Abstract Submitted
for the DAMOP08 Meeting of
The American Physical Society

Instrumental Asymmetry Reduction in Polarized Electron Beams
M.I. FABRIKANT, University of Nebraska Lincoln, K.W. TRANTHAM, Fort Hays State University, T.J. GAY, University of Nebraska Lincoln — We report progress in the reduction of instrumental asymmetries (IAs) related to the photoemission of polarized electrons from GaAs caused by circularly-polarized diode laser beams [1]. Such asymmetries can mask true helicity-dependent interactions between the emitted electrons and chiral targets. Minimization of laser intensity IAs is achieved by chopping two spatially separated light beams with orthogonal polarizations which are recombined and passed through a quarter-wave plate to yield a single beam with rapidly flipping helicity. We have demonstrated the ability to reduce intensity IAs of the laser beam itself to less than 2 x 10^{-6} [2]. We have also investigated the IAs of the photemission current from the GaAs. At present, we are able to reduce the photoemission asymmetry to values that are comparable to the laser intensity asymmetry. Implications for experiments measuring effects due to electron circular dichroism [3] will be discussed. [1]Trantham K.W. *et al* J. Phys. B. **28** L543 (1995) [2] Fabrikant M.I. *et al* submitted to Appl. Opt. [3] Mayer S., Kessler J. Phys. Rev. Lett. **74**, 4803 (1995) Funding for this project was provided by Undergraduate Creative Activities and Research Experiences (UCARE) and the National Science Foundation (PHY-0653379).

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Date submitted: 04 Feb 2008 Electronic form version 1.4