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Experimental Study on AC Loss of a Quasi-isotropic Strand Fabricated by 2G HTS CCs in AC Magnetic Fields

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AC loss of the superconducting composite conductor is one of the important factors for the application of superconducting power devices since it determines the stability and operation cost. In recent years, a variety of models have been successfully developed to simulate HTS coated conductors (CCs), while the calculation of AC loss focused on superconducting strands based on REBCO CCs is relatively less. Moreover, systematic analysis on hysteresis loss is relatively mature, much efforts need to be made to carry out the research on the eddy-current loss and coupling loss because they are also crucial part of AC loss. In this paper, we analyze total AC loss including eddy-current loss and coupling loss as well as hysteresis loss of a quasi-isotropic strand consisting of symmetrically stacked 2G HTS CCs and present a new calorimetric method for measuring AC loss of the strand by optical fiber Bragg grating (FBG) in liquid nitrogen temperature. The experimental results are in agreement with the calculations.

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