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Investigation of the hadronic light-by-light contribution to the muon $g-2$ using staggered fermions

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Hadronic contributions dominate the uncertainty of the standard model prediction for the anomalous magnetic moment of the muon. In this talk, we will describe an ongoing lattice calculation of the hadronic, light-by-light, four-point function, performed with staggered fermions. The presence of quarks with different tastes complicates the analysis of this position-space correlation function. We present a suitable adaptation of the “Mainz method”. As a first numerical test, we reproduce the well-known lepton-loop contribution. Results at a single lattice spacing for the light quark contribution, using several volumes from 3 to 6 fm, will then be discussed. Our study of the long distance behavior and finite-volume effects is supplemented by considering the contribution of the light pseudoscalar-pole. The corresponding transition form factors have been evaluated in previous simulations on the same ensembles.

Topical area

Particle Physics Beyond the Standard Model

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