Abstract Submitted
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Elevated-q_{min} Steady-State Scenarios on DIII-D: New Controls and Stability Characterization[1] C.T. HOLCOMB, B.S. VICTOR, LLNL, J.R. FERRON, T.C. LUCE, R.J. LAHAYE, GA, E. SCHUSTER, W.P. WEHNER, U. Lehigh, F. TURCO, Columbia U., W.M. SOLOMON, PPPL — Fully non-inductive, high performance plasmas with $q_{min} > 1.5$ have been sustained on DIII-D at $\beta_N > 3.5$. Since the formation and sustainment of such plasmas entails operation near multiple stability limits there is a sensitivity to variations in conditions that can lead to different results, i.e. tearing modes. The parameter range for stability at high-β_N is not well known, and it is unclear if tearing modes are destabilized by neoclassical (i.e. missing bootstrap current) or classical (i.e. tearing too close to ideal-wall kink limit) β_N limits. We present work to improve reproducibility and stability understanding using new controls. Electron cyclotron heating applied at breakdown improves repeatability. Current profile and β_N feedback control are used to obtain equilibria that are assessed for stability and steady-state potential. We discuss the range of stable operation found using these tools and tests designed to identify tearing destabilization mechanisms.

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