Polarisation Observables from Strangeness Photoproduction on a Polarised Target at Jefferson Lab

Stuart Fegan[1]

[1]University of York, York, UK

(For the CLAS Collaboration)

The FROST experiment at Jefferson Lab used the CLAS detector in Hall B with the intention of performing a complete and over-determined measurement of the polarisation observables associated with strangeness photoproduction, in combination with data from previous JLab experiments as part of the N* program. This was achieved by utilizing the FROST polarised target in conjunction with polarised photon beams, allowing direct measurement of beam-target double polarisation observables.

Although sufficient observables have now been measured to enable the associated reaction amplitudes to be determined, facilitating a near model-independent partial wave analysis, global data in strangeness channels is a couple of orders of magnitude smaller than pion photoproduction, so some ambiguities remain. These can be resolved by measuring observables spanning combinations of beam, target and recoil polarisation. Furthermore, the recent revision to the value of the weak decay parameter makes a wider range of observable measurements even more desirable as a cross-check of interpretations of previous data. Studies on strangeness photoproduction reactions may provide evidence of previously undetermined resonances, due to the different coupling strengths of these states to other reaction channels.

The G polarisation observable is one of the beam-target double polarisation observables, associated with a longitudinally polarised target and a linearly polarised photon beam, and its measurement for the strangeness reaction $\gamma p \rightarrow K^{+}\Lambda$ is the focus of the work presented. Prospects for measuring target-recoil observables on this data, utilising the self-analysing property of the hyperon, will also be discussed.