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Emittance reduction of muon beams is an important requirement in the design of a Neutrino Factory or Muon Collider. Ionization cooling, whereby beam emittance is reduced by passing a beam through an energy-absorbing material, requires tight focusing in the transverse plane which is achieved in many designs using solenoid focusing. In solenoid focusing, the beam acquires kinetic angular momentum due to the radial field in the solenoid fringe. Cooling in 'flip' mode, where the beam-focusing solenoid field changes polarity at the absorber, has already been demonstrated in the Muon Ionization Cooling Experiment (MICE). In this mode the absorber is near to the field flip, so the kinetic angular momentum is zero at the absorber. 'Solenoid mode' cooling, where the field polarity does not change across the absorber leading to a beam crossing the absorber with significant kinetic angular momentum, has been considered for the final section of the muon collider design due to potentially stronger focussing that it enables. In this paper, we present the performance of MICE in 'solenoid mode'.

Collaboration / Activity

MICE

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