Abstract Submitted
for the DPP10 Meeting of
The American Physical Society

Equilibrium and Stability Properties of Pegasus Edge Plasmas[1]
M.W. BONGARD, J.L. BARR, R.J. FONCK, E.T. HINSON, A.J. REDD, University of Wisconsin-Madison — ELM-like filamentary edge instabilities are observed under conditions of high $j_\parallel \big/ B$ ($\geq$ 1 MA/m^{2}T) in PEGASUS. Their properties include: a high-m, low-n (1–5) electromagnetic signature, consistent with $m/n \simeq q_a$; characteristic frequencies $<$ 100 kHz; high poloidal coherence; rotation; and, explosive filament detachment followed by accelerating outboard radial propagation. Presently, these modes' dependence on the peeling instability parameter $j_\parallel \big/ B$ is being systematically studied through variation of $\partial I_p/\partial t$ and I_{TF}. To date, all data indicate these instabilities lie in the peeling regime. The modest edge T_e and short pulse lengths of PEGASUS afford direct diagnostic access to the edge via internal magnetic and Langmuir probe measurements. A novel edge probe utilizing a radial array of Hall-effect sensors[2] measures $B_z(R,t)$ with high spatial and $\sim$50 μs temporal resolution, and provides strong experimental constraint on $j(\psi)$ in equilibrium reconstructions on ELM-relevant timescales. Initial magnetic equilibrium reconstructions and ideal stability analysis with DCON imply instability when edge filamentation occurs.

[1]Work supported by US DOE Grant DE-FG02-96ER54375.
[2]M.W. Bongard *et al.,* accepted for pub. in Rev. Sci. Instrum. (2010)

Michael Bongard
University of Wisconsin-Madison

Date submitted: 16 Jul 2010 Electronic form version 1.4