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【316】 Development of a frozen-spin muon trap for the search for a muon electric dipole moment

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The muEDM Collaboration is searching for the muon EDM by implementing, for the first time, the frozen-spin technique [Farley *et al.* (2004), PRL:**93**:052001]. A factor 1000 improvement upon the current limit $d_\mu < 1.8 \times 10^{-19}$ ecm (95% C.L.) [Bennett *et al.* (2009), PRD:**80**:052008] is expected from this approach. A sub-microsecond trapping scheme is being developed to store 28 MeV/c muons on a circular orbit exposed to a 0.3 MV/m radial electric field inside a 3 T solenoid. A pulsed magnetic field will accordingly kick the longitudinal momentum of injected muons, thereafter axially confined by a static weakly-focusing magnetic field. Prototypes are being tested to explore different field geometries and study the effect of eddy currents on the frozen-spin conditions.

Theoretical Work

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