Effect of L-Mode Electric Field Bifurcations and Edge Stochasticity on the L-H Transition Power Threshold with Applied n=3 Resonant Magnetic Perturbations*1 L. SCHMITZ, T.L. RHODES, L. ZENG, University of California Los Angeles, Los Angeles, CA, D.M. KRIETE, Z. YAN, G.R. MCKEE, UWisc. Madison, WI, R. WILCOX, ORNL, Oak Ridge, TN, T.E. EVANS, C. PAZ-SOLDAN, General Atomics, San Diego, CA, S.R. HASKEY, B.A. GRIERSON, PPPL, Princeton, NJ, P. GOHIL, C.C. PETTY, General Atomics, San Diego, CA, DIII-D TEAM — H-mode access in ITER-similar-shape plasmas in DIII-D \((n_e = 1.5-5 \times 10^{19} \text{m}^{-3}), B_t = 1.9-2 \text{T}, I_p = 1.5 \text{MA}, q_{95} = 3.6\) with applied n=3 Resonant Magnetic Perturbations (RMP) is found to depend on edge collisionality like \(P_{\text{LH}}/P_{\text{LH-08}} \approx (\nu^*)^{-0.5}\). This is a concern for ECH-heated, low collisionality plasmas on ITER since RMP may be applied before the L-H transition to safely suppress the first ELM. Bifurcations to positive radial electric field, increased toroidal co-rotation, and reduced edge \(E \times B\) shear are observed when RMP fields are screened, preventing H-mode access at high applied RMP within the heating power range explored (\(P_{\text{loss}} \leq 4 \text{ MW}\)). Evidence of restored H-mode access with n=3 RMP field penetration is presented. An edge stochasticity model accounting for electron loss in the stochastic boundary layer can explain the experimental findings. The observed increase in \(P_{\text{LH}}\) at low collisionality is attributed to a reduced ExB shearing rate \(\omega_{E \times B}\) and an increased normalized growth rate \(\gamma L/\omega_{E \times B}\).

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