



Contribution ID: 573 Contribution code: TUE-PO1-714-02

Type: Poster

Energization waveform for reducing Screening Current-induced Magnetic Field in No-Insulation REBCO Coil Systems

Tuesday 16 November 2021 13:15 (20 minutes)

We have been developing a no-insulation (NI) REBCO coil system for medical accelerators and high-field magnetic resonance imaging (MRI). There are increasing attempts to apply NI winding technology to achieve both high current density and high thermal stabilization of REBCO coils. However, REBCO coated conductor has a tape shape, and when a magnetic field is applied vertically to the tape surface, a shielding current is induced, and an irregular magnetic field (shielding current induced magnetic field: SCIF) is generated. In addition, when NI winding technology is applied, an excitation delay occurs because current flows not only in the circumferential direction but also in the radial direction. In our previous study, we have investigated the influence of the SCIF on magnetic field accuracy when the excitation delay occurs in NI-REBCO coil system by newly developed computer program, and confirmed that a current control by overshoot with plateau improves the temporal stability of the magnetic field. The current control adopting plateau is a method of maintaining the demagnetization effect by waiting for a certain period for the “delay of the circumferential current due to the excitation delay” generated in NI coil winding. However, there is a demerit that the excitation time becomes long. In this study, to improve the temporal stability of the generated magnetic field, we attempted to optimize the energizing current waveform to suppress the effect of SCIF and excitation delay in NI-REBCO coil by considering the ratio of overshoot and the temporal length of plateau as parameters.

This work was supported by JSPS Grant-in-Aid for Scientific Research (S) from the Ministry of Education, Science, Sports, and Culture (No. 18H05244).

Primary author: Mr MURAKAMI, Shogo (Waseda University)

Co-authors: Prof. ISHIYAMA, Atsushi (Waseda University); Dr UEDA, Hiroshi (Okayama University); NOGUCHI, So (Hokkaido University)

Presenter: Mr MURAKAMI, Shogo (Waseda University)

Session Classification: TUE-PO1-714 Magnetization and Field Quality II