Contribution ID: **1056** Type: **Poster Presentation**

M2Po2E-06 [54]: Suppression of Magnetization and Creep in High-temperature Superconducting Cable by Magnetic Field Cycling

Tuesday, July 23, 2019 1:30 PM (2 hours)

High-temperature superconductor composites, such as coated conductor-based CORC and Bi2212-based cables, are being considered for high field magnets to be used in particle accelerators. Strand magnetization can degrade the magnetic field quality by introducing error fields, and flux creep may lead to drift in the magnetic field value during magnetic field ramp holding sequences, such as at particle injection. Here, selective cycling of the magnetic field applied to Bi2212 Rutherford cable and CORC and Roebel cable is explored as a technique to reduce the starting magnetization of the cable and the subsequent decay of the magnetization. The Rutherford cable samples were ˜3 cm x 1.5 cm and were cut from racetrack coil RC5 measured at LBNL. The coil was wound with state-of-the-art Bi2212 wire and achieved 8.6 kA at 4 K, and generated a peak field of 3.5 T, with a wire current density of 1020 A/mm2. The CORC cable sample was 2.7 cm long and 3.2 cm in diameter and was cut from a 2 layer, 3 turn canted cosine theta (CCT) prototype tested at LBNL. The Roebel cable sample was 3 cm x 1.2 cm x 0.5 cm. The cable comprised 9 tapes with each tape being 5.6 mm wide and ˜100 microns thick. The measurements were performed at 4 K in a 12 T cryogen-free magnet system. A Hall sensor, placed close to the extracted sample, was used to measure the magnetization. The applied field was ramped through full flux penetration and then brought within one flux penetration depth of the target applied field before the decay measurement commenced. The typical particle injection field of 1 T was used as the target field. Significant suppression of both the initial magnetization and its subsequent decay was observed.

Author: MYERS, Cory (Ohio State University)

Presenters: MYERS, Cory (Ohio State University); Prof. COLLINGS, Ted (MSE, OSU); SUMPTION, Mike (The Ohio State University)

Session Classification: M2Po2E - LTS Cables - Fabrication and Characterization