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H-mode and ELM Characteristics at Ultralow Aspect Ratio in the Pegasus Experiment[1] R.J. FONCK, J.L. BARR, M.W. BONGARD, D.M. KRIETE, J.M. PERRY, J.A. REUSCH, University of Wisconsin-Madison, K.E. THOME, ORAU — Operation at low B_T and $A < 1.3$ allows access to the H-mode regime in the Pegasus experiment using only Ohmic heating.[2] Modest plasma parameters in this regime permit detailed probe measurements of the edge pedestal region. H-mode plasmas have standard L-H transition phenomena: a drop in D_α radiation; formation of pressure and current pedestals; field-aligned filament ejection during ELMs; and a doubling of τ_E from $H_{98} \sim 0.5$ to ~ 1. The L-H power threshold P_{LH} increases monotonically with n_e, consistent with both the ITPA08 scaling, P_{ITPA08}, used for ITER and the theoretical FM^3 power threshold model. Unlike at high A, P_{LH} is comparable in limited and single-null diverted topologies at $A \sim 1.2$, consistent with FM^3 predictions. P_{LH}/P_{ITPA08} increases rapidly as $A \to 1$, and is > 10 for $A < 1.3$. Multiple-n modes are observed during ELMs, consistent with excitation of multiple peeling-ballooning modes. Small, Type-III-like ELMs occur at $P_{OH} \sim P_{LH}$ with $n \leq 4$. Large, Type-I-like ELMs occur with $P_{OH} > P_{LH}$ and intermediate $5 < n < 15$. High-resolution spatiotemporal measurements of $J_{edge}(R,t)$ across single ELMs show the nonlinear generation and expulsion of current-carrying filaments during the large ELM crash. Helical edge current injection appears to suppress small ELM activity.

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[2]K.E. Thome *et al.*, *Phys. Rev. Lett.* **116**, 175001 (2016).

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