Contribution ID: **635** Type: **Poster**

Sat-Mo-Po.02-04: Design and Test of Two Long Bi-2212 Coils to Address Their Axial Properties for Bi-2212 High Field Insert Coil Program

Saturday 5 July 2025 09:30 (1h 45m)

The over-pressure heat-treatment (OPHT) processed Bi-2212 insert coil technology for high field (> 24 T) magnet systems is based on two critical technologies developed at the National High Magnetic Field Laboratory (NHMFL): optimized OPHT process for high in-field performance (J_E ~ 900 A/mm2 at 20 T) and introduction of alumina fiber reinforcement for efficient magnetic stress management. In 2022, we were able to operate a test coil withstanding over 350 MPa of J_Br stress while producing a magnetic field of 4.9 T in 12 T background field. To understand the coils'axial properties, ASC started looking into "long"Bi-2212 test coils (up to three times longer than the test coil in 2022) as to confirm the effectiveness of the proposed stress management techniques against thermal and magnetic stresses . Two mid-scale Bi-2212 test coils are under preparation and will be tested in the 12 T background field in 2025. The two test coils will be used to compare two different coil reinforcement layouts. The test results will be compared from the perspective of their in-field performance, stress management and mechanical integrity, magnetic field uniformity, and Bi-2212 coil protection. The test results will be applied to our Bi-2212 insert coil development projects, e.g., our in-house Φ 54 mm bore / 20 T research magnet and the NIH R01 funded Φ 42 mm bore / 28 T high homogeneity NMR demonstrator magnet.

Author: Dr KIM, Youngjae (NHMFL/FSU)

Co-authors: Dr DAVIS, Daniel (NHMFL/FSU); LARBALESTIER, David (Applied Superconductivity Center, National High Magnetic Field Laboratory, Florida State University); MARTIN, Emma; HELLSTROM, Eric; MILLER, George (NHMFL/FSU); JIANG, Jianyi (National High Magnetic Field Laboratory); KVITKOVIC, Jozef (Florida State University); BRADY, Tomoka (NHMFL/FSU); TROCIEWITZ, Ulf (Applied Superconductivity Center/National High Magnetic Field L)

Presenter: Dr KIM, Youngjae (NHMFL/FSU)

Session Classification: Sat-Mo-Po.02 - Magnets for Other Medical Application III