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Recent results from MICE on multiple Coulomb scattering and energy loss

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Multiple Coulomb scattering and energy loss are well known phenomena experienced by charged particles as they traverse a material. However, from recent measurements by the MuScat collaboration, it is known that the available simulation codes (GEANT4, for example) overestimate the scattering of muons in low Z materials. This is of particular interest to the Muon Ionization Cooling Experiment (MICE) collaboration which has the goal of measuring the reduction of the emittance of a muon beam induced by energy loss in low Z absorbers. MICE took data without magnetic field suitable for multiple scattering measurements in the fall of 2015 with the absorber vessel filled with xenon and in the spring of 2016 using a lithium hydride absorber. In the fall of 2016 MICE took data with magnetic fields on and measured the energy loss of muons in a lithium hydride absorber. These data are all compared with the Bethe-Bloch formula and with the predictions of various models, including the default GEANT4 model.

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