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Radiative corrections for the MUonE experiment

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One of the most intriguing signals beyond the Standard Model is the well-known discrepancy between the theoretical prediction of the muon anomalous magnetic moment amu=(g-2)mu/2 and its experimental value. However, the accuracy of the theoretical prediction is limited by the uncertainty on the Hadronic Leading Order (HLO) contribution amu^HLO. In this regard, the recently proposed MUonE experiment aims at providing a novel determination of amu^HLO through the study of elastic muon-electron scattering. The precision measurement of the differential cross section allows the determination of amu^HLO from the running of the electromagnetic coupling alpha(t) in the space-like momentum region.

In this talk, I will present the MUonE project, discussing the theoretical calculations that are required to achieve a competitive measurement. In particular, the precision goal of 10 ppm on the differential cross section requires a next-to-next-leading order computation of the muon-electron scattering, which has to be matched to a QED parton shower. Furthermore, since the initial-state electrons are bound in a low-Z target, the background due to muon-nucleus interactions must also be taken into account. In order to provide a reliable simulation tool, both processes are currently under implementation in MESMER, a new Monte Carlo event generator for the MUonE experiment.

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