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Program of Compton Scattering Studies on the Deuteron at HIGS GERALD FELDMAN, George Washington University, COMPTON@HIGS COLLABORATION — The High Intensity Gamma Source (HIGS) at Duke University will deliver intense mono-energetic photon beams with high degrees of linear or circular polarization by backscattering of free-electron laser (FEL) photons. To exploit the unique capabilities of this facility, a program of Compton scattering studies on light nuclei (p, d, ^{3}He) is planned. Experiments using deuterium targets will elucidate the electromagnetic polarizabilities of the neutron (α_n and β_n) and provide high precision data at low energies (E_γ = 30-50 MeV) for comparison with chiral Effective Field Theory (EFT) calculations. Absolute cross sections for elastic Compton scattering on deuterium will be measured for the first time in this energy region, and with the advent of polarized deuterium targets at HIGS, additional constraints on α_n and β_n can be imposed. Furthermore, the prospect of measuring double polarization observables with circularly polarized photons in Compton scattering at higher energies (E_γ = 100-120 MeV) will enable the spin polarizabilities (γ_1, γ_2, γ_3, γ_4) of the neutron to be determined for the first time and will complement parallel studies on the proton. The plans for Compton scattering experiments on deuterium will be outlined and the impact on the neutron electromagnetic and spin polarizabilities will be discussed.

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