

Abstract Submitted
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Control Solutions for High Performance in ITER with Test Blanket Modules¹ M.J. LANCTOT, J.S. DEGRASSIE, R.J. LA HAYE, C. PAZ-SOLDAN, E.J. STRAIT, R.J. BUTTERY, GA, J.A. SNIPES, ITER, H. REIMERDES, EPFL-CRPP, N.C. LOGAN, J.-K. PARK, W.M. SOLOMON, B. GRIERSON, PPPL, J.M. HANSON, Columbia U. — 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 optimal correction fields, identified by maximizing the plasma toroidal angular momentum, reduced the impact of the TBM EF on energy, particle, and momentum confinement at $\beta_N = 2.9$ by 60%, a factor of 2 improvement over previous results at $\beta_N = 1.8$. 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 EFs on high beta operation can be controlled with the external correction coils in ITER.

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