

Search for the electric dipole moment of the muon using the frozen-spin technique in a compact storage trap

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Electric dipole moments (EDM) of fundamental particles inherently violate the combined symmetry of charge-conjugation and parity inversion (CP). At PSI we plan to measure the EDM of the muon using the frozen-spin technique within a compact storage trap. This method exploits the high effective electric field, $E = 165$ MV/m, experienced in the muon's rest frame with a momentum of about 23 MeV/c when passing through a solenoidal magnetic field of $B=2.5$ T. In my talk, I will outline fundamental considerations for a muon EDM search and present the status for a demonstration experiment conducted at a secondary muon beamline of the Paul Scherrer Institute in Switzerland. In an initial phase the expected sensitivity to a muon EDM is $4E-21$ ecm, assuming 200 days of data. In a subsequent phase, Phase 2, we propose to improve the sensitivity to $6E-23$ ecm using a dedicated instrument installed on a different beamline that produces muons of momentum 125 MeV/c.

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