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Tue-Mo-Or8-02: Recent progress on CORC® cable and wire development for magnet applications

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Advanced Conductor Technologies is developing high-temperature superconducting Conductor on Round Core (CORC®) cables and wires wound from REBCO coated conductors for use in high-field magnets. Magnet applications on which the conductor development is focused on include compact fusion magnets that operate at currents between 50 and 100 kA at fields of 12 –20 T and accelerator magnets that operate at currents exceeding 10 kA and engineering current densities (Je) of over 600 A/mm2 at 4.2 K in a background field of 20 T. Here, we outline the latest results of CORC® cable and wire development tailored for each magnet application. We'll discuss the improvements of CORC® wires with respect to in-field performance and flexibility required for high-field accelerator magnets through improved pinning performance and reduction of the substrate thickness from 30 down to 25 µm in tapes from SuperPower. The design of several CORC® Cable-in-Conduit-Conductors (CICC) for fusion magnets will be discussed. The CORC®-CICC are designed with improved mechanical support of the bundle of 6 CORC® cables, or 10 –14 CORC® wires, to ensure sufficient mechanical resilience against transverse compressive stresses when operated at 50 –80 kA at 10.8 T later this year in the SULTAN test facility at the Paul Scherrer Institute in Switzerland.

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