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Wed-Af-Po.11-07: Residual Inductive Voltage Calculations for the Quench Detection Loops of the ITER TF Coils during Single Coil Testing in the ITER Magnet Cold Test Bench

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While the ITER assembly is progressing, a Magnet Cold Test Bench (MCTB) is also under preparation to test some of the ITER superconducting coils at 4 K up to nominal current before their installation in the pit. In this context calculations were performed to estimate the residual inductive voltages in the quench detection loops of the TF coils during the test scenarios. These residual inductive voltages are defined as the difference between the turn and co-wound- tape voltages appearing during ramping operation. These residual voltages need to be known as they cannot be avoided and because they need to be smaller than the resistive voltage developing during a quench to allow its detection. In particular the case of a fast discharge is investigated, which represents the most severe transient operation expected for MCTB, generating the largest possible residual inductive voltages. Once validated against the MCTB tests, the models used to predict these residual inductive voltages in the ITER TF coils, can be applied to predict these voltages during a plasma pulse during ITER operation. This would allow the assessment by which margin quenches can be detected in the ITER TF coils during operation.

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

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