

Recent Advances in Storage Ring EDM Feasibility

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For some time, experiments at the Cooler Synchrotron (COSY) located at the Forschungszentrum Jülich in Germany have been used to demonstrate the feasibility of key technologies for a possible storage ring search for an electric dipole moment aligned with the spin of a fundamental particle or nucleus. For some time, such tests have made use of a highly efficient thick target configuration for making continuous polarization measurements of the circulating beam. More recently, the clock-time marking of all polarimeter events has made possible the unfolding of the rapidly precessing in-plane components of the polarization and the exploration of bunching, electron cooling, and sextupole field corrections to extend the lifetime of the in-plane polarization, a requirement for the final EDM experiment. This report will emphasize the recent records achieved of in-plane polarization lifetimes in excess of 1000 seconds and the new capability of controlling the polarization precession rate through active feedback from the polarization measurements to the RF cavity frequency. This latter capability is the last technical achievement needed to ensure that the polarization remains aligned with the particle velocity during an actual EDM experiment.