Abstract Submitted
for the DPP01 Meeting of
The American Physical Society

Sorting Category: 5.6.2 (Experimental/Observational)

3-D Distortion of Magnetic Surfaces due to Toroidally Asymmetric External Magnetic Field[1] L.L. LAO, M.S. CHU, T.E. EVANS, R.J. LA HAYE, T.C. LUCE, T.W. PETRIE, E.J. STRAIT, T.S. TAYLOR, General Atomics, M.R. WADE, ORNL — Enhanced confinement of H-mode discharges often leads to large edge pedestals with very narrow widths. In these discharges, accurate determination of the edge separatrix location becomes extremely crucial for proper interpretation and understanding of the governing physical processes. This is typically determined by extrapolating the external magnetic measurements inward, assuming the discharge is in a 2-D axisymmetric equilibrium state. In DIII-D H-mode discharges, this can also be inferred from measurements of T_e profile in a different poloidal plane. Comparison of separatrix locations from these two methods indicates a difference of 1-4 cm can occur. A leading explanation is the toroidal asymmetry in the external shaping coils. Preliminary results from perturbative 3-D calculations indicate a 1-2 cm radial shift in the coil location can lead to formation of an edge stochastic region with observable distortion of the plasma shape. A more self-consistent variational approach including plasma response is being formulated. Details will be presented.

[1]Work supported by US DOE Contracts DE-AC03-99ER54463 and DE-AC05-00OR22725.

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Date submitted: July 19, 2001 Electronic form version 1.4