

**Abstract Submitted for the 54th Annual Meeting  
Division of Plasma Physics  
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Category Number and Subject: 5.5.0 ITER and Magentic Fusion

Development

Theory     Experiment

**3D Vacuum Magnetic Field Modeling of the ITER ELM  
Control Coils During Standard Operating Scenarios,\***

T.E. Evans, W. Wu, *General Atomics*, D.M. Orlov, *UCSD* A. Wingen, *ORNL*, A. Loarte, T.A. Casper, *ITER*, O. Schmitz, *FZ-Jülich* and G. Saibene, *F4E* — ELM coil optimization and failure studies have been completed for 9 standard ITER operating scenarios based on vacuum island overlap width calculations. Here, the toroidal phase of the current in the upper and lower coils is scanned in  $2^\circ$  steps while the current in the center ELM coil is held constant. The minimum current needed to satisfy the DIII-D ELM suppression correlation criterion varies from 20 to 50 kAt depending on the ITER operating scenario. In general, as the coil current is increased above the minimum required to meet the DIII-D criterion the available phase angle operating space increases approximately linearly with current. The DIII-D criterion can be satisfied, in the most demanding ITER scenario, with  $n=3$  perturbation fields and failures in up to 8 of the full 27 coils. In this case, the available phase angle operating space is reduced from 79% with no failures to 27% with 8 failures by increasing the current in the remaining ELM coils to the maximum operating current of 90 kAt. Details of these results will be discussed along with plans to extend the analysis to include the plasma response to the perturbation field.

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