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Local Access Conditions for ELM-free Pedestals in DIII-D Quiescent H-mode Plasmas[1] THERESA WILKS, MIT-PSFC, A GAROFALO, General Atomics, P.H. DIAMOND, Z.B. GUO, UCSD, J.W. HUGHES, MIT-PSFC, K.H. BURRELL, XI CHEN, General Atomics, X. XU, LLNL, MIT TEAM, GENERAL ATOMICS COLLABORATION, UCSD COLLABORATION, LLNL COLLABORATION — Quiescent H-mode (QH-mode) has been identified as an attractive stationary operational regime in tokamaks due to its lack of edge localized modes (ELMs), along with good particle and impurity control due to the presence of MHD or edge turbulence. Local edge access conditions such as a critical edge rotational shear for the transition from a QH-mode to a typical ELMy H-mode in DIII-D are explored. The experimentally determined critical shearing rates are compared to a theoretical model, which demonstrates a linear relationship with $\sqrt{(T_i + T_e)/(k_y L_p \Delta x)}$, where T is temperature, k_y the poloidal wave number, L_p the pressure gradient scale length, and Δx the radial width of the mode. Linear BOUT++ stability calculations are performed to calculate edge turbulence characteristics included in the model, such as mode structure, dominant toroidal model number, and growth rates, and are shown to compare well with experimental observations from pedestal profiles, BES, and magnetics.

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