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Wed-Af-Po3.15-04 [8]: Design study and preliminary test results of a high field ReBCO coil with a new end structure

Wednesday, 25 September 2019 14:00 (2 hours)

IHEP (The Institute of High Energy Physics, Chinese Academy of Sciences) is pursuing the pre-study of SPPC, a super Proton-Proton collider prorosed to be built in the future. To reach the 70 TeV or higher center of mass energy in proton collisions, dipole magnets with 12-T or higher bore field are required. A subscale magnet named LPF1 was fabricated and tested in 2018, which reached a main field of 10.2 T at 4.2 K with NbTi and Nb3Sn coils. In parallel with the continuous improvement of LTS (Low temperature superconductor) approach, the HTS (High temperature superconductor) coils are also under development to provide 1.5-3 T more field in LTS magnets. The conceptual design of a high field ReBCO insert coil with a new end structure has been completed. It will be fabricated and inserted into the LPF2: an improved magnet based on LPF1 and is expected to provide much higher dipole field than LPF1. To take advantage of the angular dependence of the critical current in the ReBCO tapes, an anti-angular arc is adopted at the coil ends to bend the tape with a larger radius and reduce the angle between the broad side of the tape and the magnetic field flux. The main design concept, fabrication process and test results of this ReBCO coil will be introduced.

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