Contribution ID: **180** Type: **Poster Presentation of 1h45m**

Electrical Field Generation by Hall Effect in High Field No-Insulation REBCO Pancake Coils

Thursday 31 August 2017 13:45 (1h 45m)

A no-insulation (NI) winding technique is very promising to conduct a practical use of REBCO pancake coils by greatly enhancing the thermal stability. Many applications using the NI technique have been developed or constructed, such as a magnetic separation, a 1.3-GHz NMR, an over 40-T magnet, etc. So far, a lot of measurement data proved a high thermal stability of test magnets through overcurrent experiments. When an NI REBCO magnet transitions into a normal state, an operating current radially bypasses from a joint to another joint across turns. This mechanism enhances a thermal stability of NI REBCO pancake coils, and the bypassing currents avoid the coils from burning out. However, since the bypassing currents flow under a high magnetic field, an electrical field is generated in the circumferential direction, according to the Hall effect. The electrical field generated by the Hall effect is linearly proportional to a current density and a magnetic field. The radial bypass current flows through the stabilizer edges of REBCO tape so that the current density in the radial direction increases under a high magnetic field in the axis direction. Consequently, a high electrical field is generated along the REBCO tape winding. When an NI REBCO magnet is operated under a high background field, the electrical hall-effect field would be not negligible. Therefore, we try to estimate the electrical hall-effect field in simulations, and investigate the influence of the electrical hall-effect field on the stability of NI REBCO magnets. In future, since NI REBCO magnets will be installed into very high background fields, it is necessary to grasp a hall-effect phenomenon not only after quench but also during charging magnets.

Submitters Country

Japan

Authors: Prof. NOGUCHI, So (Hokkaido University); Prof. HAHN, Seungyong (Seoul National University); Prof. ISHIYAMA, Atsushi (Waseda University)

Presenter: Prof. NOGUCHI, So (Hokkaido University)

Session Classification: Thu-Af-Po4.11

Track Classification: G8 - Novel Diagnostics and Other Techniques