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Characterization of Edge Current Density, Pressure Gradient, and Instabilities Using the Improved MSE System and a Radial Sweeping Technique[1] L.L. LAO, J.R. FERRON, V.S. CHAN, R.J. GROEBNER, R.J. LA HAYE, R.L. MILLER, T.H. OSBORNE, E.J. STRAIT, A.D. TURNBULL, T.S. TAYLOR, General Atomics, B.W. RICE, Lawrence Livermore National Laboratory — Edge instabilities with moderate toroidal mode numbers n = 2–5 typically terminate the ELM-free phase of DIII–D high performance discharges with a fast growth time $\gamma^{-1} \approx$ 20–150 μs. These moderate n magnetic precursors were also observed, although less frequently, in the ELMing phase. Ideal stability calculations of the experimental equilibria are consistent with many observed features of the instabilities and indicate a complex interaction between edge current density $J_{\rm edge}$ and pressure gradient $P'_{\rm edge}$ which drive ballooning/kink/peeling modes at moderate n. As these instabilities are sensitive to $P'_{\rm edge}$ and $J_{\rm edge}$, for a more definite comparison with theory, new experiments were performed using the improved 35-channel MSE system and a radial sweeping technique to better characterize both the plasma edge gradients and the instabilities.

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L.L. Lao
Lang.Lao@gat.com
General Atomics

☐ Prefer Oral Session
☒ Prefer Poster Session

Special instructions: DIII–D Poster Session I (transport, turbulence, & stability), immediately following Wong

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