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Current sharing by copper core in spiral coated conductor cable

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An assembly of coated conductors wound spirally on a copper core such as a CORC® wire is one of the most popular types of high current coated conductor cables. In such a cable, the current sharing by the copper core as well as the current sharing between coated conductors plays a key role for its quench protection. We conducted quench experiments using the simplest configuration, in which one coated conductor was wound spirally on a copper core, in order to clarify the current sharing by the copper core. A sparse spiral winding allowed us to attach voltage taps on the core as well as the coated conductors. We measured the voltages along the coated conductor, those along the core, and those between the coated conductor and the core. From these voltage data, we verified experimentally that the current in the normal-transited coated conductor was shared by the metal core and that this current sharing reduced the hotspot temperature. The numerical modelling of this current sharing is in progress, and the latest results will be presented at the workshop.

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