Abstract Submitted
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BOUT++: A framework for parallel plasma fluid simulations[1]
B.D. DUDSON, H.R. WILSON, University of York, UK, M.V. UMANSKY, X.Q. XU, LLNL, P.B. SNYDER, General Atomics — A modular code for the solution of 3D fluid equations in curvilinear coordinates is presented. Aimed at simulating Edge Localised Modes (ELMs) in tokamak x-point geometry, the code is able to simulate a wide range of fluid models (magnetised and unmagnetised) involving an arbitrary number of scalar and vector fields. Time evolution is fully implicit, and 3rd-order WENO schemes are implemented for accurate capturing of shocks. Benchmarks are presented for linear and non-linear problems (the Orszag-Tang vortex) showing good agreement. Performance of the code is tested by scaling with problem size and processor number. Linear and non-linear simulations of ELMs are presented, and compared to the linear ELITE code. These initial results, show that BOUT++ recovers many of the features expected from analytic theory of peeling-ballooning modes.

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X.Q. Xu
llnl

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