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P4.006 Design review for the Italian Divertor Tokamak Test facility

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The original DTT (Divertor Tokamak Test facility) proposal presented in 2015 [1] in the challenging area of plasma exhaust has been described in detail in [2] with a critical review of several aspects.

Afterwards, according to the conclusions of the DTT Workshop held at Frascati in June 2017, various points have been examined to improve the proposal in the design review phase.

One issue is the flexibility of the machine, so as to be able to incorporate the best candidate divertor concept (e.g. conventional, snowflake, super-X, double null, liquid limiter). In particular, up-down symmetry has been required so as to properly test double null configurations. Another important point is the additional power coupled to the plasma needed to guarantee significant results in view of DEMO.

Here we present the engineering aspects of the Italian DTT design review, which led to an up-down symmetric tokamak with a major radius of 2.08 m, a minor radius of 0.65 m, a toroidal field of 6 T, a plasma current of 5.5 MA, and a pulse duration of 90-100 s.

In particular we illustrate the rationale for the design choices, focusing on the main differences with respect to [1-2], namely for:

- magnet system;
- scenarios;
- vacuum vessel;
- in-vessel components;
- thermal shield and the neutron shield;
- additional heating system.

[1] DTT Divertor Tokamak Test facility, Project Proposal, ENEA, 2015, 2016, ISBN:978-88-8286-318-0, http://fsn-fusphy.frascati.enea.it/DTT/downloads/Report/DTT_ProjectProposal_July2015.pdf,

[2] Special Section of Fusion Engineering and Design, Vol. 122, 2017, pp. 253-294 and e1-e25

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