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Development and test of a small-aperture dipole coil made of REBCO stacked-tape cable

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This paper describes the magnetic and mechanical design, and the main parameters of a small-aperture two-layer dipole coil made of REBCO twisted stacked-tape cable. The coil has 36-mm diameter aperture and 59-mm outer diameter. The coil turns are wound into grooves in a special structure that ensures the appropriate turn location and control the level of strain and stress in the brittle REBCO tapes throughout the magnet assembly and operation. The coil structure is produced using a 3D printing technology. The twist of the stacked-tape cable is introduced in the coil straight section during coil winding. The structure geometry and the coil winding procedure were tested and optimized using 3D printed plastic parts and “dummy” cable made of stainless-steel tapes. The REBCO coil was fabricated and tested in liquid Nitrogen and Helium. The details of the coil design, fabrication and tests will be reported and discussed.

Footnotes

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