Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

Investigations of detachment bifurcations in DIII-D with UEDGE[1] A.E. JAERVINEN, S.L. ALLEN, A.G. MCLEAN, T. ROGNLIEN, C.M. SAMUELL, LLNL, G.D. PORTER, L, M. GROTH, D. HILL, Aalto University — UEDGE simulations with cross-field drifts indicate that changes in the divertor electric potential can be largely responsible for the experimentally observed bifurcated onset of detached conditions in DIII-D. Partially detached divertor conditions are presently favored for ITER for optimal plasma performance with tolerable divertor heat loads. Divertor Thomson scattering measurements in DIII-D show that in high confinement mode plasmas with the B$\times\bigtriangledown$B-drift towards the active X-point, the low field side (LFS) divertor plate undergoes a rapid transition from well attached to fully detached conditions within a few percent increase in plasma density. UEDGE simulations indicate that at the onset of LFS detachment, the poloidal E$\times$B drift in the private flux region is reduced from about 15% of the LFS recycling flux to less than 1%, effectively eliminating a strong particle sink in the LFS divertor. This increases the LFS divertor particle content further leading to fully detached conditions.

[1]Work supported by the US Department of Energy under DE-FC02-04ER54698 and DE-AC52-07NA27344.

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Date submitted: 13 Jul 2016 Electronic form version 1.4