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Assembly and test of a modified spectrometer solenoid for MICE

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*Abstract:*

The MICE superconducting spectrometer solenoids have been modified and rebuilt as a result of the testing done in 2008, 2009 and 2010. The number of two-stage cryocoolers was increased from three in 2009 to five in the modified magnet. The new shield for the spectrometer solenoid is fabricated primarily from 1100-O aluminum instead of 6061-T6 aluminum used in the former versions of the magnet. The thermal connection between the shield and the first-stage of the cold heads has been improved to reduce the temperature drop between the shield and the coolers. As a result of these changes, the first-stage temperatures for the coolers will be below 45 K, which will result in an increase in the refrigeration generated by the cooler second stages. The quench protection system has been altered in order to provide additional protection to the magnet in the event of a lead failure between the magnet power supply and the magnet coils. The quality of the shield and cold mass MLI wrap has also been improved. Steps have been taken to reduce thermal acoustic oscillations and the heat leak down the vent and fill pipes. The results of the magnet improvements made are presented in this paper.

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