

The Muon Scattering Experiment (MUSE) at PSI and the proton radius puzzle

Saturday, 31 May 2014 15:00 (2:00)

Collaboration

MUSE

Abstract content

The unexplained large discrepancy of the proton charge radius measurements with muonic hydrogen Lamb shift and determinations from elastic electron scattering and Lamb shift in regular hydrogen of seven standard deviations is known as the proton radius puzzle. Suggested solutions of the puzzle range from possible errors in the experiments through unexpectedly large hadronic physics effects to new physics beyond the Standard Model. A new approach to verify the radius discrepancy in a systematic manner will be pursued with the Muon Scattering Experiment (MUSE) at PSI. The experiment aims to compare elastic cross sections, the proton elastic form factors and the extracted proton charge radius with scattering of electrons and muons of either charge and under identical conditions. The difference in the observed radius will be probed with a similar precision as has been established with hydrogen spectroscopy and electron scattering. An overview of the experiment and the current status will be presented.

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