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Hadronic vacuum polarization contribution to the muon magnetic anomaly from lattice QCD

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Anomalous magnetic moments have guided the evolution of quantum field theory ever since its earliest stages, serving both as a stringent test of the theory at increasingly higher levels of precision and as a possible window to new physics. After decades of perfect agreement, the measured muon magnetic moment (which is known to a precision of about 0.5 parts per million both from theory and experiment) now deviates from the theoretical expectation by around 3.5σ . In order to accentuate or resolve this discrepancy, an experiment at Fermilab is currently underway and is aiming to improve the precision of the measurement to 0.14 ppm. But the theoretical calculation has to be improved as well. The largest source of error are low energy hadronic contributions, that can be evaluated either via a phenomenological approach or *ab initio*, directly from the standard model Lagrangian, using lattice QCD. In this talk we will see how lattice QCD can be used to compute the leading hadronic contribution to the muon magnetic moment: the one induced by hadronic vacuum polarization.

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