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UV-finite QED correction to the hadronic vacuum polarization contribution to $(g-2)_\mu$

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In the anomalous magnetic moment of the muon, the determination of the hadronic vacuum polarization (HVP) contribution must reach sub-percent precision in order for the Standard Model prediction to match the precision of the experimental measurement. To achieve this, one needs to include QED corrections that break the isospin symmetry, which is usually imposed in lattice calculations. One typically treats these corrections perturbatively in the electromagnetic fine-structure constant α, expressing them through Feynman diagrams with hadronic n-point functions calculated in isospin symmetric QCD, where individual vertices are connected by the photon propagator.
We present a study of one of the disconnected diagrams, which is UV-finite and not suppressed by SU(3) flavour symmetry. We employ a lattice calculation, performed in coordinate space with QED treated in the continuum, on seven CLS ensembles with four different lattice spacings and pion masses ranging from 170-420 MeV. We extrapolate the result to the physical point by making use of a phenomenological description in terms of the pseudoscalar meson exchange and the charged pion loop, where we also take into account the effect of $\eta\eta'$-mixing.

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