MT 26
International Conference on Magnet Technology
Vancouver, Canada | 2019

Contribution ID: **1568** Type: **Poster Presentation**

Thu-Mo-Po4.07-05 [50]: Field Quality Measurements of High-Temperature Superconducting Canted Cosine Theta Accelerator Magnets

Thursday 26 September 2019 08:45 (2 hours)

High-temperature superconducting (HTS) composites are being considered for use in high-field magnets for future particle accelerators, as they allow the development of very high field dipoles and quadrupoles. As part of the US Magnet Development Program, LBNL is developing Bi2212- and REBCO-based insert magnets towards 20 T hybrid dipole magnets. The field quality of the magnets is important to assess and limited reports on HTS accelerator magnet field quality measurements are available. Furthermore, drift in the field quality resulting from flux creep in HTS is an important consideration. Here we report on field quality measurements of insert magnets measured at 77 and 4.2 K, self-field. The insert coils were based on canted cosine theta design and were wound with Bi2212 Rutherford cables and REBCO CORC® wires. Hall sensors and rotating coil fluxmeters were used to measure the generated magnetic field harmonics and their evolution with time. The magnetization and decay data from M-μ0H measurements performed, at 4 K, on samples of cables of the HTS composites were used as inputs to finite element and analytical models to predict the field error of a magnet made from the cables. The data was taken in fields up to 8 T. We compare the results of the field quality measurements to calculated results from models based on the short cable sample magnetization data results. The study allowed us to better understand the field quality issues in HTS magnets and to provide important feedback on the conductor development and strategies to improve the field quality of emerging HTS accelerator magnets.

Author: MYERS, Cory (Ohio State University)

Co-authors: SUMPTION, Mike (The Ohio State University); Prof. COLLINGS, Ted (MSE, OSU); DIMARCO, Joseph (Fermi National Accelerator Laboratory); PRESTEMON, Soren (LBNL); SABBI, GianLuca (LBNL); Dr SHEN, Tengming (Lawrence Berkeley National Lab); GARCIA FAJARDO, Laura (Lawrence Berkeley National Laboratory); WANG, Xiaorong (Lawrence Berkeley National Laboratory)

Presenter: MYERS, Cory (Ohio State University)

Session Classification: Thu-Mo-Po4.07 - Magnetization and AC Losses II