

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

Category Number and Subject:

Theory     Experiment

**Characterizing the transition from high recycling to partial detachment,\*** A.G. McLean, S.L. Allen, M. Fenstermacher, C. Lasnier, B. Meyer, G. Porter, V. Soukhanovskii, *Lawrence Livermore National Laboratory*; B.D. Bray, T.N. Carlstrom, A.W. Leonard, C. Liu, *General Atomics*; D. Eldon, *University of California San Diego*; M. Groth, *Aalto University*; P.C. Stangeby, C. Tsui, *University of Toronto* – Experiments at DIII-D have explored the transition from the high recycling to the partially detached divertor condition in L- and H-mode with an unprecedented level of detail. Improved divertor and core Thomson scattering diagnostics were coupled with high resolution spectroscopic studies of molecular and neutral emissions. 2-D  $T_e$  and  $n_e$  profiles of the outer leg reveal the earliest indications of formation of the detachment front at the target plate, reducing local  $T_e$  at the outer strike point from 8-10 eV to 2-3 eV with a marginal (<10%) increase in  $\langle n_e \rangle$  upstream. These data help guide and expose any missing physics in simulations of detachment onset using state-of-the-art boundary codes, and in predictions for operation with a partial detached divertor in future devices.

\*This work supported in part by the US Department of Energy under DE-AC52-07NA27344 and DE-FC02-04ER54698.