Abstract Submitted
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Lower L-H transition power threshold via enhanced turbulence Reynolds stress and flow shear in favorable magnetic geometry[1] Z. YAN, G. MCKEE, U. Wisc, L. SCHMITZ, UCLA, P. GOHIL, GA, S. HASKEY, B. GRIERSON, PPPL, C. PETTY, GA — The L-H transition power threshold (P_{LH}) in favorable magnetic geometry (ion ∇B drift direction towards X-point) is up to a factor of 2 lower than in the unfavorable magnetic geometry (ion grad-B drift direction away from X-point) on multiple tokamaks. In a systematic experiment on DIII-D, the ion ∇B drift direction was changed continuously from unfavorable to favorable configurations during the plasma shot. In the process the input power was kept constant at the value above the P_{LH} for favorable configuration, but lower than the P_{LH} for unfavorable configuration. Toroidal field and plasma current were also kept constant and there is little change in the edge n_e and T_e profiles. The density fluctuation amplitude, measured with BES decreases approaching the transition, while a large increase of turbulence Reynolds stress and turbulence flow shear are simultaneously observed during the slow varying of the ion ∇B drift direction approaching the transition. These measurements demonstrate an important correlation between turbulence and turbulence driven flow and a lowering of P_{LH}, provide insights into the underlying physics behind the hidden parameters and inform a more complete physics-based model of L-H transition power threshold.

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