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Search for new physics via baryon EDM at LHC

Permanent electric dipole moments (EDMs) of fundamental particles provide powerful probes for physics beyond the Standard Model. We propose to search for the EDM of strange and charm baryons at LHC, extending the ongoing experimental program on the neutron, muon, atoms, molecules and light nuclei. The EDM of strange Λ baryons, selected from weak decays of charm baryons produced in pp collisions at LHC, can be determined by studying the spin precession in the magnetic field of the detector tracking system. A test of CPT symmetry can be performed by measuring the magnetic dipole moment of Λ and $\bar{\Lambda}$ baryons. For short-lived Λ_c^+ and Ξ_c^+ baryons, to be produced in a fixed-target experiment using the 7 TeV LHC beam and channeled in a bent crystal, the spin precession is induced by the intense electromagnetic field between crystal atomic planes. A possible realisation of this programme would be at the LHCb experiment. In this scenario the experimental layout based on the LHCb detector and the expected sensitivities in the coming years are discussed, along with perspectives for the future.

Experimental Collaboration

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