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Status of edge gyrokinetic turbulence simulation in XGC1[1]
SEUNG-HOE KU, C.S. CHANG, D. ZORIN, L. GREENGARD, New York University, M. ADAMS, Columbia University, J. CUMMINGS, Caltech, P. WORLEY, E. D'AZEVEDO, ORNL, W. LEE, PPPL, S. PARKER, Y. CHEN, University of Colorado at Boulder, Z. LIN, UC Irvine, THE SCIDAC CPES TEAM — Gyrokinetic simulation of a tokamak edge plasma is one of the highest priority research items for ITER and the magnetic fusion program. Due to the complex physical modeling required in the edge plasma (closed and open magnetic field lines with the magnetic separatrix in between, the importance of neoclassical physics, the material wall boundary, steep pressure gradients, a non-Maxwellian distribution function, and the neutral particle physics), most of the gyrokinetic simulation activities have so far been focused on the core plasmas. The status of the gyrokinetic edge turbulence simulation in the XGC1 particle code in the SciDAC Prototype FSP Center for Plasma Edge Simulation (CPES) will be reported. XGC1 includes the above mentioned edge complexities with full- f/delta-f particle technology on an unstructured mesh. Special physics/math/CS features will be discussed. Our current electrostatic turbulence/neoclassical capabilities will be presented and verified. Plans for incorporating full electromagnetic turbulence will also be discussed.

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