

P2.1052 Fluid simulations of turbulence in stellarator geometries with BSTING

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see full abstract here

<http://ocs.ciemat.es/EPS2019ABS/pdf/P2.1052.pdf>

The topology of the Wendelstein 7-X edge and scrape-off-layer exhibits stochastic fields, island chains, highly varying connection lengths, and a non-uniform curvature drive for plasma turbulence. These challenges have previously inhibited successful development of a plasma fluid turbulence simulation framework. The BSTING project [1] has extended BOUT++ [2] to stellarator geometries, thereby providing the first nonlinear fluid simulation framework for stellarator geometries. Here we outline recent developments in the BSTING project, including a newly implemented curvilinear grid system suitable for stellarator edge magnetic topology, and present simulations of plasma filaments in stellarator geometries. Simulations of filaments in non-uniform drive scenarios [3], and the effects of strongly-varying connection length will also be presented. The application of these methods to Wendelstein 7-X edge scenarios will also be discussed.

[1] B. Shanahan, B. Dudson, and P. Hill, *Plasma Physics and Controlled Fusion* 61, 025007 (2018).

[2] B. D. Dudson, M. V. Umansky, X. Q. Xu, P. B. Snyder, and H. R. Wilson, *Computer Physics Communications* 180, 1467 (2009).

[3] B. Shanahan, B. Dudson, and P. Hill, *Journal of Physics: Conference Series* 1125, 012018 (2018).

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