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The leading disconnected contribution to the anomalous magnetic moment of the muon

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The hadronic vacuum polarization can be determined from the vector correlator in a mixed time-momentum representation. We explicitly calculate the disconnected contribution to the vector correlator, both in the $N_f = 2$ theory and with an additional quenched strange quark, using non-perturbatively $O(a)$ -improved Wilson fermions. All-to-all propagators are computed using stochastic sources and a generalized hopping parameter expansion. Combining the result with the dominant connected contribution, we are able to estimate an upper bound for the systematic error that arises from neglecting the disconnected contribution in the determination of $(g - 2)_\mu$.

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