

Abstract Submitted  
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**Peeling Instability in the Pegasus ST**<sup>1</sup> M.W. BONGARD, J.L. BARR, R.J. FONCK, A.J. REDD, D.J. SCHLOSSBERG, University of Wisconsin-Madison — Ohmic plasmas in PEGASUS are often initially unstable to peeling modes, an instability underlying deleterious edge localized mode (ELM) activity in fusion-grade plasmas. These edge-localized instabilities are observed under conditions of high parallel edge current density ( $J_{\parallel} \sim 0.1 \text{ MA/m}^2$ ) and low magnetic field ( $B \sim 0.1 \text{ T}$ ) present at near-unity aspect ratio, corresponding to high peeling instability drive ( $\propto J_{\parallel}/B$ ). They generate electromagnetic MHD activity with low toroidal mode numbers  $n \leq 3$  and ELM-like, field-aligned edge filaments with high poloidal coherence that detach from the plasma and propagate outward. The modest edge temperatures and short pulse lengths of PEGASUS discharges permit time-resolved measurements of the edge current density profile  $J_{edge}$  using an insertable Hall probe. Peeling MHD fluctuation amplitudes scale strongly with measured  $J_{\parallel}/B$ , consistent with theory. Ideal stability analysis of Hall-constrained equilibrium reconstructions with DCON finds instability to peeling modes. Filaments form from an initial  $J_{edge}$  “current-hole” perturbation and carry currents  $\sim 100\text{-}250 \text{ A}$ . Their radial trajectories feature transient acceleration due to magnetostatic repulsion followed by constant-velocity motion, consistent with models of ELM dynamics.

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