Contribution ID: **826** Contribution code: **THU-PO3-206-10** Type: **Poster**

Preliminary structural analysis of the DTT current feeders conductors and clamps

Thursday 18 November 2021 10:00 (20 minutes)

Divertor Tokamak Test facility (DTT) is the device devoted to tackle the power exhaust issue in the view of future fusion power plant [1]. The DTT construction is nowadays started in the ENEA site of Frascati, Italy. The DTT superconducting magnet system is comprised of 18 Toroidal Field (TF) coils, able to generate a magnetic field of 6 T at the plasma major radius (i.e., at 2.19 m from the z-axis), 6 independent Poloidal Field (PF) coils and a Central Solenoid (CS) made of 6 stacked, independently fed, graded modules. The DTT current feeding system consists of superconducting feeders, whose latest design foresees the use of NbTi Cable in Conduit Conductors (CICC), of Current Lead boxes (CLBs) and resistive busbars, operating at room temperature. The TF are fed in series with an operative current of 42.5 kA, whilst the PF and CS with a maximum current of 30kA, both at operative temperature of 4.5K. A feeders'pair layout comprises both the positive and negative poles clamped together to counteract the electromagnetic (EM) force. Clamps, which are made of plates and a certain number of bolts, serve as constraints for feeder cables relative displacements during operations.
The aim of this work is to provide a preliminary structural assessment of the CICC jacket, together with the feeders clamps and bolts (both in terms of dimensions and number), resorting to a coupled EM and structural analysis. Exploiting a parametric model, developed within ANSYS APDL environment, it is possible to scan a wide solution range and to extrapolate a configuration that is compliant with the feeders design requirements.

References

[1] R. Martone, R. Albanese, F. Crisanti, A. Pizzuto, P. Martin. "DTT Divertor Tokamak Test facility Interim Design Report,"ENEA (ISBN 978-88-8286-378-4), April 2019 ("Green Book") https://www.dtt-dms.enea.it/share/s/avvglhVQT2aSkSgV9vuEtw

Primary author: Dr GIORGETTI, Francesco (University of Tuscia)

Co-authors: Dr DE MARZI, Gianluca (ENEA Frascati Research Center); Prof. GIUSEPPE, Calabrò (University of Tuscia, Department of Economy, Engineering, Society and Business Organization (DEIM)); DELLA CORTE, Antonio (Enea); DI ZENOBIO, Aldo (ENEA); Dr FANELLI, Pierluigi (University of Tuscia, Department of Economy, Engineering, Society and Business Organization (DEIM)); GIANNINI, Lorenzo (ENEA); Mr MERCURI, Alessandro (University of Tuscia, Department of Economy, Engineering, Society and Business Organization (DEIM)); Dr MUZZI, Luigi (ENEA); TOMASSETTI, Giordano (ENEA)

Presenter: Dr GIORGETTI, Francesco (University of Tuscia)

Session Classification: THU-PO3-206 Fusion VI: JT-60SA, DTT and Other Devices