

A Dedicated Muon EDM Experiment in the Muon 'g-2' Ring

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With the recent first results of Fermilab Muon g-2 experiment, the discrepancy from theory of the measured magnetic dipole moment (MDM) of the muon looks even more persistent, and there is much motivation to search for new physics in spin precession experiments. We present initial studies into the possibility of using a modified version of the Muon g-2 storage ring to search for a non-zero muon EDM. Using both electric and magnetic fields to produce a “frozen spin” condition for the MDM, while enhancing precession due to an EDM, the storage ring would operate at a lower central muon momentum than for the g-2 measurement, which can be obtained using high intensity beam from the PIP-II linear accelerator. Preliminary calculations and simulation results of beam production at 800 MeV, plus the determination of the closed orbit inside the hybrid ring configuration muon beam are presented. The possible operational range in momentum and energy of muons and their respective window of electric and magnetic field values shall be presented. Challenges in the pursuance of this technique and systematic errors inherent in this approach are discussed.

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