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Cryogenic Refrigeration System for Fermilab's Muon Experimental Program

A new helium cryogenic refrigeration system for operating large superconducting solenoid magnets for two future muon experiments at Fermilab has been designed, installed, and operated for initial commissioning. This cryogenic system will support the Muon g-2 and Mu2e experiments at Fermilab's Muon Campus. Much of the system consists of equipment reused from the Tevatron including gaseous helium and liquid nitrogen inventory storage, four 300 kW screw compressors, and four 600 W liquid helium satellite refrigerators. New piping and cryogenic transfer lines have been built and a new control system was installed. Two refrigerators with transfer line are independently available for each of the Muon g-2 and Mu2e experiments. This paper describes the Muon Campus cryogenic system, discusses the successful commissioning operation, and illustrates how existing cryogenic infrastructure is reused to meet new experimental needs.

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