Abstract Submitted
for the DPP09 Meeting of
The American Physical Society

Formation of Coherent Vortex Structures and Transport Reduction in Electron Temperature Gradient Turbulence[1] MOTOKI NAKATA, Graduate University for Advanced Studies, TOMO-HIKO WATANABE, HIDEO SUGAMA, National Institute for Fusion Science — Formation of coherent vortex structures and related transport reduction in the slab ETG turbulence has been investigated by means of gyrokinetic Vlasov simulations with high phase-space resolution. A spontaneous transition of vortex structures from a turbulent state with finer-scale fluctuations to a coherent state dominated by large-scale vortices with zonal flows are found, where the electron heat flux is significantly reduced. The transport reduction in the coherent vortex state is mainly attributed to the phase matching of the potential and temperature fluctuations in association with the structural change of the velocity distribution function. A traveling wave solution of the Hasegawa-Mima type fluid equation including electron temperature gradient successfully describes the coherent vortex structures. It is also investigated how the parameters of η_e and Θ=$k_{||}/k_\theta$ affect the formation of the coherent vortex structures and the resultant transport levels. Results of the toroidal ETG turbulence simulation will be also discussed.

[1]This work is supported by the Grant-in-Aid (No. 20-4017) for Japan Society for the Promotion of Science Fellows.

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Date submitted: 17 Jul 2009 Electronic form version 1.4