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Theory Experiment

L-H Transition Studies on DIII-D to Determine H-mode Access for Operational Scenarios in ITER,* P. Gohil, T.E. Evans, M.J. Schaffer, *GA*; M.E. Fenstermacher, *LLNL*; O. Schmitz, *FZ Jülich* – A comprehensive set of L-H transition experiments has recently been performed on DIII-D to determine the requirements for access to H-mode plasmas in ITER’s first (non-nuclear) operational phase with H and He plasmas, and second (activated) operational phase with D plasmas. The results from these experiments have revealed that the H-mode power threshold, P_{TH} : (a) increases with the applied torque for all 3 main ion species (H, He, D); (b) increases with the application of the I-coil current, which is normally used to induce $n=3$ resonant magnetic perturbations required for edge localized mode (ELM) suppression; (c) can be significantly reduced by changing the plasma geometry; (d) exhibits a weak dependence on the edge electron and ion temperatures, but shows a strong dependence on the edge toroidal rotation; and (e) is not significantly affected by the application of magnetic error fields expected from test blanket module assemblies in ITER.

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