MT25 Conference 2017 - Timetable, Abstracts, Orals and Posters



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## Advanced mathematical model of ITER PF1 coil for manufacture quality control

Thursday 31 August 2017 13:45 (1h 45m)

A quality control technique is proposed that enables numerical reconstruction of distortions occurred during the manufacture and assembly of the PF1 coil for the ITER machine. The technique utilizes field maps measured near the surface of every pancake and the entire winding pack when the warm coil is energized with a low current. The measured data are used to evaluate parameters of the coil through solving an inverse problem sensitive to accuracy of inputs. This necessitates detailed description of the geometry for every turn, particularly, such elements as interturn and interlayer jogglings. The solution is obtained as the minimized functional of deviations of measured fields from the ideal field distribution. An advanced model has been proposed that describes every PF1 turn in conformity with design documentation. The numerical reconstruction is based on analytical solutions and utilizes the integral formulation. This ensures high accuracy and smoothness of the solution. PF1 is modelled via nearly 1500 arc and linear conductors with square cross-sections. The effect of ferromagnetic components of a shop floor can also be taken into account.

The proposed technique has been validated in experiments with the Dummy Double Pancake PF1.

## **Submitters Country**

Russian Federation

**Authors:** Dr AMOSKOV, Victor (JSC "NIIEFA"); Dr BELOV, Alexander (JSC "NIIEFA"); Prof. BELYAKOV, Valery (JSC "NIIEFA"); Dr LAMZIN, Eugeny (JSC "NIIEFA"); Dr RODIN, Igor (JSC "NIIEFA"); Dr STEPANOV, Dmitry (JSC "NIIEFA"); Dr SYTCHEVSKY, Sergey (JSC "NIIEFA")

Presenter: Prof. BELYAKOV, Valery (JSC "NIIEFA")

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