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Gyrokinetic simulation of short wavelength residual zonal flows[1]

E.S. YOON, T.S. HAHM, Princeton Plasma Physics Laboratory, Princeton University, S. KU, Courant Institute of Mathematical Sciences, New York University — It is widely recognized that zonal flow plays a crucial role in saturating the level of turbulence. Therefore, estimation of residual (i.e., undamped) zonal flow level is important in predicting turbulence transport. There has been considerable theoretical progress on this topic [1,2,3]. In particular, Wang and Hahm [3] formulated an analytic expression for residual zonal flows which is valid for arbitrary wavelength, taking into account of both neoclassical and classical polarization shielding of both species. This is in broad agreement with the previous gyrokinetic simulation results by Jenko et al. [4]. In this work, we examine various parametric dependences of residual zonal flow level in wide wavelength range using gyrokinetic simulation, and compare with the analytic predictions [3]. [1] M.N. Rosenbluth and F.L. Hinton, Phys. Rev. Lett. **80**, 724 (1998) [2] Y. Xiao and P.J. Catto, Phys. Plasmas **13**, 102311 (2006) [3] L. Wang and T.S. Hahm, Phys. Plamsas **16**, 062309 (2009) [4] F. Jenko, W. Dorland, M. Kotschenreuther, and B.N. Rogers, Phys. Plasmas **7**, 1904 (2000)

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