Abstract Submitted
for the DAMOP13 Meeting of
The American Physical Society

Search for Asymmetric Interactions between Chiral Molecules and Spin-Polarized Electrons JOAN DREILING, ERIC LITAKER, TIMOTHY GAY, University of Nebraska-Lincoln — We present our preliminary asymmetry results for the transmission of longitudinally spin-polarized electrons through a vapor of chirally-pure bromocamphor ($C_{10}H_{15}BrO$) molecules. We define the asymmetry for transmission as $A = [(I\uparrow\text{-}I\downarrow)/(I\uparrow + I\downarrow)]_R$ - $[(I\uparrow\text{-}I\downarrow)/(I\uparrow + I\downarrow)]_L$, where I↑ (I↓) is the transmitted current measured for spin-up (spin-down) electrons and the "L" and "R" subscripts correspond to the left- and right-handed chirality of the molecules. At present, we have measured A at 1.5 eV electron scattering energy to be $5.4(2.5)*10^{-5}$ when the transmitted, magnetically collimated electron beam is attenuated to 10% of its initial value, corresponding to a pressure of a few millitorr in a cell of length 2.54 cm. This should be compared with the measurements of Mayer et al., where they report an asymmetry (by our definition) of about $3.4(0.2)*10^{-4}$ for the same incident energy and electron beam attenuation [1]. We discuss possible reasons for this discrepancy.

[1] S. Mayer, C. Nolting, and J. Kessler, J. Phys. B 29, 3497 (1996).

Joan Dreiling
University of Nebraska-Lincoln

Date submitted: 29 Jan 2013 Electronic form version 1.4