

Electric dipole moments of charged particles at storage rings

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The Standard Model (SM) of Particle Physics cannot explain the matter-antimatter asymmetry in the Universe. Therefore, the search of physics beyond the SM is required and one way to achieve it is to strive for the highest precision in the search for electric dipole moments (EDMs). Permanent EDMs of particles violate both time reversal and parity invariance and, via the CPT theorem, also the combined CP symmetry. Finding an EDM would be a strong indicator for physics beyond the SM.

Storage rings offer possibility to measure EDMs of charged particles by observing the influence of the EDM on the spin motion in the ring. The Cooler Synchrotron COSY at the Forschungszentrum Jülich provides polarized protons and deuterons with momenta up to 3.7 GeV/s, making it an ideal testing ground and starting point for the JEDI collaboration (Jülich Electric Dipole moment Investigations) for such an experimental program. The talk will present the JEDI program for the measurement of proton and deuteron EDMs and discuss recent results of the first direct (precursor) measurements of the deuteron EDM in COSY.