Contribution ID: **539** Contribution code: **THU-PO3-206-13** Type: **Poster**

Updated structural assessment of the Poloidal Field Coils of the DTT tokamak

Thursday 18 November 2021 10:00 (20 minutes)

In the context of tokamak reactors, the Poloidal Field Coils (PFCs) are magnets that surround the Toroidal Field Coil (TFC) assembly and generate a magnetic field which equilibrates the plasma and shapes it into specific forms. To enforce plasma requirements, the six PFCs of the Divertor Tokamak Test (DTT), a facility that will be built at the ENEA research centre in Frascati with the main mission of optimising the power exhaust management in view of DEMO (1), have been designed to reach as high a self –field as 9T, and in operation will withstand electromagnetic loads of several tens of MN. From a mechanical point of view the PFCs are highly interconnected components, whose structural response is influenced by their own loading conditions as well as by the TFC system they are installed onto. As the PFCs experience high time-varying vertical forces that would tend to separate the coils from the TFCs, a challenging task is attaining a robust design of their support structures. These latter must maintain the PFCs in place by exerting an intense counterbalancing precompression, without however compromising the integrity of the PF coil itself. This work discusses these and other design choices that have been made for the PF coil system of DTT, illustrating the in –operation behaviour and interaction among the TF coils, the PF supports and the PF magnets. Finite Element Analysis has been the principal, but not exclusive, means of investigation.

(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: ZOBOLI, Lorenzo (University of Rome "Tor Vergata", Dept. of Civil Engineering and Computer Science)

Co-authors: ANEMONA, Alessandro (ENEA); DI ZENOBIO, Aldo (ENEA); GIANNINI, Lorenzo (ENEA); MUZZI, Luigi (ENEA); ROMANELLI, Gherardo (ENEA); TURTU', Simonetta (ENEA/ICAS); DELLA CORTE, Antonio (Enea); Prof. VAIRO, Giuseppe (University of Rome "Tor Vergata", Dept. of Civil Engineering and Computer Science)

Presenter: ZOBOLI, Lorenzo (University of Rome "Tor Vergata", Dept. of Civil Engineering and Computer Science)

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