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The status of the construction of MICE Step IV

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Muon beams of low emittance provide the basis for the intense, well-characterised neutrino beams necessary to elucidate the physics of flavour at the Neutrino Factory and to provide lepton-anti-lepton collisions at the Muon Collider at energies of up to several TeV. The International Muon Ionization Cooling Experiment (MICE) will demonstrate ionization cooling; the technique by which it is proposed to reduce the phase-space volume occupied by the muon beam at such facilities.

Ionization cooling requires that a muon beam passes through a material (the absorber) in which it loses energy.

In an ionization-cooling channel, the energy lost in the absorber is replaced in a short linac.

The combined effect of energy loss and re-acceleration is to reduce the transverse emittance of the beam (transverse cooling).

MICE is being constructed in a series of Steps.

At Step-IV, MICE will be able to study the properties of liquid hydrogen and lithium hydride that affect cooling.

A solenoidal spectrometer will measure emittance upstream and downstream of the absorber vessel.

The muon beam will be focused at the absorber by a focusing coil.

The construction of Step-IV at the Rutherford Appleton Laboratory is well advanced and is scheduled to be complete early in 2015.

The status of the construction project will be described together with the performance of the principal components.

The demonstration of ionization cooling will be performed at Step-V which requires an additional absorber/focus-coil module and a short linac (the RF/coupling-coil module).

The status of preparation of the Step-V components will be briefly described.

Summary

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