Reduction of Core Turbulence in I-mode Plasmas at Alcator C-Mod

A.E. WHITE, MIT, M. BARNES, UT Austin, A. DOMINGUEZ, PPPL, M. GREENWALD, MIT, N.T. HOWARD, UCSD, A.E. HUBBARD, J.W. HUGHES, MIT, D.R. MIKKELESEN, PPPL, F.I. PARRA, M.L. REINKE, C. SUNG, J. WALK, D.G. WHYTE, MIT — Core turbulent fluctuations (0.40 < r/a < 0.95) are reduced in the high confinement regime, I-mode, at Alcator C-Mod. Long wavelength density fluctuation levels are observed to decrease from L-mode levels by up to 30%, while long wavelength electron temperature fluctuation levels are observed to decrease by up to 70%. This reduction in core turbulence is correlated with the increases in confinement in I-mode. During some L-I transitions, density fluctuations in the core (r/a ~ 0.5) and near the top of the Te pedestal (r/a ~ 0.95) are both reduced prior to the reduction of low-frequency edge turbulence (r/a ~ 0.99-1.0), and prior to the onset of the edge-localized weakly coherent mode (WCM) (r/a ~ 0.99-1.0). This result contrasts typical observations of confinement transitions (I-mode and H-mode) where changes in edge turbulence occur prior to changes in core turbulence.

1Supported by USDoE: DE-FC02-99ER54512 and DE-SC0006419.

A. E. White
MIT

Date submitted: 11 Jul 2013

Electronic form version 1.4