

PRISMA+ Colloquium

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Lorentz-Raum, 05-127, Staudingerweg 7

Dr. Graziano Venanzoni
Frascati, Italy

Status and prospects of the MUonE experiment

The latest measurement of the muon $g-2$ announced at Fermilab exhibits a 4.2σ discrepancy from the currently accepted Standard Model prediction. The main source of uncertainty on the theoretical value is represented by the leading order hadronic contribution a_{μ}^{HLO} , which is traditionally determined through a data-driven dispersive approach. A recent calculation of a_{μ}^{HLO} based on lattice QCD is in tension with the dispersive evaluation, and reduces the discrepancy between theory and experiment to 1.5σ . An independent evaluation of a_{μ}^{HLO} is therefore required to solve this tension and consolidate the theoretical prediction.

The MUonE experiment proposes a novel approach to determine a_{μ}^{HLO} by measuring the running of the electromagnetic coupling constant in the space-like region, via μ -e elastic scattering. The measurement will be performed by scattering a 160 GeV muon beam, currently available at CERN's North Area, on the atomic electrons of a low-Z target. A Test Run on a reduced detector is planned to validate this proposal. The status of the experiment in view of the Test Run and the future plans will be presented.