"A frozen-spin storage trap to measure the electric dipole moment of the muon."

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Electric dipole moments (EDM) of fundamental particles inherently violate time-reversal (T) symmetries implying also the violation of the combined charge-conjugation and parity (CP) symmetry.

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 rest frame of the muon with a momentum of about 23 MeV/c when it passes 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 current status for a demonstration experiment to be conducted at secondary muon beamlines 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.