

Calibration Study and Preliminary Results of PRad Experiment

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The PRad experiment, that addresses the ongoing proton radius puzzle through new elastic ep -scattering measurements, was successfully performed in last June. We will present an extended study of the electromagnetic calorimeter calibration of this experiment as well as some preliminary results on ep - and ee -scattering processes extracted from the data.

The latest measurements of the proton radius through muonic hydrogen Lamb shift show a discrepancy of 7σ from a global analysis of standard hydrogen Lamb shift and elastic ep -scattering. In order to understand this gap, the PRad experiment took elastic ep -scattering data at very low Q^2 ($2 \cdot 10^{-4}$ to 10^{-1} GeV²) with very accurate angle and energy measurements to minimize the systematic uncertainties.

Before measuring the cross-sections that will be used to extract the electromagnetic form factor $G_E(Q^2)$ and the proton radius, a very careful calibration of the electromagnetic calorimeter (*HyCal*) must be performed to get a good energy resolution and separate ep -events from Møller events especially at low angle.