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Dispersive approach to hadronic light-by-light scattering and the muon $g-2$

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Collaboration

Abstract content

The anomalous magnetic moment of the muon has been measured and computed to very high precision of about 0.5 ppm. For more than a decade, a discrepancy has persisted between the experiment and the Standard Model prediction, now of more than 3 sigma. Forthcoming experiments at FNAL and J-PARC aim at reducing the experimental error by a factor of 4. The main uncertainty of the theory prediction is due to strong interaction effects. At present, the largest uncertainty comes from hadronic vacuum polarisation, which, however, is expected to be reduced significantly with help of new data from e^+e^- experiments. In a few years, the subleading hadronic light-by-light (HLbL) contribution will become the dominating error. So far, only model calculations of the HLbL contribution exist. Recently, we have published a first dispersive approach to HLbL scattering (arXiv:1402.7081). This new, model-independent approach is based on the fundamental principles of unitarity, analyticity, crossing and gauge invariance. I will explain the ideas of our approach and highlight the advantages of a data-driven determination of the hadronic light-by-light contribution to the muon $g-2$.

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