

New measurement of Beam Asymmetry from Pion Photoproduction on a Neutron using the Jefferson Lab CLAS detector.

Daria Sokhan^(a), Dan Watts^(a), Derek Branford^(a), and the CLAS Collaboration^(b)

^(a) University of Edinburgh, Edinburgh, UK

^(b) Various institutions

The new generation of pion photoproduction measurements from the nucleon is expected to give completely new, precise information on the poorly established nucleon excitation spectrum. Measuring a total of eight single- and double- polarisation observables from experiments employing polarised photon beam and target and recoil nucleon polarimetry have the potential to give the first model independent extraction of the nucleon excitation spectrum [1]. Measurements of pion photoproduction on the neutron are particularly sparse despite such data being crucial to achieving a reliable extraction of the electromagnetic couplings of the excited states.

I present a preliminary analysis of the photon beam asymmetry observable (Σ) from the neutron reaction channel $\gamma n \rightarrow \pi^- p$. The measurement was obtained using the near-4 π CLAS detector at Jefferson Laboratory, USA, employing a linearly polarised photon beam with an energy range 1.1 - 2.3 GeV, incident on a liquid deuterium target. The measurement will greatly expand the world data-set both in energy and angle, which currently consists of only three experiments limited to the 1.70 - 2.05 GeV range in energy and 35° - 90° in polar angle [2] [3] [4].

[1] I. Barker, A. Donnachie, J. Storrow, Nucl. Phys. B **95**, 347 (1975)

[2] J. Alspector *et al.*, Phys. Rev. Lett. **28**, 1403 (1972)

[3] L. Abrahamian *et al.*, Sov. J. Nucl. Phys. **32**, 69 (1980)

[4] F. Adamyan *et al.*, J. Phys. G **15**, 1797 (1989)

E-mail: daria.sokhan@ed.ac.uk