Current Results of the PRad Experiment at JLab

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The latest measurements of the proton radius through muonic hydrogen Lamb shift show a discrepancy of about 7σ from a global analysis of standard hydrogen Lamb shift and elastic ep-scattering. In order to understand this proton radius puzzle, the PRad experiment, that was designed through an independent method, successfully performed in June 2016, taking elastic ep and Møller-scattering data with rich statistics in a wide $Q^2$ range including very low momentum transfer ($Q^2 \in [10^{-4}, 10^{-1}]$ GeV$^2$) with very accurate angle and energy measurements to minimize the systematic uncertainties to achieve a sub-percent precision. After briefly reminding the framework around this proton radius puzzle and how the specific setup of the PRad experiment was designed to improve the previous measurements on elastic ep-scattering cross-sections, using a high efficiency and high resolution calorimeter (HyCal) and a high resolution GEM detector, the presentation will focus on the data analysis and the extraction of ep scattering cross-section normalized by the well known Møller cross-section, to finally show the latest physics results from the 2.2 GeV data.

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