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The smeared R-ratio in isoQCD from first-principles lattice simulations

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The R-ratio is a phenomenological observable of great relevance, both in itself and in applications such as the dispersive approach to the muon anomalous magnetic moment. It can be investigated from first-principles in lattice QCD by introducing an arbitrary smearing kernel and employing the well-known Hansen-Lupatantalo method to perform spectral reconstruction with controlled statistical and systematic errors. Improving upon a first study published in 2023, we show preliminary results using the correlation functions produced by ETMC in $N_f = 2 + 1 + 1$ lattice simulations at four lattice spacings, different volumes and with higher statistics w.r.t. our previous study. The new correlators, thanks to the implementation of the Low Mode Average technique, allow the determination of the R-ratio smeared with Gaussian kernels of widths down to $\sigma \sim 200$ MeV with phenomenologically relevant precision.

Parallel Session (for talks only)

Quark and lepton flavor physics

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