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Stability of Elevated-q_{min} Steady-State Scenarios on DIII-D[1] C.T. HOLCOMB, B. VICTOR, LLNL, J.R. FERRON, T.C. LUCE, General Atomics, E. SCHUSTER, U. Lehigh — Limits to high performance steady-state operation with q_{min}>1.4 and $\beta_N \leq 3.5$ are identified and explained. Various β_N and q-profile histories were produced while testing feedback control of these profiles. Ten pulses had no core MHD at β_N=3.4-3.5, with q_{min}=1.4-1.8, and q_{95}=5-5.8. These have predicted ideal-wall kink β_N limits between 4 and 5. One pulse had an n=1 tearing mode (TM) at β_N=3.5 with no clear trigger. Five pulses developed n=1 TMs when β_N=2, q_{min}=2, and q_{95}=4.7. Stability calculations for these latter cases will be shown. In seven other shots, additional NBI power from sources with more normal injection was used, and these had off-axis fishbone (OAFB) modes at β_N=3.5. These sources produce more large-radius trapped ions whose precession can drive OAFB. Preliminary analysis suggests a threshold power or voltage exists. In some cases OAFB appear to trigger n=1 TMs. These studies seek to clarify the operational limits of a steady-state scenario for next step devices.

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