Contribution ID: **1044** Contribution code: **WED-PO2-709-02** Type: **Poster**

Behaviour prediction of parallel co-wound no-insulation HTS coil

Wednesday, 17 November 2021 10:30 (20 minutes)

No-insulation (NI) technique has been proved to be an available approach for improving the thermal stability as well as the highest operating current of the high-temperature superconducting (HTS) coil. Nevertheless, the NI HTS coil suffers from a non-negligible charging delay inevitably. To address this issue, the parallel co-wound technique is a possible way. For investigating the performance of parallel co-wound NI HTS coil, in this study, we have built an equivalent circuit model coupled with a finite element model. The models'predictions are in well agreement with experimental tests for a small size prototype, in which, the termination resistance is taken into consideration. Based on this model, the charging and discharging, as well as over-current behavior have been studied. The results show that with the increase of the turns of coil, the number of co-wound tapes needs to be increased for shortening the charging delay. Furthermore, the underlying mechanism of the uneven distribution of currents within each tape has been revealed as well. Overall, this work has provides a useful tool for the behavior prediction of parallel co-wound NI HTS coil, and the designation for specific application accordingly.

Primary author: ZHOU, Pengbo (Southwest Jiaotong University)

Presenter: ZHOU, Pengbo (Southwest Jiaotong University)

Session Classification: WED-PO2-709 No-Insulation Coils