

Broadband Magnetic and Density Fluctuation Evolution Prior to First ELM in DIII-D Edge Pedestal*

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High-resolution quadrature reflectometer density fluctuation measurements have been utilized on DIII-D during H-mode pedestal studies. Broadband density fluctuations localized to the edge pedestal have been observed to increase significantly prior to the first edge localized mode. Magnetic fluctuations measured by magnetic loops and density fluctuations from vertical interferometer chords mirror this evolution. A ballooning character of the magnetic fluctuations is observed when comparing low and high field side magnetic loops. Similarly, vertical interferometer chords viewing both the low and high field sides show larger amplitude density fluctuations on the low field side. This increase in pedestal density fluctuations is correlated with increased total pressure gradient and reduced dP_e/dt of electron pedestal pressure P_e . ELITE MHD stability code analysis indicates that edge pressure gradient exceeds nominal ideal MHD ballooning stability limit at same time as observed magnetic turbulence increase.

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