



Contribution ID: 886

Type: **Invited Oral Presentation**

M3Or2B-02 [Invited]: Measurements and Modelling of YBCO Cable at High dB/dt for various HTS cables

Wednesday, 24 July 2019 11:30 (30 minutes)

In this work, segment of various HTS cables were measured for loss at high dB/dt in a rotating magnet AC loss machine. The cables types including CORC, Roebel, and TWST cables. The cable were measured in a spinning magnet calorimeter (SMC). This test device has a spinning rotor which consists of permanent magnets arranged in a Halbach array, with the sample exposed to an AC field of 0.566 T (peak) and a radial dB/dt of 272 T/s (tangential, $B_{max} = 0.242$ T, dB/dt = 125 T/s). Loss is measured using nitrogen boiloff from a double wall calorimeter feeding a gas flow meter. For comparison, a straight segment of tape of the kind used in the cable was also measured in a field perpendicular to the wide face of the tape. The results were compared to a simple analytic models for losses of these conductors and the starting tape. The losses of the cables were compared, as well as the amount of strand coupling vs hysteretic loss present in each. The coupling loss was moderate for the TWST, and small for the Roebel and CORC, but the loss was dominated by hysteretic losses in all cases. The influence of applied field amplitude and demagnetization on field penetration was discussed. Results were compared to analytic and FEM models which showed a functional dependence of both the coupling and the hysteretic loss on twist pitch.

Primary authors: SUMPTION, Mike (The Ohio State University); HAUGAN, Timothy (U.S. Air Force Research Laboratory); MURPHY, John (University of Dayton Research Institute)

Presenter: SUMPTION, Mike (The Ohio State University)

Session Classification: M3Or2B - AC Loss YBCO