MT 26
International Conference on Magnet Technology
Vancouver, Canada | 2019

Contribution ID: **1669** Type: **Contributed Oral Presentation**

Mon-Mo-Or3-04: Cable Quench Simulations and Current Sharing in REBCO Conductors Wound on Round Cores (CORC) for High Field Accelerator Magnet

Monday, 23 September 2019 12:00 (15 minutes)

Winding REBCO conductors on round cores (CORC) has innovatively transformed REBCO thin tapes to round cables which allow high temperature superconductor to meet low-inductance requirement and offer symmetrical electromagnetic and mechanical properties for large-scale high field accelerator magnets. HTS conductors, however, are known for slow quench propagation and large minimum quench energy, and very few quench studies have been conducted on the CORC cables. Its dynamic current sharing is largely unknown due to complex layer structure and layer-to-layer contacts. We plan to perform quench simulations of the CORC cables to achieve better understanding about transient current sharing during quenching. H formulation and T-phi formulation will be employed to model critical state magnetization in layers and A-V formulations will be used to characterize layer-to-layer current sharing behaviors and resulted Joule losses. Heaters will be imbedded into various locations inside the cable volume or on the cable outside surface. Current redistribution and normal zone propagation mechanism will be studied in addition to voltage and temperature signals. These studies will help find effective quench detection and protection for the HTS-cable based accelerator magnets.

Acknowledgment
The authors would like to thank K. Amm, R. Gupta, D. Hazelton, D. van der Laan, J. Weiss for helpful discussions and general support.

Primary authors: SONG, Honghai (Brookhaven National Laboratory); HUNG, H. Allen (Brookhaven National Laboratory, and Stony Brook University)

Presenter: SONG, Honghai (Brookhaven National Laboratory)

Session Classification: Mon-Mo-Or3 - Quench and Normal Zone Behavior I