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## **Wed-Mo-Or11-01 [Invited]: Magnetization, Flux Penetration, and Drift of YBCO Cable Segments Models and Measurements for Accelerator Magnet Applications**

*Wednesday 25 September 2019 11:15 (30 minutes)*

High temperature superconductors, such as YBCO, are being considered for high magnetic field magnets to be used in particle accelerators. A knowledge of the magnetic properties of these superconductors, and in particular the cables made from them are needed for accelerator magnet design. Here we present measurements of HTS CORC and Roebel cables using two devices. First, from a hall probe rig made to measure the magnetization of short sections of YBCO cable up to 4 cm x 1 cm. We performed measurements on stacks of YBCO tape, Roebel cable, and CORC cables at 4.2 K in this work, with field cycles up to 12 T. The second measurement was on longer segments of superconducting cables using a 3 T dipole AC susceptometer. The magnetization and penetration field of the cables was then compared to tape from which the cables were wound. Models for the magnetization of the cables, as well as direct measurements of them, were then compared. The time decay (creep) of the magnetization was also measured for these cables. Simple models were then used to make estimates of field errors and field error drift (from creep), and the influence of field cycle was explored. Magnetization values on the order of 1000 kA/m were observed, with 20% change over 20 minute hold times. This could result for some magnets in errors in the hundreds of units.

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