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The Quiescent Double Barrier Regime in DIII-D[1] C.M. GREENFIELD, K.H. BURRELL, T.A. CASPER, J.C. DEBOO, E.J. DOYLE, D. ERNST, A.M. GAROFALO, P. GOHIL, R.J. GROEBNER, J.E. KINSEY, L.L. LAO, C.J. LASNIER, M.A. MAKOWSKI, G.R. MCKEE, R.A. MOYER, G.D. PORTER, T.L. RHODES, D.L. RUDAKOV, G.M. STAEBLER, B.W. STALLARD, G. WANG, W.P. WEST, L. ZENG, DIII-D National Fusion Facility — The Quiescent Double Barrier regime, featuring sustained high performance ($\beta_N H_{89} > 7$ for 1.6 s), combines discrete edge (H-mode) and internal transport barriers (ITB). Near the edge, a continuous low amplitude electromagnetic MHD instability (Edge Harmonic Oscillation) replaces ELMs in facilitating density control via an external cryopump. Occasionally, global MHD with a significant edge component can play the same role. Unlike ELMs, neither mode has a detectable impact in the core. Separation between the two barriers is naturally maintained by a zero crossing of the E×B shearing rate. The ITB resembles those obtained with an L-mode edge, but a strong H-mode pedestal ($T_i^{ped} \leq 6$ keV) elevates the temperature profiles. Experimental data and simulations both indicate that the ITB is maintained without complete turbulence suppression. Instead, the correlation lengths become very small so as to reduce transport.

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