



Contribution ID: 69

Type: **Short oral**

A Method of Confirming the Operation of Active Magnetic Compensation Coils on the ITER HNBs

Monday 3 October 2022 12:50 (20 minutes)

As with all Neutral Beam injection into tokamaks, the ITER Heating Neutral Beam (HNB) beamline must ensure that the effect of the magnetic field is minimised in order for the pre-neutralised beam to avoid significant deflection which, when later neutralised, will enable it to pass through into the tokamak plasma without damaging the beamline. Due to the strength and range of the ITER magnetic field and the length of the HNB beamline, the system required here is significantly more complicated.

The Active Compensation and Correction Coils (ACCC) system is comprised of 9 coils in total for each HNB, each independently powered using a feedback system, based on the vertical field measurements made at several locations in the beamline. The locations of the measurements are not yet confirmed, but they will be situated in safe locations to avoid damage from the beam. If they have to be located some distance from the beam, this may mean that the exact field along the beam axis can only be loosely inferred, rather than directly measured.

Due to access limitations, initial calibration of the ACCC may require some other method to fine tune and confirm the baseline level. This paper will explore the possible use of the beamline thermocouples to optimise the level of the ACCC.

The views and opinions expressed herein do not necessarily reflect those of the ITER Organization

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Session Classification: Oral session 2

Track Classification: 6. Beam lines and facilities