

LNP-5

Fabrication and Performance Evaluation of a 400-MHz 66-mm Bore All-REBCO Conduction-Cooled NMR Magnet

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In 2014, a project to develop a 400 MHz 66 mm high temperature superconductor Nuclear Magnetic Resonance (NMR) magnet was embarked with a team led by Korea Basic Science Institute in close international collaboration among the National High Magnetic Field Laboratory, Korea Institute of Machinery and Materials, Kunsan National University, Seoul National University, and SuNAM Co., Ltd. The magnet consists of a stack of 48 Double Pancake coils wound with the multi-width no-insulation winding technique. It operates under conduction-cooled environment at 20 K or lower to generate the target center field of 9.4 T at a nominal operating current of 187 A. To reduce temporal field drift and spatial field error due to screening current, the current sweep reversal method is adopted as a charging protocol. This paper presents design, construction, and operation results including passive and active shimming with the respective ferro and copper-coil shim sets.

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