

Abstract Submitted
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Critical edge gradients and flows with reversed magnetic field in Alcator C-Mod¹ B. LABOMBARD, N. SMICK, M. GREENWALD, J.W. HUGHES, B. LIPSCHULTZ, K. MARR, J.L. TERRY, MIT PSFC — Both L- and H-mode gradients near the separatrix in C-Mod appear to be set by a critical gradient condition [1] – at fixed values of normalized collisionality, pressure gradient scales as plasma current squared, holding the MHD ballooning parameter, α_{mhd} , unchanged. With normal magnetic field direction, lower-null (LSN) L-mode discharges attain higher α_{mhd} values than upper-null (USN). In addition, near-sonic scrape-off-layer flows on the high-field side are co-current directed in LSN and counter in USN, suggesting that such flows may influence critical gradient values. Recently, LSN/USN discharges with reversed magnetic field have been studied, revealing persistent trends: regardless of B -field direction, higher α_{mhd} values are attained when $B \times \nabla B$ points towards the x-point – a generalized condition that results in co-current directed flow in the high-field SOL. The latter observation supports the hypothesis that ballooning-like cross-field transport is responsible for the near-sonic parallel plasma flows observed there [2].

[1] *Nucl. Fusion* **45** (2005) 1658.

[2] *Nucl. Fusion* **44** (2004) 1047.

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