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**Characteristics of Turbulence dominated by Zonal Flows and Large Scale Structures**[1] TARO MATSUMOTO, Japan Atomic Energy Agency, YASUAKI KISHIMOTO, JIQUAN LI, Kyoto University — In order to better understand the feature of turbulent transport in tokamak plasmas, characteristics of turbulent plasmas dominated by nonlinearly excited large scale structures (LSS),such as zonal flows, streamers, and generalized Kelvin- Helmholtz mode, are investigated by gyro-fluid simulations of electron/ion temperature gradient modes. It was found that the zonal flows change the characteristics of turbulence from "homogeneous" to "inhomogeneous," in which disintegrated micro- scale vortices and nonlinearly excited macro-scale vortices appears at different radial zones, exhibiting a two-scale nature in turbulence. It is also found that the reduction of the heat flux by zonal flows results from the synergetic interplay of two exclusive mechanisms, i.e. the reduction of coherence and the phase synchronization between the poloidal electric field and the pressure perturbation. The effects of LSS on mode couplings will be also shown by bispectral analysis.

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