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Status and Prospects for the Measurement of the Pion Vector Form Factor

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The anomalous magnetic moment of the muon (a_μ) is one of the most precisely measured quantities in physics, thus providing an extremely sensitive probe for physics beyond the Standard Model (SM). However, the picture for the SM prediction of this quantity is not as clear as for the experimental results. Large tensions in the evaluation of the Hadronic Vacuum Polarization (HVP) contribution to a_μ prevent an unambiguous SM prediction.
The (time-like) pion vector Form Factor (FF), i.e. the cross section for the production of two charged pions in e^+e^- annihilation, accounts for 75\% of the HVP contribution evaluated through the dispersive approach.
Over the last decades, several experimental collaborations have performed measurements of the pion FF with a claimed accuracy of 1\% or better. Nevertheless, these data sets show significant discrepancies. Consequently, depending on the data set used, the resulting SM predictions either show good agreement with the experimental value or exhibit a tension exceeding 5σ.
In this contribution, the to-date most precise results on the pion FF will be summarized, hints on the origin of the observed discrepancies will be discussed, and perspectives towards new measurements provided.

Collaboration

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