SES19-2019-000110

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

Compton Scattering and Nucleon Polarizabilities at HIγS[1]

XIAQING LI, Duke University / TUNL

The electromagnetic polarizabilities of the nucleon are fundamental quantities revealing the internal dynamics of the nucleon. In the past decade, effective field theories have successfully established a bridge between QCD and low-energy description of the nucleon and made predictions for 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 γ-ray Source (HIγS) has provided the Compton scattering cross sections on the proton at 78.7 MeV to extract the electromagnetic polarizabilities of the proton. In addition, the cross sections of elastic Compton scattering from ^{4}He have also been measured at high precision to provide a complementary approach to determine the nucleon polarizabilities. In this talk, I will present the details of the experimental method, the analysis and the results of the 78.7 MeV Compton scattering data on ^{4}He and the proton.

[1]This work is supported in part by DOE under grants DE-FG02-03ER41231, DE-FG02-97ER41033, DE-FG02-97ER41041 and DE-SC0005367.