J/ψ Near-Threshold Photoproduction off the Proton and Neutron with CLAS12

Richard Tyson[1]

[1]University of Glasgow, United Kingdom

J/ψ near threshold photoproduction plays a key role in the physics program at the Thomas Jefferson National Accelerator Facility (JLab) 12 GeV upgrade due to the wealth of information it has to offer. J/psi photoproduction proceeds through the exchange of gluons in the t-channel and is expected to provide unique insight about the nucleon gluonic form factor.

The JLab based CLAS Collaboration, which uses the CEBAF Large Acceptance Spectrometer (CLAS12), aims to measure the J/ψ near threshold photoproduction cross section using both a proton and a deuteron target. The latter further offers the possibility of comparing the proton and neutron gluonic form factors in a first measurement of the ratio of the cross sections off a proton or neutron within the deuteron target. The analysis towards these measurements is ongoing and well advanced, with machine learning based techniques for particle and reaction identification already designed and tested on CLAS12 data taken towards these measurements.

This talk will describe the aims and experimental design for the measurement of J/ψ near threshold photoproduction off the proton and neutron with the CLAS12 detector along with the current stage of the data analysis.