

# Beam Spin Asymmetry in Exclusive $\omega$ Photoproduction off the Bound Proton

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## Abstract

In this poster, we present preliminary results for the polarization observable beam-spin asymmetry,  $\Sigma$ , of the  $\vec{\gamma}d \rightarrow \omega p(n)$  reaction, where the  $\omega$  meson was identified through its charged decay ( $\omega \rightarrow \pi^+\pi^-\pi^0$ ). The data were taken during the g13-b experiment with the CLAS detector, using the Hall-B Coherent Bremsstrahlung Facility to provide a high quality beam of linearly-polarized photons in the energy range from 1.1 to 2.3 GeV.

We determined the beam-spin asymmetry of the  $\omega$ 's photoproduced off quasi-free protons in deuterium. We studied the evolution of  $\Sigma$  with photon energy and center-of-mass angle.

Since the  $\omega$  meson is an isoscalar ( $I_\omega = 0$ ), the reaction of interest serves as an ideal isospin filter, as only  $N^*$  states may contribute to the production process. The observable  $\Sigma$  will provide information on those resonant states that contribute in the  $\omega$  photoproduction.

Our results on the quasi-free proton will give us also a methodology to conduct feasibility studies for analysing the  $\gamma n(p) \rightarrow \omega n(p)$  channel. Should we have sufficient statistics allowing for us to calculate the  $\Sigma$  for the quasi-free neutron target. This work is funded in part by NSF grant PHY-1307340.