

SES17-2017-000057

Abstract for an Invited Paper
for the SES17 Meeting of
the American Physical Society

Spectroscopy Results with Polarization Observables in Vector Meson Photoproduction at CLAS¹

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Understanding the baryon spectrum is key to comprehend the underlying dynamics of quark-gluon interactions in baryons. Due to the broad and overlapping nature of baryon resonances, identifying them is very challenging, particularly above 1.7 GeV c.m. energies. Therefore, in addition to unpolarized cross sections, polarization observables are necessary to isolate resonance contributions from other interference terms. These high-mass excited states are predicted to have strong couplings to final states involving a heavier meson, such as the vector mesons ω and ρ . The photoproduction of these final states have mostly remained unexplored, but their study can significantly contribute towards establishing nuclear resonances. I will present results on polarization observables extracted from a comprehensive analysis of ω and $\pi^+ \pi^-$ photoproduction reactions off a proton using a polarized beam and a FROzen Spin Target at Jefferson Laboratory. The experiment used the CLAS spectrometer and covered c.m. energies up to 2.5 GeV. Many of these observables are first-time measurements, thus substantially augmenting the world database of polarization observables for these reactions. I will also present results of a partial-wave analysis within the BnGa framework that is based on this new CLAS data.

¹This work is supported by DOE DE-FG02-92ER40735