Contribution ID: **121** Type: **Poster session**

The muEDM experiment

Thursday, 16 February 2023 19:00 (1h 30m)

The Standard Model (SM) of particle physics successfully predicts many fundamental properties and interactions, but it is still incomplete. Models like baryogenesis or leptogenesis for the matter-antimatter asymmetry lead to an additional CP violation beyond the SM. In this context, electric dipole moments (EDMs), which violate time-reversal and parity symmetry, and by virtue of the CPT theorem also CP, can test such scenarios.

Many EDM searches have been concluded with increasing sensitivity, all with null results. But the most exciting hints for BSM physics appeared in several precision measurements involving muons. These hints for new physics suggest a flavour structure beyond minimal flavour violation (MFV) in the lepton sector. In MFV a simple scaling by m_μ/m_e is predicted, so that the electron EDM ($d_e \leq 1.1 \times 10^{-29} e \cdot cm$) would place severe limits on its muon counterpart. This relation does not hold in theories with a flavour structure beyond the MFV paradigm, allowing for a sizable muon EDM.

The muEDM experiment, using for the first time the "frozen-spin" technique in a compact storage ring, aims at improving the current direct experimental limit of $d_\mu < 1.5 \times 10^{-19} e \cdot cm$ of the muon EDM reaching a final precision of better than $6 \times 10^{-23} e \cdot cm$ and testing the intrinsic connection of the muon EDM with g–2. Given the complexity of the experiment, Phase I will be proof of concept and will reach a sensitivity of $3 \times 10^{-21} e \cdot cm$.

Primary author: VITALI, Bastiano (Istituto Nazionale di Fisica Nucleare)

Presenter: VITALI, Bastiano (Istituto Nazionale di Fisica Nucleare)

Session Classification: Poster Session and Discussion Session