

Testing the Standard Model at the precision frontier: the anomalous magnetic moment of the muon

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Collaboration

Abstract content

The anomalous magnetic moment of the muon $(g-2)_\mu$ is one of the most precisely measured quantities in particle physics (0.54 ppm). It shows a long-standing discrepancy of 3–4 standard deviations between the direct measurement of $(g-2)_\mu$ and its theoretical evaluation. This evaluation is dominated by the QED, weak and hadronic contributions. The QED and weak parts can be determined in perturbative approaches with very high precision. Thus, the hadronic part is the dominant uncertainty. The hadronic part is dominated by the annihilation. The second largest contribution to the hadronic uncertainty stems from the so-called Light-by-Light amplitudes. They have to be evaluated via theoretical models. These models require transition form factor measurements as input. Existing and future measurements of the relevant hadronic cross sections and transition form factors are presented.

Primary author(s) : HAFNER, Andreas (University of Mainz)

Presenter(s) : HAFNER, Andreas (University of Mainz)

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