Contribution ID: **46** Type: **Oral Talks**

The MUonE Experiment: Understanding Muon g–2 Puzzle via Muon-electron Scattering

Saturday 20 April 2024 17:15 (25 minutes)

The MUonE experiment aims at a precise measurement of the shape of the differential cross-section of the μ-e elastic scattering to extract the running of the QED coupling. By using an innovative method, this will lead to an independent determination of the leading hadronic contribution to the muon anomalous magnetic moment, a_μ(HLO). This could clarify the present tensions of 5σ discrepancy between the theoretical and experimental value of the muon g-2.

The experiment will be carried out at CERN North Area by injecting the high-intensity 160 GeV muon beam into a low-Z target. The main challenge of the experiment lies in the control of the systematic uncertainties to an unprecedented level of precision for a scattering experiment. A test run was performed in September 2023 with a reduced detector to validate the basic concepts of the proposal. The status and future plans of the experiment will be presented.

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Session Classification: Plenary-1