Contribution ID: **28** Type: **not specified**

Physics options with negative muons, polarized proton and deuteron beams in the muon g-2 ring

Tuesday, 25 May 2021 10:35 (35 minutes)

Running with negative muons presents a special challenge due to the very strict vacuum requirements operating the electrostatic quadrupoles. We revisit the option of using magnetic focusing with the added benefit of an RF system, first proposed by Yuri Orlov in the sixties, to reduce the momentum dispersion effect to the required level. In that case, we could also include polarized proton beams to map the magnetic field of the storage region directly.
Finally, we will explore the options of launching frozen-spin proton and deuteron EDM experiments using this ring. Interestingly, the muon g-2 ring offers a unique geometry for reduced systematic error levels, enough to make them highly competitive to the neutron EDM experiments under current consideration.

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