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Calculations and measurements of electromagnetic characteristics of striated and copper-plated coated conductors and their coils

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The striation of coated conductors is attracting interests as a means of the reduction of shielding-current-induced fields (SCIFs) in magnets made with coated conductors. We focus on striated and copper-plated coated conductors, in which plated copper allows current sharing between filaments. We characterized their electromagnetic characteristics at three steps, and, through these steps, we validated our numerical model by comparison between calculations and measurements.
At the first step, we measured and calculated coupling time constants of short pieces of the conductors with various lengths and their stacks and determined the transverse resistance between filaments.
At the second step, single pancake coils wound with striated and not-striated coated conductors were exposed cusp magnetic fields, and we compared the measured and calculated SCIFs in the pancake coils wound with the two types of coated conductors.
At the third step, we compared the decay of SCIFs in a layer-wound solenoid coil and a stack of pancake coils.
Through these studies, we the validity of our numerical model was confirmed and examined the effect of striation to reduce SCIFs.

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