Abstract Submitted
for the DPP19 Meeting of
The American Physical Society

Deep neural-network enabled study of XGC-generated blob dynamics[1] RALPH KUBE, RANDY MICHAEL CHURCHILL, SEUNG-HOE KU, CS CHANG, Princeton Plasma Physics Laboratory — Filamentary coherent turbulence structures, commonly called blobs, may have an important implication on the edge physics: edge plasma transport, nonlocal L-H transition, core-edge-SOL physics coupling, divertor heat-load width, etc. Recent analysis of X-point view GPI data suggests that blobs are also present in this high-shear region, with their dynamical properties to appear different from the blobs near the midplane. Blobs may also exists in the divertor chamber below the X-point, with their dynamical property and the correlation with the upstream blobs again different. Here we analyze the dynamical properties of blobs in a high-Ip Alcator C-Mod discharge, simulated using the XGC1 code. Pressure contour images taken in these three regions, viewed in a radial-poloidal plane are analyzed. Blobs are identified using a deep neural network that performs semantic segmentation of the image data. Semantic segmentation learns the structure of plasma blobs from a set of training data instead of relying on a thresholding method. The distribution of blob cross-field size, velocity, and amplitude distributions are compared for the three regions.

[1]This work was performed under the U.S. DoE ECP program.

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Date submitted: 03 Jul 2019 Electronic form version 1.4