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Single π^0 production in ⊠⊠ scattering at MUonE

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The Standard Model theoretical prediction of the muon anomalous magnetic moment, $= (-2)/2$, presents a discrepancy of $4.2\ \sigma$ with respect to the combined Fermilab and BNL measurements.

The MUonE project is a recently proposed experiment at CERN that will help to shed light on this situation, by providing an independent determination of the leading order hadronic vacuum polarisation (HLO) contribution,
which dominates the theoretical uncertainty on , through the study of elastic muon-electron scattering at small momentum transfer.
In order to achieve an accuracy similar to the one of existing determinations of $^{\mathrm{HLO}}$, the projected experimental precision at MUonE is of the order of 10ppm. This precision level has to be reached also by the theoretical calculations, by considering all possible radiative corrections as well as all processes that can constitute a background to the experimental signal.

In this talk, the analysis of a potential source of reducible background at MUonE, coming from the ⊠0 production in muon-electron scattering, i.e. $\mu^{\pm} \to \mu^{\pm}\pi^0$, is presented.
This kind of study is motivated by the fact that the π^0 production is dynamically enhanced in the region of small electron and muon scattering angles, which is particularly interesting for MUonE.
Moreover, the effects of this same process as a background to possible New Physics searches at MUonE are analysed, in phase-space regions complementary to the elastic-scattering ones, where one can study processes such as the production of a light new gauge boson ⊠′ via the process $\mu^{\pm} \to \mu^{\pm} e Z'$ or of a dark photon through the process $\mu^{\pm} e \to \mu^{\pm} e A'$.

Presenter: DEL PIO, Clara Lavinia (Istituto Nazionale di Fisica Nucleare)

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