DPP09-2009-001526

Abstract Submitted
for the DPP09 Meeting of
The American Physical Society

Sorting Category: 5.6.4 (E)

Edge current profile measurements of peeling-like modes at high $\langle j_{edge}/B\rangle$ in PEGASUS[1] M.W. BONGARD, R.J. FONCK, E.T. HINSON, B.T. LEWICKI, A.J. REDD, University of Wisconsin-Madison — Large-scale, coherent, high-m filamentary edge instabilities are routinely observed under conditions of high $\langle j_{edge}/B\rangle$ in PEGASUS. These ELM-like filaments are characterized with high-speed imaging, as well as scanning magnetic and Langmuir probes. Their properties include: low- to intermediate-n; a coherent electromagnetic signature; large poloidal coherence lengths; rotation with the bulk plasma; and explosive detachment from the edge with outboard radial propagation. Stability is sensitive to j_{edge}, with mode drive or suppression dependent on the sign of $\dot{I}_p$. The extremely low $\mathbf{B}$ ($B_{t,0} \leq 0.1$ T) and high $j_{edge} \approx 0.1$ MA/m^2 in PEGASUS lead to high peeling instability drive, proportional to $\langle j_{edge}/B\rangle$, comparable to that achieved in H-mode on larger experiments. However, in PEGASUS j_{edge} is driven by large $\dot{I}_p$ ($\leq$ 50 MA/s) and associated skin currents as opposed to a localized region of high bootstrap current in an H-mode pedestal. A new radial array of Hall-effect sensors measures internal $B_{\theta,edge}(R)$ directly with high spatial and temporal resolution to provide strong experimental constraint on $j_{edge}(\psi)$ in equilibrium reconstructions. Such equilibria may be used to uniquely test predictions of peeling-ballooning stability theory.

[1]Supported by U.S. D.O.E. Grant DE-FG02-96ER54375.

Michael Bongard
mbongard@wisc.edu
University of Wisconsin-Madison

[X] Prefer Oral Session
[ ] Prefer Poster Session

Special instructions: Please place in the ST contributed oral session.

Date submitted: 17 Jul 2009 Electronic form version 1.4