

Joint 20th International Workshop on Hadron Structure and Spectroscopy and 5th workshop on Correlations in Partonic and Hadronic Interactions



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The Proton Radius Puzzle: An Overview

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The proton charge radius is one of the pivotal quantities in physics. In particular, its value is highly correlated with the experimental determination of the Rydberg constant. For the past seventy years it has been measured through elastic electron-proton scattering and ordinary hydrogen spectroscopy methods. Over the years, results from both methods generally agreed with each other within their experimental uncertainties. Unexpectedly, in 2010 (and 2013) two experiments from newly developed muonic hydrogen atomic spectroscopy method reported results up to six standard deviations smaller values than the accepted average from all previous experiments performed with both methods. This discrepancy triggered the well-known proton radius puzzle in hadronic physics. This talk will discuss the post-2010 progress in proton radius measurements, together with the recent experimental results and plans for new experiments. In particular, a novel magnetic-spectrometer-free electron-proton scattering experiment (PRad), performed at Jefferson Lab in 2016, and the status of the second experiment (PRad-II), will be presented emphasizing the method and published results.

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