Evaluation of NbTi Superconducting Joints for 400MHz NMR Magnet

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Abstract - Persistent current NbTi superconducting joint were fabricated based on the cold-pressing welding method for 400MHz NMR magnet. The electrical properties of the joints were tested using the current decay measurement method. To simulate the actual coil assembly, a nine-joint series loop was made and tested. Test results show that the total resistance of the nine persistent joints made based on cold-pressing welding method is 3×10-14 W at 120 A under 1T background magnetic field, which meets the requirements of the 400 MHz NMR magnet. We have found that the induced current in the joint loop decays obeying three decay patterns, which is relevant to the flux creep and can be explained with *n*-value losses in the joint loop. Relaxation of magnetization in persistent current joint loops was also observed under 1T background magnetic field.

Keywords - persistent joints, current decay measurement method, cold-pressing welding, NMR magnet, relaxation of magnetization, flux creep

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