

Abstract Submitted
for the DPP12 Meeting of
The American Physical Society

Visualizing and Quantifying Blob Characteristics on NSTX

WILLIAM DAVIS, STEWART ZWEBEN, PPPL, JAMES MYRA, DANIEL D'IPPOLITO, Lodestar, MATTHEW KO, Princeton HS — Understanding the radial motion of blob-filaments in the tokamak edge plasma is important since this motion can affect the width of the heat and particle scrape-off layer (SOL) [1]. High resolution (64x80), high speed (400,000 frames/sec) edge turbulence movies taken of the NSTX outer midplane separatrix region have recently been analyzed for blob motion. Regions of high light emission from gas puff imaging within a 25x30 cm cross-section were used to track blob-filaments in the plasma edge and into the SOL. Software tools have been developed for visualizing blob movement and automatically generating statistics of blob speed, shape, amplitude, size, and orientation; thousands of blobs have been analyzed for dozens of shots. The blob tracking algorithm and resulting database entries are explained in detail. Visualization tools also show how poloidal and radial motion change as blobs move through the scrape-off-layer (SOL), e.g. suggesting the influence of sheared flow. Relationships between blob size and velocity are shown for various types of plasmas and compared with simplified theories of blob motion. This work was supported by DOE Contract DE-AC02-09-CH11466.

[1] J.R. Myra et al, Phys. Plasmas 18, 012305 (2011)

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Date submitted: 21 Aug 2012

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