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Potential use of a Kerr Cell in polarized electron accelerator sources for experiments in parity-violation[1] MARK DALTON, University of Virginia — Measurement of parity-violation in electron scattering has evolved to measuring sub-part-per-million asymmetries with a precision better than 10 parts-per-billion. Future experiments will be significantly more demanding, the MOLLER experiment will measure a 35.6 ppb asymmetry to 0.73 ppb. Currently, the laser beam that produces the electron beam, has its helicity reversed using a Pockels Cell. This device is a birefringent crystal to which an opposite high voltage is applied for each polarization state. The time that it takes the crystal to admit the voltage change and stabilize thereafter is too long for future experiments and the cell induces unacceptably large changes in the beam correlated with the polarization, due to piezo-electric and piezo-optical phenomena. A potential solution is the use of a Kerr Cell instead. Such a device, containing a Kerr liquid, should allow the polarization to be reversed more rapidly and with significantly reduced correlation between the polarization and other changes to the beam. The Kerr effect is weak and a useful cell would likely require significantly higher voltages and unsavory chemicals. In this presentation the Kerr Cell will be introduced, barriers to using this technology will be discussed and first data available will be presented.

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Mark Dalton
University of Virginia

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