

Abstract Submitted
for the DPP17 Meeting of
The American Physical Society

Divertor-localized fluctuations in NSTX-U L-mode discharges¹

FILIPPO SCOTTI, V.A. SOUKHANOVSKII, LLNL, S. ZWEBEN, PPPL, J. MYRA, D. BAVER, Lodestar Corp., S.A. SABBAGH, Columbia University — The 3-D structure of divertor turbulence is characterized in NSTX-U by means of fast camera imaging. Edge and divertor turbulence can be important in determining the heat flux width in fusion devices. Field-aligned filaments are found on the divertor legs via imaging of C III and D- α emission in NBI-heated diverted L-mode discharges, similar to observations in Alcator C-Mod and MAST. These flute-like fluctuations of up to 10-20% in RMS/mean are radially localized around the separatrix and limited to the region below the X-point. Poloidal and parallel correlation lengths are a few cm ($10-50\rho_i$) and several meters, respectively. For the outer leg filaments, poloidal correlation lengths decrease along the leg away from the strike point and typical effective toroidal mode numbers are in the range of 10-20. Opposite toroidal rotation is observed for inner (co-current rotation) and outer leg (counter-current rotation) filaments with apparent poloidal propagation of ~ 1 km/s. The poloidal motion of outer leg filaments is opposite to the one typically observed for NSTX upstream blobs in the scrape-off layer. The shape, dynamics and absence of correlation with upstream turbulence suggest that these fluctuations are generated and localized in the divertor region.

¹Supported by US DOE DE-AC52-07NA27344, DE-AC02-09CH11466, DE-FG02-02ER54678, DE-FG02-99ER54524.

Filippo Scotti
LLNL

Date submitted: 14 Jul 2017

Electronic form version 1.4