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Edge MHD stability in the DIII-D inductive high beta poloidal scenario D.B. WEISBERG, A.M. GAROFALO, E.J. STRAIT, T. OSBORNE, General Atomics, S. DING, ORAU, X.Z. GONG, ASIPP — The inductive evolution of the DIII-D high beta poloidal scenario to high fusion gain factor at constant normalized beta is observed to be associated with a fast external kink mode which shifts the internal transport barrier (ITB) location, enhances confinement, and can terminate in a resistive wall mode (RWM) instability. Progress has been made in understanding the onset of this MHD mode, which occurs after the plasma rotation outside of the ITB spins down, reducing its stabilizing effect on the RWM. This MHD event is consistently observed to trigger a global re-organization that shifts the ITB radially inward, increases the energy confinement time by 50%, and spins up both the core and edge rotation. Analysis of RWM feedback shows that the I-coil response is strongly affected by the ELM activity, indicating coupling between edge localized modes and the RWM. Stability analysis of the pedestal reveals that while the large type-I compound ELMs seen in high q95 discharges are limited by coupled peeling-ballooning modes, the small high frequency ELMs seen in lower q95 discharges are exclusively limited by ballooning modes, and it is shown that RWM onset may be triggered by sudden transition back to a type-I ELM regime. Proposed techniques for mode avoidance are also discussed.

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