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## **Wed-Af-Po3.25-05 [109]: Fabrication of (6+1)-structure superconducting cable based on 30-core MgB<sub>2</sub> superconducting wire**

*Wednesday, 25 September 2019 14:00 (2 hours)*

In this paper, the km-grade 30-core MgB<sub>2</sub> superconducting wire with a diameter of 1.0mm has been prepared by conventional in-situ powder-in-tube method. The metallographic analysis results show that the 30-core MgB<sub>2</sub> wire has very good uniformity in both transverse and longitudinal directions, and the critical current (I<sub>c</sub>) and critical current density (J<sub>c</sub>) reach 95 A and 2.1×10<sup>5</sup> A/cm<sup>2</sup> at 4.2 K and 4 T, respectively. Furthermore, the (6+1)-structure MgB<sub>2</sub> superconducting cable has also been successfully fabricated with different twist pitches (TP) by the twisted and reacted (T&R) route, which uses six pieces 30-core MgB<sub>2</sub> wires and one copper wire in the center. The critical current (I<sub>c</sub>) of the (6+1)-structure MgB<sub>2</sub> superconducting cable with 50 mm TP reaches 476 A at 4.2 K and 4 T in this work.

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