Abstract Submitted
for the DPP14 Meeting of
The American Physical Society

High resolution scrape-off layer profile measurements in limited and diverted plasmas in C-Mod – investigation of heat flux channel width physics[1] B. LABOMBARD, J.L. TERRY, D. BRUNNER, MIT PSFC, E. EDLUND, PPPL, T. GOLFINOPOULOS, J.W. HUGHES, MIT PSFC, C. THEILER, CRPP Lausanne, J. WALK, S. WOLFE, D. WHYTE, MIT PSFC — Narrow scrape-off layer (SOL) heat flux channel widths (λ_q) are seen on many tokamaks, both in inner-wall limited (IWL) and diverted discharges. These observations have important consequences for ITER and reactors, impacting the design of inner limiter tiles for heat load during startup and pushing the limits of dissipative divertor operation and control. A dominant $\sim 1/I_p$ scaling for λ_q is seen in a wide range of cases (IWL, H-mode and L-mode diverted [at low density]), suggestive of a poloidal ion gyroradius effect. It is troubling that λ_q does not appear to scale with major radius – a challenge for reactors. The latter observation contrasts with H-mode pedestal widths that increase with machine size, implying that the physics that sets the local gradient scale lengths in pedestal and SOL may be different. We have recently implemented a scanning "Mirror Langmuir Probe" diagnostic on C-Mod with the idea of exploring this critical interface with very high resolution. Narrow λ_q "features" in IWL discharges have been mapped out in detail, exhibiting a $\sim 1/I_p$ scaling with some evidence of a break-in-slope feature at the LCFS. We will report on these findings and on L and H-mode experiments in progress, in which divertor conditions are varied (low recycling, high-recycling, detached).

[1]Supported by DE-FC02-99ER54512.

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Date submitted: 11 Jul 2014 Electronic form version 1.4