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Thu-Af-Po.02-11: Current sharing in defected superconducting REBCO tape stack cables: FEM modeling.

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High energy physics magnets use superconducting cables to decrease their inductances which limit their induced voltages during magnet ramp rates and quenches. For HTS strands, the minimum quench energy (MQE) is quite large. Heating due to small defects within the cable can be mitigated by strand-to-strand current sharing. In this case of particular interest are REBCO tape stacks, Roebel and CORC cables. Small defects may arise in the original tapes, either during cabling or in service in the magnet. Then local heating can be generated in absence of current sharing. In this paper we modelled the current sharing in tape stack cables containing seven double-sided REBCO tapes with defects present in some of them. Electrical and thermal contact resistances between the tapes in the cables were considered. In the present work, we used Finite Element Method (FEM) modeling, assuming critical current densities of these tapes relevant for operation at 4.2 K (boiling liquid He).

Authors: COLLINGS, Edward (The Ohio State University); SUMPTION, Michael; MAJOROS, Milan; Mr JIANG, Minzheng

Presenter: MAJOROS, Milan

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