Abstract Submitted
for the DPP19 Meeting of
The American Physical Society

Filament dynamics in presence of X-point in turbulence simulations FEDERICO NESPOLI, Princeton Plasma Physics Laboratory, PATRICK TAMAIN, NICOLAS FEDORCZAK, HUGO BUFFERAND, GUIDO CIRAOLO, PHILIPPE GHENDRIH, IRFM, CEA Cadarache, F-13108 St. Paul-lez-Durance, France, DAVIDE GALASSI, Ecole Polytechnique Federale de Lausanne (EPFL), Swiss Plasma Center (SPC), 1015 Lausanne, Switzerland, RAFFAELE TATALI, ERIC SERRE, Aix Marseille Univ, CNRS, Centrale Marseille, M2P2, Marseille, France, YANNICK MARANDET, Aix Marseille Univ, CNRS, PIIM UMR 7345, Marseille, France — We investigate the impact on filamentary transport of the presence of X-points with turbulence simulations of the WEST tokamak using the TOKAM3X code. A blob recognition and tracking algorithm resolves the time evolution of the 3D filamentary structures, complemented by 2D and 3D conditional average sampling techniques. As a result, the single blobs exhibit complex trajectories with non-negligible mutual interactions in between filaments and with the turbulent background plasma. On average the blob dynamics are well described by the theoretically derived scalings of blob radial velocities against their size, showing a transition from the sheath connected regime to the ideal interchange one close to the separatrix, where the blobs disconnect from the target plates. In this work, we propose an additional mechanism for blob disconnection, namely the poloidal shear in radial EXB velocity, spontaneously arising in diverted plasmas at the X-point as the topology changes from closed to open field lines, and we compare it with the commonly accepted disconnection through high flux expansion and magnetic shear in the X-point region.

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Date submitted: 03 Jul 2019 Electronic form version 1.4