



Contribution ID: 267

Type: Poster

muCool: Development of a novel high-brightness low-energy muon beamline

Tuesday, October 18, 2016 6:57PM (1 minute)

We are developing a novel μ^+ beamline that reduces the phase space of the input beam by a factor of $10E10$ with $10E-3$ efficiency. The phase space compression is achieved by stopping μ^+ in cryogenic helium gas and applying strong electric and magnetic fields and gas density gradients. The beamline consists of several consecutive stages, which can be tested individually in the first step. The transverse and longitudinal compression stages were recently successfully demonstrated. The measurements show that we can achieve the muon beam compression with a high efficiency. The GEANT4 simulation of the full beamline is currently under development and preliminary results are in very good agreement with the measured data.

This work is supported by SNF grant 200020_159754.

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Session Classification: Poster Session

Track Classification: Advanced muon and ultracold neutron sources