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Magnetization measurements of Bi-2212 Rutherford cable using a ± 3 -T magnetometer

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High-temperature superconductors (HTS) are being considered for use in high field dipole and quadrupole magnets for future particle accelerators. In comparison with low-temperature superconductors (LTS), the persistent current magnetizations of HTS are much larger. Because of this, the magnet error fields are much larger (since they depend on the size and shape of the superconductor). In this study, we measured the magnetization of a 9×12 Bi-2212 Rutherford cable. A 3 T dipole magnetometer system was used for the measurement. In this system, the sample is placed on a probe and inserted into a dipole magnet. There are six coils wired in series and arranged as three pairs of saddle shape coils on the outer part of the probe as compensation coils. In addition, a pickup coil is present around the sample. As a maximum ramp rate of 0.6 T/min, the magnet reached 3 T at maximum current of 150 A. The tests were performed in liquid helium environment and $M-\mu_0 H$ was measured. $M-H$ loops and magnetization are compared to magnetization measurements on individual strands measured in a PPMS, and in a hall probe magnetization system.

Primary authors: XUE, Shengchen (OSU); Dr KOVACS, Chris (Air Force Research Laboratory); SUMPTION, Mike (The Ohio State University); MAJOROS, Milan (The Ohio State University); Dr COLLINGS, Edward (The Ohio State University)

Presenter: XUE, Shengchen (OSU)

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