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RTP Pockels Cell Development for Parity Violation Electron Scattering Experiments

A broad program of parity-violation measurements in electron scattering from heavy nuclei will constrain nuclear structure models as well as search for new BSM physics. PREXII and CREX are ongoing experiments at Jefferson Lab which aim to map the weak charge distribution in nuclei, with implications for the equation of state of highly dense matter, neutron stars, and gravitational waves produced in neutron star collisions. MOLLER is another upcoming experiment searching for new neutral currents, providing an unprecedented precision on the electron weak charge and electroweak mixing angle. To achieve small experimental uncertainties, innovative techniques in the electron source were required. One common crucial component of these experiments is control of helicity correlated false asymmetries in the polarized electron beam. The key technology is the Pockels cell in the laser optics of the polarized electron source. This talk will describe the development of a new RTP Pockels cell system for the laser optics of the JLab electron source, capable of nm-level position difference control, which has achieved the desired beam quality and will enable this generation of experiments.

Summary

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