

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

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## Abstract

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  $\omega \rightarrow \pi^+\pi^-\pi^0$  decay. The data were taken during the E06-103 experiment with the CLAS detector in Hall B at Jefferson Laboratory. The experiment used 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. This observable provides information on the underlying mechanisms responsible for  $s$ - and  $t$ -channel processes. In particular we are interested in the  $N^*$  states that may contribute to the production process of the  $\omega$ . Baryon spectroscopy is an effort from many laboratories around the world, our results, together with studies of other reaction channels, serve to constrain the missing resonances predicted by QCD-inspired models of the nucleon's internal structure. This work is funded in part by NSF grant PHY-1307340.