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Favorable Transport Properties of the Wide Pedestal QH-Mode Regime for ITER Operation[1] D. R. ERNST, MIT, K. H. BURRELL, C.C. PETTY, GA, K. BARADA, T. L. RHODES, G. WANG, UCLA, S. HASKEY, PPPL, C. CHRYSTAL, GA, B. A. GRIERSON, PPPL, T. ODSTRČIL, T. WILKS, MIT, S. HOUSHMANDYAR, UT-Austin — Recent DIII-D experiments in the ELM-stable Wide Pedestal Quiescent H-mode regime [Ernst IAEA EX/2-2 (2018)] show confinement improves when electron cyclotron heating (ECH) replaces neutral beam power (NBI) (so far up to 77% ECH)– promising for burning plasma operation where α-particles heat electrons. An Internal Transport Barrier (ITB) forms with on-axis ECH due to a strong inward electron thermal pinch, producing Te0>12 keV. Gyrokinetic simulations with GENE show ETG modes are stable and TEMs dominate. Confinement increases 60% with 1/3 off-axis ECH (no ITB), with ion channel improvement evident in the core and pedestal. Wide Pedestal QH-Mode has been demonstrated with zero injected NBI torque throughout [K. H. Burrell APS 2018]. Separate measurements of the intrinsic torque show it balances the local beam orbit loss torque. The regime has been sustained in ITER shape [T. Wilks APS 2018] where impurity content is reduced relative to double null. Further, confinement does not degrade with NBI power in this regime. Projections indicate ITER Baseline Scenario Parameters with fusion gain 0.4 are attainable with q_{95}=3.3 and 6.6 MW NBI at constant power per particle, without the benefit of ECH.

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Darin Ernst
Massachusetts Institute of Technology

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