SES19-2019-000059

Abstract for an Invited Paper
for the SES19 Meeting of
the American Physical Society

Proton Radius from Jefferson Lab PRad Experiment[1]

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A new measurement of the proton charge radius was recently released by Jefferson lab PRad collaboration. The PRad experiment (E12-11-1061[2]) was performed at Jefferson Lab in Hall B to investigate the proton charge radius puzzle. This experiment was designed to measure electron-proton elastic scattering cross section in an unprecedented low region of momentum transfer squared ($Q^2 = 2 \times 10^{-4} - 0.06$ $(GeV/c)^2$), with sub-percent precision. PRad experiment utilized a non-magnetic calorimetric electron detection method using a pair of large GEM detectors with high spatial resolution, a hybrid calorimeter (HyCal) with high energy resolution, and a gas flow windowless target to reduce the background from target cell walls. To better control the systematic uncertainties, the e-p elastic scattering cross section was normalized to the well-know Møller scattering process, which was measured simultaneously within the similar kinematics and detector acceptance. In this talk, we will present the details of the experiment and the proton charge radius result.

[1]This work is supported in part by NSF MRI award PHY-1229153, the U.S. Department of Energy under Contract No. DE-FG02-07ER41528, No. DE-FG02-03ER41240 and Thomas Jefferson National Laboratory, and PRad Collaboration

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