

Abstract Submitted
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Feasibility of maintaining in-plane polarization for a storage ring EDM search¹ EDWARD STEPHENSON, Indiana University Center for Spacetime Symmetries, STORAGE RING EDM COLLABORATION — A search for an electric dipole moment (EDM) on charged particles using a storage ring requires beam polarization lifetimes approaching 1000 s for in-plane polarization. A feasibility study using beam bunching and sextupole field adjustment is underway with a 0.97-GeV/c vector-polarized deuteron beam at COSY. The polarimeter consists of a thick carbon target positioned at the edge of the beam and the EDDA scintillation detectors. The DAQ system assigns a clock time to each polarimeter event. Once calibrated against the RF-cavity, the clock time is used to select events associated with a maximal sideways polarization (precessing at 120 kHz). With this tool, the in-plane polarization magnitude is tracked versus time. Electron cooling reduces the depolarization from finite emittance and second-order momentum spread acting through synchrotron oscillations. Further lifetime improvement to the level of hundreds of seconds is achieved by adjusting sextupole fields located in the COSY ring arcs at places of large transverse beta functions and dispersion. The dependence of the reciprocal of the lifetime on sextupole field strength is nearly linear, permitting an easy location of the best field values. These typically occur near loci of zero chromaticity.

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