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Fabrication and Test of a 1.5 T Cryogen-Free HTS Magnet for the Heavy Ion Spectrometer

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A 1.5 T high-temperature superconducting dipole magnet for the heavy ion spectrometer has been fabricated and tested. It mainly consists of four double pancake HTS coils and a warm iron yoke with two cylindrical poles. The gap between the poles is 120 mm. The HTS coils wound with a 12 mm wide and 0.28 mm thick HTS tape have an inner diameter of 480 mm. They will be cooled down below 20 K by a GM cryocooler and generate a central field of 1.5 T at an operation current of 280 A. In this paper, the design and construction of the HTS magnet are described and the test results are reported and discussed.

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