AP1-3

Upgrade of 25T cryogen-free superconducting magnet to 30T at HFLSM

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The 25T cryogen-free superconducting magnet (CSM) with high strength Bi2223 insert and CuNb/Nb_3Sn Rutherford cable coils is operated as a user magnet at High Field Laboratory for Superconducting materials (HFLSM) sine 2016 [1]. Now we plan an upgrade of the 25T-CSM with replacing the Bi2223 insert coil with the REBCO one. Thanks for good mechanical and in-field J_c properties of REBCO tapes, we can design the 16T REBCO insert under the background field of 14 T, in spite of some limitations such as coil space, operation current and cooling capacity. We propose two bundle (two-ply) REBCO tape winding in order to increase the space current density with a good reliability of REBCO coil. The design study is performed based on the REBCO tapes with the artificial pinning center (APC). In addition, the effects of two REBCO tape coupling on the AC losses and magnetic field should be investigated. We performed some R&D studies with the two-ply REBCO pancake coils under the electro-magnetic stress. The R&D studies and the primitive design of REBCO insert will be presented.

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