Abstract Submitted
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The next-generation ESL continuum gyrokinetic edge code[1] R. COHEN, M. DORR, J. HITTINGER, T. ROGNLIEN, LLNL, P. COLLELA, D. MARTIN, LBNL, AND ESL TEAM — The Edge Simulation Laboratory (ESL) project is developing continuum-based approaches to kinetic simulation of edge plasmas. A new code is being developed, based on a conservative formulation and fourth-order discretization of full-f gyrokinetic equations in parallel-velocity, magnetic-moment coordinates. The code exploits mapped multiblock grids to deal with the geometric complexities of the edge region, and utilizes a new flux limiter [P. Colella and M.D. Sekora, JCP 227, 7069 (2008)] to suppress unphysical oscillations about discontinuities while maintaining high-order accuracy elsewhere. The code is just becoming operational; we will report initial tests for neoclassical orbit calculations in closed-flux surface and limiter (closed plus open flux surfaces) geometry. It is anticipated that the algorithmic refinements in the new code will address the slow numerical instability that was observed in some long simulations with the existing TEMPEST code. We will also discuss the status and plans for physics enhancements to the new code.

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