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## Evaluation of Electrical Characteristics for a Twisted Soldered-Stacked-Square (3S) HTS Wire with 1 mm Width

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In the superconducting applications for large current and strong magnetic field, a twist structure between superconducting wires can prevent generation of loop current and reduce AC loss. However, the twist structure is difficult to achieve for high temperature superconducting (HTS) tapes because of their high width-thickness ratio. In order to apply twist process more easily, a novel soldered-stacked-square (3S) HTS wire, whose cross-section is a square shape of 1 mm width, has been proposed and tested. Based on previous results of 3S wire, in this paper, a direct twist structure between 3S wires will be tried firstly and studied in detail. For the twisted 3S wires, we will investigate their electrical characteristics of critical current and AC loss under various magnetic field and mechanical environment. Moreover, a three-dimensional finite element method (FEM) model considering the twist structure of 3S wire will be developed, and result of AC loss and twist effect calculated from this model will be compared with the measured ones. More detailed evaluation results and FEM model introduction will be discussed and presented in this paper.

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