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Quench Modeling and Experiment on 10 kA HTS Insulated Coil

Fast and reliable quench detection is one of the key challenges in the development of HTS magnets with large stored energy, in the range of MJ and higher. Several temperature-based detection methods are under study at EPFL Swiss Plasma Center, including twisted-pair superconducting wires (SQD), shielded thermocouple chains (TCC) and fiber-optics sensing (FOS). Integrating them into the winding pack of a high-current insulated HTS double pancake coil, the quench dynamics is studied in this work both numerically and experimentally. Results of the COMSOL modelling as well as testing up to 10 kA at the initial temperature ranging from 10 K to 77 K will be presented.

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