



Contribution ID: 809 Contribution code: THU-PO3-405-04

Type: Poster

Design, fabrication and test of a 300MHz conduction-cooled NMR superconducting magnet

Thursday 18 November 2021 10:00 (20 minutes)

A desktop 300MHz nuclear magnetic resonance (NMR) superconducting magnet with conduction-cooled cryostat system was developed in Institute of Electrical Engineering, Chinese Academy of Sciences (IEE, CAS). The magnet has a standard 54mm-diameter warm bore with length 600mm, and the 5 Gauss line is actively shielded within the region 650mm (z) × 400mm (r). The operating current is 111.46A with a safety coefficient 78.9%, which corresponds to a critical temperature about 5.5 K. A pulse-tube (PT) refrigerator was used for the magnet cooling and the minimum temperature can be amounted to less than 4K, which had adequate temperature margin to guarantee the magnet running in the superconducting state. A set of superconducting shim coils up to third order was equipped accompanying with the magnet coils. The magnet has been fabricated and energized to the target magnetic field strength and the magnetic field attenuation according to the measure data was less than 0.01 ppm/h. With a dedicated sample probe and room-temperature shimming device installed on the magnet system, the built NMR spectrometer was tested. A final proton spectrum with half-width 25.5Hz was achieved, namely 0.087 ppm in terms of the magnetic field homogeneity. The superconducting magnet will be used on solid NMR detection in the future.

Primary authors: WANG, Yaohui (Institute of Electrical Engineering, Chinese Academy of Sciences); Prof. WANG, Qiuliang (Institute of Electrical Engineering, Chinese Academy of Sciences); WANG, Hui (Institute of Electrical Engineering, Chinese Academy of Sciences); CHEN, Shunzhong (Institute of Electrical Engineering, Chinese Academy of Sciences); LIU, Hui (Institute of Electrical Engineering, Chinese Academy of Sciences); CHENG, Junsheng (Institute of Electrical Engineering, Chinese Academy of Sciences)

Presenters: WANG, Yaohui (Institute of Electrical Engineering, Chinese Academy of Sciences); Prof. WANG, Qiuliang (Institute of Electrical Engineering, Chinese Academy of Sciences)

Session Classification: THU-PO3-405 Magnets for NMR