Abstract Submitted
for the DNP13 Meeting of
The American Physical Society

Measurement of the Isovector Giant Quadrupole Resonance in ^{124}Sn Using Polarized Photon Scattering JAMES PARK, GERALD FELDMAN, MARK SIKORA, George Washington University, MOHAMMAD AHMED, JONATHAN MUELLER, LUKE MYERS, HENRY WELLER, Duke University, HEIKO SCHEIT, Technische Universitat Darmstadt, HIGS COLLABORATION — The High Intensity Gamma-Ray Source (HIGS) at the Triangle Universities Nuclear Laboratory provides energetic and polarized gamma-ray beams at fluxes of 10^7 gammas/s on target. At HIGS, we have used a linearly polarized photon beam to measure the polarization asymmetry of the Compton scattering cross sections perpendicular and parallel to the plane of polarization of the incident photon beam to investigate the isovector giant quadrupole resonance (IVGQR) in a ^{124}Sn target over a range of fifteen photon energies between 20.0 and 34.0 MeV. Eight NaI detectors were used to measure the photon scattering cross sections at both forward (55°) and backward (125°) angles, which made it possible to unambiguously determine the resonance energy position of the broad IVGQR strength distribution. The fact that the E1/E2 interference term changes sign between the forward and backward angles provides a clear signature of the presence of E2 strength. By dividing the sum of the photon counts in the horizontal plane by the sum of the photon counts in the vertical plane, we obtained polarization ratios for each photon energy, allowing us to determine the polarization asymmetry for the target, ^{124}Sn, as a function of incident photon energy. The data were fitted with a phenomenological model for the IVGQR by varying the resonance energy, width, and strength.

James Park
George Washington University

Date submitted: 01 Aug 2013 Electronic form version 1.4