Abstract Submitted
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Fine Scale Zonal Flow Suppression of Electron Temperature Gradient Turbulence[1] J.J. KOHUT, S.E. PARKER, Y. CHEN, Univ. of Colorado, Boulder, F.L. HINTON, Center for Plasma Edge Simulation — Simulations converged with respect to particle number run for long times are presented using the GEM code[1], which is a global electromagnetic gyrokinetic delta-f particle simulation with general axisymmetric geometry. Higher flux results, similar to those found from flux-tube codes, are obtainable[2]. A low electron heat diffusivity [3] (normalized by the temperature gradient) is obtained by reducing the temperature gradient in the flux-tube limit. It is found that, while zonal flows are weak at early times, the zonal flows continue to grow algebraically in time. Eventually, the zonal flows grow to a level that suppresses the turbulence due to ExB shearing. The algebraic growth of the zonal flow can be explained via the Rosenbluth-Hinton random kick mechanism[4]. High phase-space resolution simulations are underway to investigate if zonal flow suppression takes place at larger temperature gradients. Simulations with realistic electron-ion collisionality indicate collisional damping of the zonal flow is important and can cause the zonal flows to saturate at lower levels. [1] Y. Chen, S. Parker, available on line, J. Comput. Phys. (2006). [2] W. Dorland, et al., Phys. Rev. Lett. (2000). [3] Z. Lin, et al., Phys. Plasmas (2005). [4] M. Rosenbluth and F. Hinton, Phys. Rev. Lett. (1998).

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