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Overview of Recent Steady-State Scenario Experiments on DIII-D[1] C.T. HOLCOMB, LLNL, J.R. FERRON, A.M. GAROFALO, D.C. PACE, T.W. PETRIE, T.C. LUCE, C.C. PETTY, GA, J.M. PARK, ORNL, W.W. HEIDBRINK, UC Irvine, G.R. MCKEE, U. Wisconsin, T.L. RHODES, UCLA, C. HOLLAND, UCSD, F. TURCO, Columbia U., W.M. SOLOMON, PPPL — On DIII-D, on- and off-axis neutral beams and electron cyclotron heating have expanded access to a wide range of q-profiles. Plasmas with $q_{min} = 1 - 3$ have been evaluated for high β steady-state operation. With $q_{min} > 2$ and no internal transport barrier, ideal-wall kink mode β_N limits >4 are calculated but the global energy confinement is low compared to lower q_{min} plasmas. The thermal and fast ion transport dependence on q_{min} will be discussed, as well as the dependence of stability and confinement on ρ_{qmin} and $q_0 - q_{min}$, and the characteristics of plasmas dominated by bootstrap current at high β_p. At intermediate $q_{min} \geq 1.5$, high noninductive current fraction is possible with performance that projects to $Q \sim 5$ in ITER, both in double null and ITER-like shape. Divertor heat flux is reduced using increased radiation from impurity gas injection. At $q_{min} \sim 1$, "high-ℓ_i" plasmas transiently reach $\beta_N > 5$ with excellent confinement, but MHD avoidance and profile control are needed to achieve stationary high performance.

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