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Resistances between soldered YBCO tapes consisting of the stacked cable

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This presentation shows the effect of soldering between YBCO tapes on the inter-tape resistances in the stacked cables composing of dozens of YBCO tapes. The research and developments of a stacked cable with multiple YBCO tapes are ongoing as a candidate for large-scale conductors for fusion experimental devices. In this study, the inter-tape coupling losses in the cable composing of stacked 50 YBCO tapes were measured under external ac magnetic fields in liquid nitrogen. Inter-tape resistances are estimated through comparison with measured and calculated coupling losses. The measurements were carried out on two samples with and without soldering between tapes in samples composed of YBCO tapes with a copper layer. The soldered sample is stacked solder-plated YBCO tapes and then spirally wrapped in a 4-mm wide copper tape to hold them; furthermore, the whole sample is soldered. No soldered sample is composed of the same YBCO tapes without solder plating. The tapes were stacked in the air and then held with the polyimide tape. Both sample lengths were about 100 mm and non-twisted. Therefore, the inter-tape coupling current in the sample flowed around the whole sample length during experiments. The effects of soldered tapes on the resistances are discussed from the difference between coupling losses in both samples.

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