Abstract Submitted
for the DNP15 Meeting of
The American Physical Society

Elastic Compton Scattering from the Deuteron Near 100 MeV
MICHAEL KOVASH, KHAYRULLO SHONIYOZOV, Dept. of Physics, Univ. of Kentucky, COMPTON@MAX-LAB COLLABORATION — Differential cross sections for elastic Compton scattering from targets of carbon and deuterium have been measured from 86 to 113 MeV using a tagged bremsstrahlung beam at the MAX 1 electron storage ring in Lund, Sweden. Photon spectra were collected in 2009 and 2010 at scattering angles of 60, 120 and 150 degrees using three very large, high efficiency NaI spectrometers, each with a FWHM resolution of approximately 2 MeV. The deuterium target consisted of a cryogenic liquid cell of 17 cm length. Improvements made to the running conditions of previous MAX-lab data sets include the use of multi-hit time digitizers, and reduced instantaneous counting rates in both the tagging and the NaI detectors. GEANT4 simulations have been used to determine the photon detector response and efficiency, as well as the photon losses in the targets. The overall accuracy of this procedure is verified by comparing the current carbon results with previous data. The new deuterium cross sections will be presented and compared with the earlier results from this collaboration. The combined data set will be compared with recent Chiral Effective Field Theory calculations to determine the values of the neutron polarizabilities, α_n and β_n.

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Date submitted: 30 Jun 2015 Electronic form version 1.4