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Wed-Mo-Po3.01-05 [5]: Magnetostructural calculations and design study of the DTT central solenoid

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The "Divertor Tokamak Test"facility, DTT, is a project of an experimental tokamak reactor developed in Italy, in the framework of the European Fusion Roadmap.
This work presents the magnetic and the structural assessment of the performance of the DTT central solenoid. The CS is the core magnet of the poloidal system and generates the magnetic flux needed to induce the plasma current.
This magnet is composed of a stack of six layer-wound independently energized modules, comprised of Nb3Sn Cable-in-Conduit Conductors.
To optimize the amount of superconductive material, each module is divided into two submodules. The innermost submodule operates in a range of 10/14 T, while the outer one at 10/6 T.
The objective of the design process is to obtain a coil that is capable of providing the required magnetic performance while being structurally compliant.
To address this problem, an analytical assessment has been carried out and a thoroughly parametrical FEM model has been implemented.

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