Abstract Submitted
for the DPP12 Meeting of
The American Physical Society

The role of near-separatrix gradients in establishing a link between pedestal stability and the heat flux power channel in DIII-D[1] J.H. NICHOLS, PPPL, M.A. MAKOWSKI, LLNL, A.W. LEONARD, T.H. OSBORNE, R.J. GROEBNER, P.B. SNYDER, General Atomics, P.C. STANGEBY, U. Toronto, R. MAINGI, ORNL — Despite the key role that each will play in next-generation tokamak experiments, a comprehensive theory linking the physics of pedestal formation and stability to the physics governing the heat flux power channel has not yet been developed. Data taken from the high-resolution edge Thomson scattering system on the DIII-D tokamak has been analyzed to try to lay an empirical foundation for this link. Analysis is focused on gradients and gradient scale lengths near the separatrix: the upstream scale lengths are compared to divertor heat flux width measurements, and the upstream edge gradients are compared to calculated critical gradients for instabilities relevant to pedestal stability. As a first step, the infinite-n ballooning mode is used as a proxy for the kinetic ballooning mode (KBM) that is thought to be partially responsible for setting the pedestal height and width. Results are presented from shot sequences scanning various important physics parameters, including electron density, injected beam power, and upper triangularity.

[1]Work supported by US DOE contract DE-AC02-09CH11466 and the DOE Fusion Energy Sciences Fellowship Program.

Jacob Nichols
Princeton Plasma Physics Laboratory

Date submitted: 13 Jul 2012 Electronic form version 1.4