

Abstract Submitted
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Tokamak edge modeling with the 5D full-F continuum gyrokinetic code COGENT¹ MIKHAIL DORF, MILO DORR, Lawrence Livermore Natl Lab — COGENT is a full-F continuum gyrokinetic code being developed by the Edge Simulation Laboratory for edge plasma modeling. The code is distinguished by the use of a high-order finite-volume (conservative) discretization combined with arbitrary mapped multiblock grid technology. Our recent work is focused on development of a 5D version of the COGENT code to model edge plasma turbulence. A numerical algorithm utilizing locally field-aligned multiblock coordinate system has been developed to facilitate simulations of highly-anisotropic microturbulence in the presence of a strong magnetic shear. In this approach, the toroidal direction is divided into blocks, such that within each block the control cells are field-aligned and a non-matching (non-conformal) grid interface is allowed at block boundaries. The algorithm has been implemented and tested for various magnetic geometry configurations including a single-null geometry. Special emphasize is placed on development of reduced fluid electron models and the corresponding models for self-consistent variations of electrostatic potential spanning both open and closed field lines.

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