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Titolo	Methods of contemporary gauge theory / / Yuri Makeenko [[electronic resource]]
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ISBN	1-107-13180-4 1-280-41519-3 9786610415199 1-139-14754-4 0-511-16998-1 0-511-06401-2 0-511-05768-7 0-511-33122-3 0-511-53514-7 0-511-07247-3
Descrizione fisica	1 online resource (xii, 417 pages) : digital, PDF file(s)
Collana	Cambridge monographs on mathematical physics
Disciplina	530.14/35
Soggetti	Gauge fields (Physics) Mathematical physics
Lingua di pubblicazione	Inglese
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Note generali	Title from publisher's bibliographic system (viewed on 05 Oct 2015).
Nota di bibliografia	Includes bibliographical references (p. 405-410) and index.
Nota di contenuto	Path Integrals -- Operator calculus -- Free propagator -- Euclidean formulation -- Path-ordering of operators -- Feynman disentangling -- Calculation of the Gaussian path integral -- Transition amplitudes -- Propagators in external field -- Second quantization -- Integration over fields -- Grassmann variables -- Perturbation theory -- Schwinger-Dyson equations -- Commutator terms -- Schwinger-Dyson equations (continued) -- Regularization -- Quantum anomalies from path integral -- QED via path integral -- Chiral Ward identity -- Chiral anomaly -- Chiral anomaly (calculation) -- Scale anomaly -- Instantons in quantum mechanics -- Double-well potential -- The instanton solution -- Instanton contribution to path integral -- Symmetry restoration by instantons -- Topological charge and [theta]-vacua --

Lattice Gauge Theories -- Observables in gauge theories -- Gauge invariance -- Phase factors (definition) -- Phase factors (properties) -- Aharonov-Bohm effect -- Gauge fields on a lattice -- Sites, links, plaquettes and all that -- Lattice formulation -- The Haar measure -- Wilson loops -- Strong-coupling expansion -- Area law and confinement -- Asymptotic scaling -- Lattice methods -- Phase transitions -- Mean-field method -- Mean-field method (variational) -- Lattice renormalization group -- Monte Carlo method -- Some Monte Carlo results -- Fermions on a lattice -- Chiral fermions -- Fermion doubling -- Kogut-Susskind fermions -- Wilson fermions -- Quark condensate -- Finite temperatures -- Feynman-Kac formula.

Sommario/riassunto

This 2002 book introduces the quantum theory of gauge fields. Emphasis is placed on four non-perturbative methods: path integrals, lattice gauge theories, the 1/N expansion, and reduced matrix models, all of which have important contemporary applications. Written as a textbook, it assumes a knowledge of quantum mechanics and elements of perturbation theory, while many relevant concepts are pedagogically introduced at a basic level in the first half of the book. The second half comprehensively covers large-N Yang-Mills theory. The book uses an approach to gauge theories based on path-dependent phase factors known as the Wilson loops, and contains problems with detailed solutions to aid understanding. Suitable for advanced graduate courses in quantum field theory, the book will also be of interest to researchers in high energy theory and condensed matter physics as a survey of recent developments in gauge theory.