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Polarimetry for Deuteron EDM Search

Abstract:

Permanent electric dipole moments (EDMs) violate parity and time-reversal symmetry. Within the Standard Model (SM), they require CP violation and are many orders of magnitude below present experimental sensitivity. Many extensions of the SM predict much larger EDMs, which are therefore an excellent probe for the existence of `new physics'. So far only electrically neutral systems were used for sensitive searches of EDMs. Several techniques, based on storing fast particles in a magnetic storage ring, are being developped to probe charged particles for an EDM. With the introduction of these novel experimental methods, high sensitivity for charged systems, in particular light nuclei, is within reach. Of these, the deuteron is of special interest, both theoretically and experimentally. We highlight one of the crucial aspects of the experiment, viz. the monitoring of the polarization.