

Abstract Submitted
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Advances towards high performance low-torque $q_{min} > 2$ operations with large-radius ITB on DIII-D¹ G.S. XU, ASIPP, W.M. SOLOMON, PPPL, A.M. GAROFALO, J.R. FERRON, A.W. HYATT, GA, Q. WANG, Zhejiang Univ., Z. YAN, G.R. MCKEE, U. Wisc., C.T. HOLCOMB, LLNL, EAST TEAM — A joint DIII-D/EAST experiment was performed aimed at extending a fully non-inductive scenario with high β_P and $q_{min} > 2$ to inductive operation at lower torque and higher I_p (0.6 \rightarrow 0.8 MA) for better performance. Extremely high confinement was obtained, i.e., $H_{98y2} \sim 2.1$ at $\beta_N \sim 3$, which was associated with a strong ITB at large minor radius ($\rho \sim 0.7$). Alfvén Eigenmodes and broadband turbulence were significantly suppressed in the core, and fast-ion confinement was improved. ITB collapses at 0.8 MA were induced by ELM-triggered $n = 1$ MHD modes at the ITB location, which is different from the “relaxation oscillations” associated with the steady-state plasmas at lower current (0.6 MA). This successful joint experiment may open up a new avenue towards high performance low-torque $q_{min} > 2$ plasmas with large-radius ITBs, which will be demonstrated on EAST in the near future.

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