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Design and optimization of the surface muon beamline of MELODY

We report the surface muon beamline design of the Muon station for sciEnce, technoLOgy and inDustrY (MELODY) project based on China Spallation Neutron Source (CSNS). Based on the 1.6GeV proton beam, a surface muon beam line has been designed to deliver a muon flux of 10^5μ+/s to the μSR experiment area. In order to transport the large emittance muon beam, a series of solenoids for focusing combined with large-aperture dipoles are used. Moreover, we use genetic algorithm to optimize the muon beam line to maximize the beam intensity in a small beam spot.

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