

Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

Imaging of X-point turbulence in Alcator C-Mod SEAN BALLINGER, Columbia University, JAMES TERRY, ANNE WHITE, MIT, STEWART ZWEBEN, PPPL — A nearly tangential view of the lower X-point region of Alcator C-Mod has been coupled to a high-speed camera filtered for D-alpha line emission. Recording at $\sim 400,000$ frames per second, the system detects filaments propagating in the private flux region that are approximately aligned with the local magnetic field. This behavior appears similar to what has recently been observed in the MAST tokamak [1]. Turbulence and transport into the private flux region is potentially important. It may be a mechanism to spread heat across field lines and reduce peak heat fluxes on divertor targets. It may also explain how transport-driven flows seen in the high-field side scrape-off layer [2] are accommodated, being otherwise too large compared to the particle flux arriving at the inner divertor target plates. The dynamics of these filaments are analyzed, as is the rate at which they are generated. Correlation analysis is used to determine the speed and trajectories of the filaments. Radial speeds of ~ 1 km/s are found. Clear changes are observed in the X-point-region fluctuations at the L-to-H-mode transition.

[1] J.R. Harrison et al., J. Nucl. Mater. 463 (2015)

[2] N. Smick et al., Nucl. Fusion 53 (2013)

Sean Ballinger
Columbia University

Date submitted: 24 Jul 2015

Electronic form version 1.4