

# Calibration for Proton Charge Radius (PRad) Experiment at Jefferson Lab <sup>1</sup>

Li Ye

Mississippi State University

For the PRad Collaboration

The Proton Charge Radius Puzzle refers to  $7\sigma$  discrepancy between the proton charge radius extracted from muonic hydrogen Lamb shift measurements and that from the atomic hydrogen Lamb shift and e-p elastic scattering measurements. In order to get a better understanding of this puzzle, the PRad experiment (E12-11-106<sup>2</sup>) was proposed and recently performed with 1.1 and 2.2 GeV unpolarized electron beam in Hall B at Jefferson Lab.

The experiment aims to extract the electric form factor and the charge radius of proton by simultaneously measuring the  $e - p$  elastic scattering cross section and the Møller cross section at very low  $Q^2(2 \times 10^{-4} \sim 10^{-1}(\text{GeV}/c)^2)$  region, with sub-percent precision. A windowless hydrogen gas flow target was used to better control the background. A high-efficiency and high-resolution calorimeter (HyCal) and a pair of Gas Electron Multiplier (GEM) chambers were used in the experiment.

Before the production run, a very careful calibration of HyCal was performed with 0.3 GeV - 1.07 GeV photon beam. This talk will present detailed calibration results as well as some preliminary results on ep and ee scattering data.

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<sup>2</sup>Spokespersons: A. Gasparian (contact), H. Gao, M. Khandaker, D. Dutta