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A muon beam facility at CERN to demonstrate muon ionisation cooling

Monday 2 June 2025 16:00 (2 hours)

The International Muon Collider Collaboration (IMCC) has been formed following the 2020 European Strategy for Particle Physics Update, with the goal of studying the feasibility of a muon collider at a centre of mass energy of around 10 TeV. One of the most challenging sections of a muon collider is the initial cooling before acceleration, due to the necessity to apply intense magnetic and electric fields to reduce the 6D emittance of the muon beam by 5 orders of magnitude in a very short time, to cope with the limited lifetime of muons (2.2 μs at rest). The IMCC proposes to build a Demonstrator to prove that all the involved technologies (RF, magnets, absorbers, beam instrumentation) can be built at the required specifications, and integrated in order to limit the length of the cooling sections to an acceptable value. Several options are being considered in different laboratories within the collaboration. This paper describes a possible implementation at CERN, in the existing TT7 tunnel.

Footnotes

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