Abstract Submitted
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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 =1.5-5x10^{19}m^{-3}, B_t =1.9-2T, I_p =1.5MA, q_{95} =3.6) with applied n=3 Resonant Magnetic Perturbations (RMP) is found to depend on edge collisionality like $P_{LH}/P_{LH\text{-}08} \sim (\nu*)^{-0.5}$. 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_{loss} \leq$4 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_{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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