

Search for permanent Electric Dipole Moments

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The Standard Model (SM) of Particle Physics is not capable to account for the apparent matter-antimatter asymmetry of our Universe. Physics beyond the SM is required and is searched for by *(i)* employing highest energies (e.g., at LHC), and *(ii)* striving for ultimate precision and sensitivity (e.g., in the search for electric dipole moments (EDMs)). Permanent EDMs of particles violate both time reversal (*T*) and parity (*P*) invariance, and are via the *CPT*-theorem also *CP*-violating. Finding an EDM would be a strong indication for physics beyond the SM, and pushing upper limits further provides crucial tests for any corresponding theoretical model, e.g., SUSY. Direct searches of proton and deuteron EDMs bear the potential to reach sensitivities beyond 10^{-29} e·cm.

The research environment at Jülich coupled to the strong experienced groups of scientists and engineers from Jülich, RWTH-Aachen, Brookhaven National Lab, Ferrara University, and many other institutions, provides an ideal starting point for charged particle EDM searches. The talk will emphasize one of the most spectacular possibilities in modern science: Finding a signal for new physics beyond the Standard Model through the detection of permanent electric dipole moments in a storage ring.