

Search for a permanent muon electric dipole moment at the Fermilab Muon g-2 experiment

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The presence of a permanent electric dipole moment (EDM) in any elementary particle implies Charge-Parity (CP) symmetry violation and thus could help explain the matter-antimatter asymmetry observed in our universe. Within the context of the Standard Model (SM), EDMs of SM particles are extremely small. However, in many beyond SM (BSM) theories, EDMs could be within experimental reach in the near future. Recently, the muon EDM is of particular interest due to the tensions in the anomalous magnetic moment of the muon and the electron, and hints of lepton flavor universality violation (LFUV) in B-meson decays. In some of the BSM theories with LFUV, the muon EDM could be as large as $1e-22$ e cm. Moreover, the 23 orders of magnitude difference between the current experimental limit ($1e-19$ e cm) and the SM prediction ($1e-42$ e cm) means muon EDM is one of the least tested areas of the SM and any detected signal is a strong hint of new physics. In this poster, we will present how the Muon g-2 experiment at Fermilab aims to search for a muon EDM with a better sensitivity.

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