ANALYSIS OF ITER PLASMA OPERATIONAL SCENARIOS

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As the ITER project moves forward in the procurement phase of major components, the baseline design is subject to a series of modifications due to the finalization of the design or interaction with industry, revealing manufacturing or budgetary constraints.
The modifications brought to vacuum vessel, central solenoid, internal coils and power supply systems have an important impact on the performance and operation of the machine. A substantial activity is being carried out in EU in support to the design, aimed at assessing the impact of such design changes.
A revision of the 15MA baseline scenario was carried out. The effect of the 2010 design of the central solenoid on the operational space was assessed. A detailed analysis of the plasma breakdown and start-up phases was performed to assess the impact of withdrawing the booster converters from the baseline design and of the modifications to the power supply system. The start-up strategy was also analysed in order to assess its feasibility and the controllability of the null position. The possibility to enhance the performance by means of a feedback approach was also investigated.
The effect of the new asymmetric position of the vertical stability in vessel coils was analysed and a novel approach to vertical stabilization was investigated. This approach is based on a non-linear controller similar to the one developed at JET, aiming to the optimal exploitation of the H bridge power supply acting on such coils and to the reduction of the noise injected by this system.
Aim of this paper is to present a summary of the analyses performed and of the issues identified.