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**Radiative Corrections for Lepton-Proton Scattering: When the Mass Matters** ANDREI AFANASEV, George Washington University — Radiative corrections procedures for electron-proton and muon-proton scattering are well established under the assumption that the leptons are considered in an ultra-relativistic approximation. MUSE experiment at PSI and COMPASS experiment at CERN entered the regions of kinematics where explicit dependence of radiative corrections on the lepton mass becomes important. MUSE will consider the scattering of muons with momenta of the order 100 MeV/c, therefore lepton mass corrections become important for the entire kinematic domain. COMPASS experiment uses scattering of 100 GeV/c muons, and the muon mass effects are especially relevant in the quasi-real photo production limit, $Q^2 \to 0$. A dedicated Monte Carlo generator of radiative events is being developed for MUSE, which also includes effects of interference between the lepton and proton bremsstrahlung. Parts of the radiative corrections are expected to be suppressed for muons due to the larger muon mass. Two-photon exchange corrections are generally expected to be small, and should be similar for electrons and muons. We classify the radiative corrections into two categories, C-even and C-odd under the lepton charge reversal, and discuss their role separately for the above experiments.

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