

## A Dedicated Muon EDM Experiment in the ‘g-2’ Storage Ring

*Thursday, 15 June 2023 12:20 (4 minutes)*

With the first results of Fermilab Muon g-2 experiment (2021), the discrepancy from theory of the measured magnetic dipole moment (MDM) of the muon looks persistent, and there is much motivation to search for new physics in spin precession experiments. We propose here an idea of using a modified version of the Muon g-2 storage ring for a potential new scientific program to search for a non-zero muon electric dipole moment (EDM). Using both electric and magnetic dipole fields to produce a “frozen spin” condition for the MDM (all the while enhancing the EDM spin precession), the storage ring would operate at a lower central muon momentum than for the present Muon g-2 measurement. The incident proton beam on target for the muon production can be obtained from the PIP-II high intensity proton beam. Preliminary calculations and simulation results of muon production at 800 MeV PoT, along with the determination of the closed orbit inside the hybrid ‘g-2’ storage ring configuration, shall be presented. Possibilities of using the ‘g-2’ storage ring as a test bench to demonstrate the freezing of the MDM spin precession shall be discussed. The operational range of the muon’s momentum and energy, and their respective window of electric and magnetic field values to establish the frozen spin condition, shall be presented. We shall also briefly discuss the physics prospects and improvements in muon EDM bounds upon using PIP-II and future ACE upgrades to the present accelerator systems.

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**Session Classification:** Short remarks & Synergies intro