

## The MUonE Project

Tuesday, 17 October 2023 11:50 (20 minutes)

The long standing discrepancy between the measured value of the muon anomalous magnetic moment ( $a_\mu$ ) and its theoretical prediction in the Standard Model has reached the 5 sigma level after the last Fermilab measurement. This has kept the evaluation of the leading hadronic contribution to  $a_\mu$  ( $a_\mu^{HLO}$ ) under constant scrutiny, because it dominates the theoretical uncertainty. The canonical evaluation exploits dispersion relations and the optical theorem and uses  $e^+e^- \rightarrow hadrons$  cross sections time-like data. Lately, the scenario became extremely puzzling after the publication of CMD-3 hadronic cross-section data and because first-principle QCD lattice calculations of  $a_\mu^{HLO}$  bring  $a_\mu$  closer to its experimental value.

In this context, the MUonE Project aims at an independent and novel evaluation of  $a_\mu^{HLO}$  by measuring the hadronic correction to the running of the QED coupling constant in the space-like region by scattering 160 GeV muons (available at the CERN M2 beam line) on electrons in a fixed target.

The talk will review the key concepts and ideas behind the MUonE experiment and will report about the on-going experimental and theoretical efforts to reach the challenging  $10^{-5}$  ppm accuracy required by the experiment. Furthermore, an overview of the recent Test Run at CERN will be presented and the future plans for MUonE will be discussed.

### Parallel Session

Future Facilities and Directions

**Primary author:** CARLONI CALAME, Carlo Michel (INFN, Pavia (IT))

**Presenter:** CARLONI CALAME, Carlo Michel (INFN, Pavia (IT))

**Session Classification:** Facilities