

# Photoproduction of $\omega$ mesons off bounded proton with the CLAS detector at Jlab

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## Abstract

QCD-inspired models have been developed to explain the hadronic spectrum in terms of the underlying quark and gluon degrees of freedom. And while there has been many successes in delineating the significant features of the overall spectrum, many of the resonant states that have been predicted by these models have not yet been found experimentally. Determining the hadronic spectrum is a complicated task due to the high number of excited states of the nucleon, all of which have large widths causing the resonances to overlap. Also these resonances may decay into a multitude of decay channels. Because of these many channels and broadly-overlapping excited states, we seek to study the kinematic evolution of the polarization observables for obtaining a “complete measurement” towards extracting the helicity amplitudes for each of the excited baryon states.

Our research contributes to a larger experimental program that seeks to shed light on the evolving status of the proton spectrum. In our work, we are focusing on the photoproduction of  $\omega$  mesons off the bound proton which provides information about  $N^*$  resonances as  $\omega$  is an isospin filter. In this talk, we present preliminary results for the quasi-free  $\vec{\gamma}d \rightarrow \omega p(n)$  photon beam asymmetry polarization observable. The data were taken with the CLAS detector in Hall B at the Thomas Jefferson National Accelerator Laboratory (JLab). The experiment provided a high-quality beam of linearly-polarized photons in the energy range from 1.1 to 2.3 GeV. This work is funded in part by NSF grant PHY-1615146.