

## Measurement from MICE of Coulomb multiple 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 simulation code (GEANT4) available at the time overestimated the scattering of muons in low Z materials. Updates to GEANT4 have brought the simulations in line with the MuScat data and these new models can be validated over a larger range of momentum, 170-250 MeV/c, with MICE data. 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 spring of 2016 using a lithium hydride absorber and in the fall of 2017 using a liquid hydrogen absorber. The measurement in lithium hydride is reported here along with the preliminary measurements in liquid hydrogen. 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.

### Working Group

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