MT 26
International Conference
on Magnet Technology
Vancouver, Canada | 2019

Contribution ID: **1289** Type: **Poster Presentation**

Mon-Af-Po1.18-06 [63]: Quench analysis of the CFETR TF Coil Using the Gandalf Code

Monday 23 September 2019 14:30 (2 hours)

China Fusion Engineering Test Reactor (CFETR) is the next device in the roadmap for the realization of fusion energy in China, which aims to bridge the gaps between the fusion experimental reactor ITER and the demonstration reactor (DEMO). CFETR will be operated in two phases: Steady-state operation and self-sufficiency will be the two key issues for Phase I with a modest fusion power of up to 200 MW. Phase II aims for DEMO validation with a fusion power over 1 GW. For saving the cost of construction and meeting both Phase I and Phase II target with achievable technical solutions, a new design has been made by choosing a larger machine with R =6.6m,/a=1.8m, BT= 6-7T. Over 1GW fusion power can be achieved technically and it is easy to transfer from Phase I to Phase II with the same machine.
The Toroidal Field (TF) coil is a crucial system in the tokamak, which provides the main magnetic field to confine the plasma. One TF coil will be constructed next 5 years in the support of Chinese government. The quench of TF coils can be induced by many factors, for example, thermal disturbance, mechanical disturbance, vacuum destruction and so on. For the safety operation of superconducting magnet, the quench detection and quench protection system is very important for the TF coil system of CFETR. In order to give the design reference of quench detection and protection system, the assumed quench phenomenon of TF coil is analyzed. The evolution of the voltage of the normal zone, hot spot temperature and mass flow rate of cooling channel of the TF coil are simulated.

Authors: Mr WEN, Xinghao (University of Science and Technology of China); Mr LI, Junjun (Institute of Plasma Physics, Chinese Academy of Sciences); Mr REN, Yong (Institute of Plasma Physics, Chinese Academy of Sciences); Mr WANG, Dongquan (Institute of Plasma Physics, Chinese Academy of Sciences)

Presenter: Mr WEN, Xinghao (University of Science and Technology of China)

Session Classification: Mon-Af-Po1.18 - Fusion IV: Thermohydraulics, Mechanical, and AC Losses