

The Muon Ionization Cooling Experiment

The Muon Ionization Cooling Experiment (MICE) aims to demonstrate the feasibility of preparing a high brilliance muon beam, a key prerequisite for future neutrino factories and muon colliders. Given the muon rest-frame lifetime of $2.2 \mu\text{s}$, the only practical method for preparing such beams is ionization cooling. This uses an energy absorbing material to reduce the emittance (size) of a muon beam while maintaining relativistic speeds along the beam axis using RF cavities for re-acceleration. MICE is an accelerator physics experiment which relies on particle physics detectors to measure and identify the muons one by one. The first stage of the experiment comprised of just the detectors is complete and initial beam emittances have been measured. The next stage will include absorbers with first emittance reduction results anticipated in 2013. To fully characterize ionization cooling, a suite of simulation software tools is being developed that will allow detailed comparisons of reconstructed beam characteristics with measurements. This software will also be vital during the design of the aforementioned neutrino factories and muon colliders.

Primary author: LANE, Peter (Illinois Institute of Technology)

Presenter: LANE, Peter (Illinois Institute of Technology)