

The International Muon Ionisation Cooling Experiment

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4/07/2013

**Abstract**

The International Muon Ionisation Cooling Experiment (MICE) aims to give the first demonstration of ionisation cooling. Such a demonstration is necessary if planned future facilities such as a neutrino factory or muon collider are ever to be realised. MICE will use a low  $Z$  absorber to first reduce the momentum of a muon beam; then use a series of radio-frequency (RF) cavities to restore the longitudinal momentum of the muon beam. In the summer of 2010 data was taken with MICE in its step I configuration and it is planned that in the summer of 2015 data will be taken with MICE in the step IV configuration. MAUS is the MICE project's reconstruction and analysis framework and is used to simulate the beam line downstream of D2. G4beamline is a software package created by Muons Inc in which high statistics simulations of muon beams can be generated. Simulations from the target to D2 will be produced by G4beamline and the output passed to MAUS. Simulating particles travelling through the entire beam line is computationally expensive and for this reason efforts are being made to install G4beamline on the grid. The purpose of this study is to investigate how G4beamline can be used to model asymmetries in the beam at the downstream detectors. For step IV having a version of G4beamline which accurately models MICE and the output of which can be compared to data will be important. Further more integrating the two software packages, G4beamline and MAUS, to allow users quick and easy access to the functionality of both is another development goal for the MICE experiment.