Compton scattering from nuclear targets at HI$\vec{\gamma}$S$^1$ B.A. PERDUE, M.A. AHMED, M.A. BLACKSTON, Y. PARPOTTAS, A.P. TONCHEV, H.R. WELLER, Duke U./TUNL, V.N. LITVINENKO, I.V. PINAYEV, Y. WU, Duke U./DFELL, R.M. PRIOR, M.C. SPRAKER, NGCSU/TUNL, G. FELDMAN, GWU, B.D. SAWATZKY, B. NORUM, UVA, J.R. CALARCO, UNH — A Compton scattering program is presently being developed at HI$\vec{\gamma}$S utilizing the nearly-monoenergetic beams of 100% polarized $\gamma$-rays produced by intra-cavity Compton backscattering of FEL photons. Polarization asymmetries of Compton scattering on $^{16}$O have been measured between 25-40 MeV to search for a narrow iso-vector giant quadrupole resonance (IVGQR). A beam with $\Delta E/E \sim 10\%$ was incident on a $\text{H}_2\text{O}$ target. The scattered $\gamma$-rays were detected by four $10'' \times 10''$ NaI detectors located between $\theta=90-150^\circ$ and $\phi=0, 90, 180,$ and $270^\circ$. The data indicate that significant, narrow concentrations of E2 strength are not present below 40 MeV. Another measurement of the Compton scattering cross section of $^{3}$He between $E_\gamma=3-11$ MeV is proposed to extract the electric polarizability, $\alpha_E$, of the $^{3}$He nucleus. A preliminary run has been performed to study the backgrounds, and a high pressure gas target system has been tested.

$^1$Supported in part by USDOE Grants No. DE-FG02-97ER41033 & DE-FG02-97ER41046.