

Abstract Submitted
for the DPP05 Meeting of
The American Physical Society

Operational Phase Space of the Edge Plasma in Alcator C-Mod¹

B. LABOMBARD, T. BIEWER, M. GREENWALD, J.W. HUGHES, B. LIPSCHULTZ, N. SMICK, J.L. TERRY, MIT PSFC — Earlier C-Mod experiments [1] uncovered some clear connections between the operational space of the near scrape-off layer (SOL) and that expected from electromagnetic fluid drift turbulence theory – at fixed values of normalized collisionality (‘diamagnetic parameter’, α_d), pressure gradients increase with plasma current squared, holding the MHD ballooning parameter, α_{MHD} , unchanged. Thus, the edge plasma state occupies a narrow band within this two-parameter phase-space; both L and H-mode profiles appear controlled by a critical-gradient transport paradigm. Here, we examine a wider parameter range in lower and upper single null (LSN/USN) discharges and with an improved edge diagnostic set: Langmuir-Mach probes on high and low-field SOLs and $D\alpha$ imaging on the low-field SOL. Preliminary results indicate a sensitivity of L-mode gradients to magnetic topology, favoring higher sensitivity of L-mode gradients to magnetic topology, favoring higher α_{MHD} for LSN compared to USN. These observations potentially connect to the different SOL plasma flows and velocity shears that arise in LSN versus USN [2]. [1] B. LaBombard, et al., submitted to Nuclear Fusion [2] Nucl. Fusion **44** (2004) 1047, Phys. Plasmas **12** (2005) 056111.

¹Work supported by DoE

B. LaBombard
MIT PSFC

Date submitted: 25 Jul 2005

Electronic form version 1.4