Abstract Submitted for the 56th Annual Meeting
Division of Plasma Physics
October 27–31, 2014
New Orleans, Louisiana

Category Number and Subject:

[ ] Theory [X] Experiment

Control Solutions for High Performance in ITER with Test Blanket Modules,* M.J. Lanctot, J.S. deGrassie, R.J. La Haye, C. Paz-Soldan, E.J. Strait, R.J. Buttery *General Atomics*; J.A. Snipes, *ITER;* H. Reimerdes, *EPFL-CRPP*; N.C. Logan, J.-K. Park. W.M. Solomon, B. Grierson, *PPPL*; J.M. Hanson, *Columbia Univ.* – Recent DIII-D experiments indicate applied n=1 fields can be used in high performance plasma regimes to reduce to a tolerable level the impact of the Test Blanket Modules (TBMs) error field (EF) on energy and particle confinement. Active coils, designed to mock-up the magnetic EF from two TBMs in one ITER equatorial port, were used to mimic the magnetization from the reduced-activation ferritic martensitic steel used in present TBM designs. The optimum correction fields, identified by maximizing the plasma toroidal angular momentum, reduced the impact of the TBM EF on energy, particle, and momentum confinement at β_N~2.9 by 60%, a factor of 2 improvement over previous results at β_N~1.8. This improved performance of n=1 control fields at high beta is consistent with the hypothesis that the strong beta dependence of TBM EF effects observed in previous campaigns is due mainly to amplification of the n=1 component of the TBM EF. Similar performance was obtained with either internal or external n=1 error field control coils. The results suggest that the impact of the TBM related error fields on high beta operation can be controlled with the external correction coils in ITER.

*Work supported by the US DOE under DE-FC02-04ER54698, DE-AC02-09CH11466 and DE-FG02-04ER54761.