



Contribution ID: 122

Type: Poster

Design and Analysis of the CFETR TF Coils with REBCO tapes

Monday, 5 June 2017 13:40 (2 hours)

Yong Ren*, Xiaogang Liu, Zhaoliang Wang, Junjun Li, Shijun Du, Guoqiang Li, Xiang Gao

Institute of Plasma Physics, Hefei Institutes of Physical Science, Chinese Academy of Sciences, PO Box 1126, Hefei, Anhui, 230031, People's Republic of China

*E-mail: renyong@mail.ustc.edu.cn; renyong@ipp.ac.cn.

Abstract—The China Fusion Engineering Test Reactor (CFETR), which has the potential to produce a fusion power above 2 GW, is being designed to bridge the gap between the ITER and Demo in China. The fusion power is strongly dependent on the plasma pressure to magnetic pressure ratio and toroidal magnetic field at the plasma major radius. The maximum magnetic field above 20 T is expected in the CFETR TF coil. The state-of-the-art low temperature superconducting (LTS) magnet has a relatively low coil current density in magnetic field above 15 T. Therefore, a high performance superconducting magnet with high temperature superconductor (HTS) is required to provide the superior superconducting property. The RE-Ba-Cu-O-coated (REBCO) tapes, which has the higher critical current density than LTS in magnetic fields above 15 T and endure a high tensile stress, will be used for the CFETR TF coil. The CFETR TF coil is composed of the REBCO HTS coils and Nb3Sn LTS coil.

This paper will describe the design of the CFETR TF coil. The electromagnetic and thermal-hydraulic analysis of the CFETR TF coil is performed.

Keywords—CFETR, Double-pancake (DP), REBCO coil, Superconducting magnet, Thermal-hydraulic behavior.

Eligible for student paper award?

No

Authors: Dr REN, Yong; Dr LIU, Xiaogang; Dr WANG, Zhaoliang; Dr LI, Junjun; Dr DU, Shijun; Dr LI, Guoqiang; Dr GAO, Xiang

Presenter: Dr REN, Yong

Session Classification: M.POS: Poster Session M

Track Classification: Magnets