFT correspondence in string theory and condensed matter physics. The book is aimed at advanced undergraduate students and graduate students in physics and applied mathematics, and researchers in MCMC simulations and QFTs. At the end of this book the reader will be able to apply the techniques learned to produce more independent and novel research in the field.