

Lattice Gauge Theory, From Fundamentals to Applications

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The lattice formulation allows a first principles nonperturbative study of Yang-Mills theories (and, in particular, QCD) via statistical mechanics methods, at the price of a very high computational investment. Today, lattice simulations have become a key input in precision tests of standard model phenomenology, including the determination of the muon $g - 2$ factor. At the same time, some lesser explored features of the simulations allow the investigation of fundamental properties of QCD, such as the mechanism behind color confinement. We describe general aspects of the lattice formulation and current trends in the field. We also present some unconventional ideas to investigate confinement from infrared propagators on the lattice.