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Wed-Af-Po.10-05: Bending characteristic of Bi-2223 three-groove CICC for fusion application

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Bi-2223 high temperature superconducting (HTS) tape has shown high mechanical stability and current capacity, which could be a potential material of cable-in-conduit-conductor (CICC) design and manufacture for fusion magnets. During winding process of magnet coil, bending strain is induced which cause the current capacity degradation. Thus, the bending performance of CICC cable is needed to be characterized through experiment and simulation. In this study, a 500 mm three-groove CICC sample was fabricated with Bi-2223 tapes stacked in each groove and bending test with different bending radii was performed at 77 K and self-field condition. To establish the model of Bi-2223 three-groove CICC and explain the experimental results, simulation using finite element method combined analytical model driven by bending test results of Bi-2223 HTS tape was carried out. The experimental and numerical results in this work will demonstrate the presented structure can meet the bending requirement of 15 kA-level CICC for fusion application.

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