

Abstract Submitted
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Progress in Performance and Understanding of Steady ELM-free I-modes on Alcator C-Mod¹ A.E. HUBBARD, D.G. WHYTE, A. DOMINGUEZ, M.J. GREENWALD, N. HOWARD, J.W. HUGHES, B. LABOMBARD, Y. LIN, B. LIPSCHULTZ, E.S. MARMAR, M.L. REINKE, J.E. RICE, J.L. TERRY, J. WALK, A.E. WHITE, S.J. WUKITCH, MIT Plasma Science and Fusion Center, P. SNYDER, General Atomics — The I-mode regime of operation has been extended in recent Alcator C-Mod campaigns in duration and robustness, over a wide range of parameters. It features an edge thermal barrier, with L-mode like density profiles and particle transport [1]. I-modes are now routinely maintained in stationary conditions for over $10 \tau_E$. They are usually ELM free, a key advantage given the concern over divertor heat pulses on ITER. Instead, a continuous pedestal fluctuation, the “weakly coherent mode,” appears to enhance selectively particle over thermal transport. High performance I-modes are usually obtained with unfavorable ion drift direction, and extend to low $q_{95}=2.5$ and $\nu_{ped}^*=1.3$. τ_E is in the range of H-mode ($H_{98,y2}$ up to 1.2), and exhibits less power degradation ($W \sim P^{0.7}$). Power thresholds for I-mode are higher than typical L-H scalings, and increase with I_p as well as density. The widest power range for I-mode, nearly a factor of two above the L-I threshold, has been obtained in reversed field, lower null discharges at moderate n_e . The focus of 2012 experiments is on assessing the density range and dependences, important for extrapolating to ITER, and measuring the pedestal profiles and fluctuations in greater detail.

[1] Whyte D G *et al* 2010 *Nucl. Fusion* **50** 105005

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