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ID: 2907 Identification and Methods for Reduction of Neutral Particle Contamination in the MICE Muon Beam

Presenter Rob Roy MacGregor Fletcher (UCR, Riverside, California)

Authors Rob Roy MacGregor Fletcher, Linda Coney, Gail G. Hanson (UCR, Riverside, California)

Abstract The Muon Ionization Cooling Experiment (MICE) is being built at the ISIS proton synchrotron at Rutherford Appleton Laboratory (RAL) to test ionization cooling of a muon beam. Production of particles in the MICE beamline begins with a titanium target dipping into the ISIS proton beam. The resulting pions are captured, momentum-selected, and fed into a 5T superconducting solenoid. This magnet contains the pions and their decay muons, which are then sent through the rest of the MICE beamline toward the cooling channel. During recent data-taking, it was determined that there is a significant background contamination of neutral particles populating the MICE muon beam. This contamination creates unwanted triggers in MICE, thus reducing the percentage of useful data taken during running. This paper describes the analysis done with time-of-flight detectors, to identify these neutral particles and investigate methods with which to reduce their effect on the detectors and on the data quality.

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