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M2Po2D-05 [47]: Comparison between measured and calculated ac losses in a CORC wire

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We reported previously the ac loss measurements of a CORC wire, which consisted of six 2 mm-wide coated conductors wound into three layers around a copper core. The critical current at the self field and 77 K of each coated conductor was 68 A. In order to compare with these experimental results, we carried out numerical electromagnetic field analyses. Our numerical model was formulated with the current vector potential T and was based on the thin-strip approximation. The three-dimensional geometry of coated conductors in a CORC wire was modelled with curved shells. The comparison between measured and calculated ac losses suggested the followings: magnetization loss characteristics can be explained by the variation of the orientation of the wide face of a coated conductor in the CORC wire; the lateral critical current density distribution might influence the magnetization loss; the current distribution among layers could influence the transport loss. The effect of striating coated conductors for ac loss reduction of CORC wire is discussed as well.

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