

Abstract Submitted
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Steady state gyrokinetic PIC simulation of ITG turbulence¹ W.W.

LEE, Princeton Plasma Physics Laboratory, Princeton, NJ, R. GANESH, Institute for Plasma Research, Bhat, India, S. ETHIER, Princeton Plasma Physics Laboratory, Princeton, NJ — We will report the implementation of the two-weight scheme [1] in the global gyrokinetic PIC code - GTC [2], for studying turbulence transport in tokamak plasmas along with our initial attempts to also include the neoclassical transport physics. With the two-weight scheme, which is based on multiscale expansion $F = F_0(\epsilon\mathbf{x}) + \delta f(\mathbf{x})$, where ϵ is a smallness parameter and F_0 is the background Maxwellian, we are able to simulate the transition from δf particles in the linear stage to a certain percentage of full F particles in the nonlinear stage in the same run. Such a scheme would help us to assess the correctness of δf runs when δf becomes large as well as for the cases where there are sources and sinks in the simulation. The behavior of the entropy for the new scheme and the effect of collisions will also be reported along with the comparisons with the size scaling obtained earlier [3] using only the δf simulation.

[1] W. W. Lee, T. G. Jenkins and S. Ethier, *Comp. Phys. Comm.* **182**, 564 (2011).

[2] Z. Lin, T. S. Hahm, W. W. Lee, W. M. Tang, and R. White, *Science* **281**, 1835 (1998).

[3] W. W. Lee, S. Ethier, R. Kolesnikov, W. X. Wang, and W. M. Tang. *Comp. Sci. & Disc.* **1**, 015010

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