

Direct Measurement of Radiative Effects for ep Elastic Scattering at Very Low Q^2

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The recent PRad experiment at Jefferson Lab has precisely measured the cross sections for elastic electron proton scattering at four momentum transfer square (Q^2) from 2×10^{-4} to 6×10^{-2} GeV^2/c^2 . The charge radius of proton was extracted based on the measured proton form factors at very low Q^2 . This experiment utilized a high precision, hybrid calorimeter (HyCal) that can precisely determine the energy and position of electrons and photons. The HyCal's inner array of PbWO_4 modules can also separate two incident particles with a distance greater than about 30 mm ($\sqrt{2}$ of the module size) on the detection plane. Together with the GEM detectors placed in front of the HyCal, which serve as a veto detector for neutral particles, the PRad detector system is capable of measuring and identifying the scattered electrons and the radiative photons simultaneously from the elastic ep scattering process. In this talk, I will present the preliminary results of the direct radiative effects measurement from the PRad experiment. I will also discuss the expected improvements with the upcoming PRad-II experiment.