Abstract Submitted
for the SES11 Meeting of
The American Physical Society

Neutron emission asymmetries from linearly polarized γ rays on ^{nat}Cd, ^{nat}Sn, and ^{181}Ta W. CLARKE SMITH, GERALD FELDMAN, George Washington University, HIγS COLLABORATION — Azimuthal asymmetries in neutron yields produced by bombarding targets with linearly polarized photons via (γ,n), (γ,2n), and (γ,f) reactions are being investigated as a possible means of identifying various nuclear isotopes. The High Intensity γ-ray Source (HIγS) at Duke University provides nearly monochromatic, circularly or linearly polarized γ rays with high intensity by Compton backscattering free-electron-laser photons from stored electrons. Linearly polarized γ rays produced by HIγS were incident on ^{nat}Cd, ^{nat}Sn, and ^{181}Ta targets at six energies E_γ between 11.0 and 15.5 MeV and emitted neutrons were detected both parallel and perpendicular to the plane of polarization by an array of 18 liquid-scintillator detectors at angles in the range $\theta = 55°$–$142°$. Detected neutrons were distinguished from Compton scattered photons by pulse-shape-discrimination and timing cuts, and their energies (E_n) were determined using time-of-flight information over a 0.5 m flight path. The characteristic plots of R_n, the ratio of neutron counts parallel to neutron counts perpendicular to the plane of the incident γ-ray polarization, against E_n were constructed for each value of E_γ and θ and then compared to those for other targets studied at HIγS, including fissile nuclei ^{235}U and ^{238}U.

W. Clarke Smith
George Washington University

Date submitted: 24 Aug 2011 Electronic form version 1.4