

## P5.1105 Design of neutron and gamma ray measurements for the start-up phase of the DTT tokamak

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See the full abstract here <http://ocs.ciemat.es/EPS2019ABS/pdf/P5.1105.pdf>

The Divertor Tokamak Test (DTT) facility, which is under design for construction in Frascati (Italy), will produce neutron yield up to  $1.3 \cdot 10^{17}$  n/s at full power (H-mode scenario). This calls for an accurate design and selection of the 2.5 MeV neutron diagnostic systems and detectors which can give the full exploitation of the high neutron fluxes. Measurements of 14 MeV neutrons (which are about 1% of the total yield) due to triton burn-up will also be performed.

DTT will reach its best performances after a preliminary phase needed to assess and improve the machine parameters. Here we present the neutron and gamma ray diagnostics systems which are under design for the initial start-up phase of DTT. The design work benefits from the experience gathered by the community on high power tokamak such as JET. These systems, also called day-1 diagnostics, are:

- i) Neutron flux monitors which measure the 2.5 and 14 MeV neutron yield
- ii) Hard x-ray monitors for measurements of the bremsstrahlung radiation produced by runaway electrons in the 1-40 MeV energy range
- iii) Neutron/Gamma camera for the reconstruction of the neutron and gamma ray emission profile of the plasma.

A brief description of the nuclear diagnostics which are under study for the so called exploitation phase of DTT will also be given. Although these systems will be needed only in a second phase during the operation of DDT at full power, it is crucial to study and design them from the beginning for integration issues.

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**Presenter:** ANGELONE, M. (EPS 2019)

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