Abstract Submitted
for the DNP20 Meeting of
The American Physical Society

Reconstructing Cross Sections in the Enge Focal Plane[1] BRIANA STRICKLAND, Ursinus College, RICHARD LONGLAND, North Carolina State University — Particle transfer and elastic scattering cross sections can be used to probe single-particle excitations in nuclei. The Enge Split-pole Spectrograph at the Triangle Universities Nuclear Laboratory (TUNL), is focused on understanding excited states important for astrophysical reactions. Key information about these excited states are excitation energies, spin-parities, and spectroscopic factors, all of which are essential in determining the cross sections of interest. To extract spin-parities and spectroscopic factors, theoretical differential cross sections are typically fitted to experimental data collected at a range of angles. Here we present a new method to determine the cross section in finer detail. By using a wide spectrograph entrance aperture, a method was developed to reconstruct these cross sections on a fine scale by performing ray-tracing through the focal-plane detector of the Enge Split-pole Spectrograph. This is achieved by including two position-sensitive sections in the detector package. The method was tested with well-known cross sections. To investigate the effects of detector response on this ray-tracing procedure, the Geant4 Monte Carlo simulation toolkit was used. The results of this reconstruction are finer, more detailed cross section calculations.

[1]This material is based partly upon work supported by the U.S. Department of Energy, Office of Science, Office of Nuclear Physics, under Award Number DE-SC0017799. This work is also supported by NSF grant number 1757783.

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Date submitted: 30 Jul 2020 Electronic form version 1.4