

Hans Ströher

Institut für Kernphysik, Forschungszentrum Jülich (Germany)

JEDI – The Jülich Electric Dipole Moment Investigations in Storage Rings

The Standard Model (SM) of Particle Physics is not capable of accounting 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 reducing upper limits further provides crucial tests for any corresponding theoretical model, e.g., SUSY. Direct searches for proton and deuteron EDMs bear the potential to reach sensitivities beyond 10^{-29} e.cm. For an all-electric proton storage ring, this goal is pursued by the US-based srEDM collaboration, while the newly founded Jülich-based JEDI-collaboration is pursuing an approach using a combined electric-magnetic lattice, which shall provide access to the EDMs of protons, deuterons, and ^3He ions in the same machine. In addition, JEDI has recently proposed making a direct measurement of the proton and/or deuteron EDM at COSY using resonant techniques involving Wien filters.