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## **Demonstration of a 60 kA-class 6-around-1 high-temperature superconducting Conductor on Round Core Cable in Conduit Conductor**

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High-temperature superconducting (HTS) Conductor on Round Core (CORC) cables are an enabling technology for the next generation of low-inductance fusion and accelerator magnets that would operate at elevated temperatures or at magnetic fields exceeding 20 T. We have developed a 60 kA-class CORC cable in conduit conductor (CORC-CICC), having a 6-around-1 configuration, for use in fusion magnets. One of the concerns is that the large stresses acting on the individual CORC cables in the CORC-CICC when operated in these high-field and high-current applications could potentially degrade their performance. We optimized the 6-around-1 CORC-CICC, using the results of measurements and simulations of the effect of transverse compressive stress on the critical current of individual CORC cables. Measurements of the critical current of CORC cables with various configurations under the application of transverse compressive stress exceeding 1.3GPa were performed at 76 K. The performance of the 6-around-1 CORC-CICC was tested at high operating current at 4.2 K in a background field of up to 8 T at various current ramp rates and under current cycling.

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