Abstract Submitted
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Study of Fluctuations with the PCI Diagnostic During the Search for an I-Mode on DIII-D[1] A. MARINONI, J.C. ROST, M. PORKOLAB, A.E. HUBBARD, A.E. WHITE, D.G. WHYTE, MIT, K.H. BURRELL, T.H. OSBORNE, GA — Recent experiments on DIII-D explored the operational space required to achieve the I-mode regime observed on Alcator C-Mod. This regime features an edge energy transport barrier without an accompanying particle barrier, and broadband instabilities known as WCM [1]. Although none of the DIII-D plasmas exhibited all those characteristics, preceding the H-mode transition, the edge electron temperature slowly and intermittently evolved towards a pedestal-like profile 0.4 keV high while maintaining a typical L-mode edge density profile. During this prelude phase, edge density fluctuations measured with the recently upgraded Phase Contrast Interferometer (PCI) are observed to be qualitatively similar to those seen in H-mode: the intensity of fluctuations is reduced, and the frequency spectrum is broadened in the range of 300 kHz and is non-monotonic. The 2D k-f spectra also approach those typical of an H-mode, showing broad fluctuations in k-space and group velocities increasing to 10 km/s. Several branches are observed in 2D spectra, possibly indicating multiple instabilities at play.

[1] D.G. Whyte et al., Nucl. Fusion 50, 105005 (2010).

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