RBRC-296 Lattice calculation of the lowest order hadronic contribution to the muon anomalous magnetic moment

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abstract We present a quenched lattice calculation of the lowest order ($O(\alpha^2)$) hadronic contribution to the anomalous magnetic moment of the muon which arises from the hadronic vacuum polarization. A general method is presented for computing entirely in Euclidean space, obviating the need for the usual dispersive treatment which relies on experimental data for $e^+e^-$ annihilation to hadrons. While the result is not yet of comparable precision to those state-of-the-art calculations, systematic improvement of the quenched lattice computation to this level is straightforward and well within the reach of present computers. Including the effects of dynamical quarks is conceptually trivial, the computer resources required are not.