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Gyrokinetic study of the spatial entropy dynamics in turbulent plasmas with zonal flow KENJI IMADERA, YASUAKI KISHIMOTO, JIQUAN LI, Kyoto University, TAKAYUKI UTSUMI, Tokyo University of Science, Yamaguchi — We have developed a new computational algorithm based on the IDO-CF (Conservative Form of Interpolated Differential Operator) scheme [1], which is efficient in capturing sharp domain structure in long time scale, for solving full-f Gyrokineitc Vlasov-Poisson system. By using the developed code, we have performed the ITG simulation focusing on entropy dynamics and associated zonal flow formation. Here, we have introduced the modified local entropy defined as$\delta S_m(x) = \int \left\langle \delta f^2 / \left\{ 2 f_0 (-1 + v_{||}^2/T) \right\} \right\rangle_{yz} dv$, which retains the spatial information. It is found that the entropy balances with the acoustic coupling driven by ITG mode in the linear stage, and then the zonal flows expel the entropy to outside region via its convection. The spatial structure of the entropy is regulated by the zonal flows, and finally, the quasi-steady state where the entropy and zonal flows have similar structure is established. This indicates that the zonal flows couple with the entropy spatially [1] Y.Imai *et al.*, J. Comput. Phys. **227** (2008) 2263.

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