Abstract Submitted
for the APR07 Meeting of
The American Physical Society

Simulation of the Lineshape Response of a Large NaI Detector
DANIEL MITTELBERGER, GERALD FELDMAN, George Washington University — A Monte Carlo simulation of a high-resolution large-volume NaI detector has been created using the GEANT4 toolkit. This simulation models the components of the detector (a cylindrical core, four annular quadrants, and Pb shielding) and outputs the energy deposited in each NaI component to a file for analysis using the ROOT analysis package. To more accurately characterize the detector's intrinsic response, the simulation output is smeared using a Gaussian function which is determined by fitting the simulation to experimental in-beam data. Using this response function, the simulation can then model the detector lineshape for the scattering geometry with a carbon or liquid deuterium target using a tagged photon beam of variable energy. The effects of detector acceptance, finite target volume, and photon absorption in the target material are all taken into account. The comparison of the simulation to both in-beam and scattering data will be presented.

Daniel Mittelberger
George Washington University

Date submitted: 08 Jan 2007 Electronic form version 1.4