Abstract Submitted
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H-mode threshold physics studies on Alcator C-Mod in support of ITER Y. MA, J.W. HUGHES, B. LABOMBARD, A.E. HUBBARD, E.S. MAR-MAR, MIT PSFC, D.C. MCDONALD, EFDA — Comprehensive studies on H-mode threshold physics have been conducted on Alcator C-Mod tokamak, covering many ITER-relevant conditions, e.g. similar magnetic field and density range, metallic wall, and divertor configuration. C-Mod experiments confirm that the density dependence of H-mode threshold power ($P_{th}$) is U-shaped without clear dependence on plasma current, and the local minimum of $P_{th}$ in density ($n_{min}$) decreases as $B_T$ is reduced [1]. An effect of divertor geometry on $P_{th}$ was identified, with a dramatic (~50%) reduction in $P_{th}$ seen in “slot” divertor operation accompanied by longer SOL connection length [2]. Experimental results were also compared with a new physics-based model for $P_{th}$ [3], showing reasonable agreement of density, $B_T$, and divertor geometry dependences with model predictions. A significant implication of this model is that $n_{min}$ occurs as the SOL transitions from sheath-limited to conduction-limited regime, which also seems to agree with experiments. Supported by USDoE award DE-FC02-99ER54512.


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