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Developing on DIII-D a QH-mode edge solution for Q=10 in ITER.[1] A.M. GAROFALO, C. PAZ-SOLDAN, D.B. WEISBERG, General Atomics, T.M. WILKS, MIT, J.M. HANSON, Columbia U., N.C. LOGAN, PPPL, C.M. SAMUELL, LLNL — Experiments on DIII-D are advancing toward a demonstration of access to and control of Q(uiescent)H-mode at normalized performance equivalent to Q=10 in plasmas with ITER shape and collisionality, and low NBI torque throughout the pulse length. Earlier experiments had shown that ELMs return at NBI torque magnitude below ˜3.5 Nm, which is above the expected level of normalized torque input in ITER. Recent experiments have been able to extend QH-mode operation to lower torque ˜2 Nm and higher energy confinement by increasing the plasma-wall gap at the outboard mid-plane, and by reducing the input energy of the beam-injected ions. Two hypotheses are being tested: (a) the outer gap affects the scrape-off layer flows and thus the rotation gradient at the edge of the plasma, known to affect QH-mode access; (b) fast ion losses bombarding the wall may release impurities that affect the edge collisionality and stability making QH-mode operation more difficult.

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