Contribution ID: **455** Type: **Poster**

M2Po2B-03: Magnetization, Flux Creep, and AC Loss in a Bi-2212 Conductor for Particle Accelerator Applications

Tuesday 11 July 2023 14:00 (2 hours)

Bi-2212 Rutherford cables are under consideration for construction of the next generation of high-field magnets for particle accelerators. The critical current has been increased to a level sufficient for these magnets, but field errors due to magnetization and flux creep is still a concern, especially since these can be higher for HTS materials than Nb-Ti or Nb₃Sn. The magnetization and decay of magnetization due to flux creep in a Rutherford cable segment were measured previously. A series of magnetic field sweeps was applied of the form 0 T, 2.5 T, x, 1 T, followed by an 1800 s dwell at 1 T, where x is several values ranging from -1 to 1 T. By doing so, the relaxation of various internal flux penetration profiles is probed, and the implications for the time-dependent magnetization response of an accelerator magnet are examined. In the previous analysis, relaxation rates were found which were lower than in previous measurements of Bi-2212 strands. Here, the analysis of the cable is extended to the wire from which that cable was made. The effects of sample length, microstructure, strand geometry, and cabling on the magnetization and its temporal decay are evaluated.

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Session Classification: M2Po2B: Modelling and AC Losses