

Contribution submission to the conference SMuK 2021

The search for electric dipole moments of charged particles on storage rings — ●VERA SHMAKOVA for the JEDI-Collaboration — IKP, Forschungszentrum Jülich, 52425 Jülich, Germany

One of the main problems of modern particle physics is the inability of the Standard Model (SM) of Particle Physics to explain the matter-antimatter asymmetry in the Universe. The pursuit 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, through the CPT-theorem they also violate the combined CP symmetry. Hence, EDM measurements of fundamental particles are capable to probe new sources of CP-violation, and finding an EDM would be a convincing indicator for physics beyond the SM. Storage rings make it possible to measure EDMs of charged particles by observing the effect of the EDM on the spin motion in the ring. The direct search for proton and deuteron EDMs bears the potential to reach sensitivity beyond 10^{-29} e cm. The Cooler Synchrotron COSY at the Forschungszentrum Jülich provides polarized protons and deuterons with momenta up to 3.7 GeV/s, which is an ideal starting point for such an experimental program. The JEDI (Jülich Electric Dipole moment Investigations) collaboration is currently aiming at the first direct (precursor) measurement of the deuteron EDM in COSY. The technical design of the prototype EDM storage ring is the next milestone of the JEDI research program. The talk will present the JEDI program for the measurement of proton and deuteron EDMs and discuss recent results.

Part: HK
Type: Gruppenbericht;Group Report
Topic: Fundamentale Symmetrien
Email: v.shmakova@fz-juelich.de