



Contribution ID: 630

Type: Poster

Sat-Mo-Po.07-08: Design and prototyping of CORC CCT inserts for testing in background dipole fields

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

We present design options and initial prototyping of CORC Canted Cosine Theta (CCT) dipole inserts compatible with testing in the ~ 8 T background field of the existing Nb₃Sn outsert CCT5. We explore different CCT geometries and configurations, seeking to optimize the coil geometry to meet the minimum bending radii requirements of the CORC conductor with maximum coil magnetic efficiency. The result of these studies is a four-layer CORC CCT dipole design with ~ 5 T stand-alone short-sample limit at 4.2 K that maintains compatibility with testing in the 90 mm clear aperture of the CCT5 outsert. We present the full magnetic design of this insert magnet and initial studies of the mechanical coupling between the insert and outsert in 2D. Finally, we share initial prototyping of this design where short lengths of CORC conductor are characterized before and after winding into the CCT coil geometry as a first step towards demonstrating degradation-free coil fabrication.

This work was supported by the U.S. Department of Energy, Office of Science, Office of High Energy Physics, through the US Magnet Development Program under contract No. DE-AC02-05CH11231.

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Session Classification: Sat-Mo-Po.07 - HTS Magnets