Abstract Submitted
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Unlocking locked tearing-mode by applied rotating 3D field M. OKABAYASHI, N. LOGAN, Z. WANG, Princeton Plasma Physics Laboratory, Z. TAYLOR, E. STRAIT, R. LA HAYE, General Atomics, J. HANSON, Columbia University, D. SHIRAKI, ORNL, S. INOUE, QST — Tokamak reactors require control of locked tearing modes. Pre-emptive applications of a rotating 3D field controlled with (M. Okabayashi: IAEA2016) or without (D. Shiraki: APS/ DPP13/PO4.15) feedback have demonstrated promising paths for recovering H-mode operation even in n=1 3D perturbed equilibria. Once a tearing mode becomes deeply locked with near-zero rotation across the radial profile, it is challenging to unlock before disruption. Preliminary observations suggest that the deeply locked state is a configuration with multiple instances of torque bifurcation and internal locking between multiple rational surfaces. Full rotation recovery was found in a narrow range of applied 3D field frequency or after one event of forced reconnection, reflecting the complex transient process of replacing the uncorrected error field with another 3D field. Initial comparison with a non-linear reduced MHD code (AEOLUS-IT) shows qualitative agreement. This work is supported in part by the US Department of Energy under DE-AC02-09CH11466, DE-FG02-99ER54531, DE-SC0003913, and DE-FC02-04ER54698.

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