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Lattice calculation of the R-ratio smeared with Gaussian kernels

Wednesday, 15 February 2023 10:00 (20 minutes)

The ratio R(Q) of the cross-sections for Q+Q−⟶ hadrons and Q+Q−⟶Q+Q− is a valuable energy-dependent probe of the hadronic sector of the Standard Model. Moreover, the experimental measurements of R(Q) are the inputs of the dispersive calculations of the leading hadronic vacuum polarization contribution to the muon Q−2 and these are in significant tension with direct lattice calculations and with the muon Q−2 experiment. In this talk we discuss the results of our first-principles lattice study of R(Q). By using a recently proposed method for extracting smeared spectral densities from Euclidean lattice correlators, we have calculated R(Q) convoluted with Gaussian kernels of different widths Q and central energies up to 2.5 GeV. Our theoretical results have been compared with the KNT19 compilation of experimental results smeared with the same Gaussian kernels and a tension (about three standard deviations) has been observed for Q~600 MeV and central energies around the Q resonance peak.

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