



Contribution ID: 10

Type: Short oral in replacement of poster

Short_Oral_10: Advances in the DTT poloidal interferometer/polarimeter design

Monday, 6 September 2021 17:05 (10 minutes)

A multi-channels poloidal interferometer/polarimeter is under development for the Divertor Tokamak Test (DTT) facility, a new tokamak device whose construction is starting in Italy [1]. The aim of the diagnostics is the simultaneous measurement of the line integrated electron density, Faraday rotation and Cotton Mouton effect. The measurement of two polarimetric signals together with the interferometric one would allow for a robust electron density estimate, for the internal magnetic field measurement as well as for the magnetic equilibrium reconstruction.

In this work, we present the advances in the diagnostics design whose characteristics are constrained by both scientific requirements as well as the DTT structural aspects. In this regards, we have analyzed the possibility of accommodating up to 16 lines of sight in the available space and the contribution of different chords positions in the magnetic equilibrium reconstruction.

In particular, we have used the VMEC and V3FIT codes to evaluate the expected interferometric/polarimetric signals and their contribution in the reconstruction of the q profile. These results were used to optimize the chords positions. Eventually, we present a realistic CAD-driven design of the diagnostics, with details of the most critical components (e.g. the corner cube retroreflectors in the high field side), which would allow for the selected chords configurations implementation.

References

- [1] R. Martone, R. Albanese, F. Crisanti, P. Martin and A. Pizzuto, DTT-Divertor Tokamak Test Facility, Interim Design Report (ENEA, 2019),
https://www.dtt-project.enea.it/downloads/DTT_IDR_2019_WEB.pdf

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