

Abstract Submitted  
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**Compton Scattering and Nucleon Polarizabilities at HI $\gamma$ S XI-**  
AQING LI, Duke Univ, COMPTON@HI $\gamma$ S COLLABORATION — The electromagnetic polarizabilities of the nucleon are fundamental quantities related to nucleon structure. In the past decade, effective field theories have successfully established a bridge between the QCD and low-energy description of the nucleon and made predictions of the polarizabilities. Lattice QCD calculations are also eminent on electromagnetic polarizabilities. High precision data are now needed to benchmark these calculations. To this end, the Compton scattering program at the High Intensity  $\gamma$ -Ray Source (HI $\gamma$ S) has measured Compton scattering cross sections on the deuteron at 65 and 85 MeV to extract neutron polarizabilities. Recently, data has also been collected at HI $\gamma$ S to measure the beam asymmetry of linearly polarized Compton scattering on the proton at 84 MeV to extract proton polarizabilities independently from the Baldin sum rule. In addition, the Compton scattering cross sections on  $^4\text{He}$  was measured using a circularly polarized photon beam at 84 MeV. The scattered photons were detected by eight large-volume NaI(Tl) detectors located both in and out of the scattering plane. In this talk, I will present the details of the experimental method and preliminary analysis of the 84 MeV Compton scattering data on  $^4\text{He}$  and the proton.

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