Abstract Submitted
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ITER Steady-State Demonstration on DIII-D[1] J.M. PARK, M. MURAKAMI, A. SONTAG, S.J. DIEM, Oak Ridge National Laboratory, C.T. HOLCOMB, Lawrence Livermore National Laboratory, J.R. FERRON, T.C. LUCE, General Atomics, DIII-D TEAM — A systematic scan of q_{95} (=4.5, 5.5, 6.5) at constant β_N (∼3) and high q_{min} (∼1.8-2.1) has been obtained in a lower single null ITER-like shape to study confinement, stability and edge pedestal characteristics using off-axis neutral beam current drive for the ITER steady-state mission ($f_{NI} = 1$, $Q = 5$). The edge pedestal height is found substantially lower than in similar 2008 experiments, resulting in lower f_{NI} due to reduced edge pedestal bootstrap current. Toroidal Alfvén Eigenmode power fluctuation is well correlated with the estimated beam ion diffusion (D_b). Strong dependency of D_b on q_{95}, q_{min} and neutral beam power (PNB) has been found indicating that lower q_{95} (≤4.5) would have reasonably good beam ion confinement ($D_b \geq 0.3\,m^2/s$) even at $q_{min} > 2$ and high PNB=12 MW. The calculated ideal β_N stability limit increases with lower q_{95} allowing access to high β_N (>3.5) needed for $f_{NI} = 1$ and $Q = 5$. This study shows that optimum choice of q_{95} (∼5.5) and q_{min} (>2) is crucial to achieving $Q = 5$ steady-state mission for ITER.

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