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**Thermal Instability Analysis of Gas Fueled DIII-D H-mode Shots that Achieved Densities in Excess of the Greenwald Density**<sup>1</sup> W.M. STACEY, Georgia Tech, T.H. OSBORNE, T.W. PETRIE, General Atomics — H-mode discharges with densities well in excess of the empirical Greenwald density have recently been achieved by continuous gas fueling in DIII-D. These results are in marked contrast to early attempts to achieve high densities in DIII-D H-mode discharges by continuous gas fueling, where degradation of confinement and/or the formation of a MARFE coincident with a H-L transition limited the achievable density to the Greenwald density or less, which can be attributable to thermal instabilities in the edge plasma transport barrier.<sup>2</sup> Examination of shots that achieve densities above and below the Greenwald density identify factors that are important to achieving high densities without MARFEs: steep edge temperature gradients, low edge neutral concentrations and an inward pinch.

<sup>1</sup>Work supported by US DOE Contract DE-AC03-99ER54463.

<sup>2</sup>W.M. Stacey and T.W. Petrie, Phys. Plasmas **7**, 4931 (2000).

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Prefer Oral Session  
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