

The MUon Scattering Experiment

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The MUon Scattering Experiment (MUSE) at the Paul Scherrer Institute aims to address the proton radius puzzle which comes from the discrepancy of the proton charge radius measured by hydrogen spectroscopy and electron-proton scattering. While the discrepancy is clearly observed in classical hydrogen and muonic hydrogen spectroscopy results, there is no muon-proton scattering cross-section available so far at the precision sensitive to the proton radius extraction. MUSE seeks to do this by performing high-precision measurements of elastic ep and μp scattering for both lepton charges using mixed secondary beam (e, μ, π) with momenta of 115, 160, or 210 MeV/c. By utilizing a non-magnetic spectrometer, MUSE allows the direct comparison of ep and μp cross sections with reduced systematic uncertainties and provide a better test of lepton universality than has been seen before experimentally. Access to both positive and negative lepton beams give MUSE the ability to also study two-photon exchange. Currently MUSE experiment is at the data production stage. The overview of the current progress and timeline will be presented and discussed.

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