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Tests of Magnetic Shielding of MicroBooNE Photomultiplier Tubes at Cryogenic Temperatures: Demonstration of Efficacy[1] EVAN SHOCKLEY, TIMOTHY MCDONALD, PAUL NIENABER, Department of Physics, Saint Mary's University of Minnesota — The MicroBooNE detector, a liquid argon time projection chamber (LArTPC) positioned in the Booster Neutrino Beam (BNB) line at Fermilab and used to detect charged particles produced by interactions of those neutrinos, employs photomultiplier tubes (PMTs) to detect scintillation light used in certain triggering modes. Magnetic fields, even those as small as those from the Earth, can adversely affect tube performance, particularly that of the large (eight-inch diameter) tubes used in MicroBooNE. The location of the PMTs inside the liquid argon cryostat poses the additional challenge of shielding within a cryogenic environment. This presentation details procedures developed and carried out using a cryogenic test stand at Fermilab. Results from these tests demonstrate the effectiveness of shields manufactured from a cryogenic magnetic material in greatly reducing the impact of geomagnetic fields on PMT operation.

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