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Triad interactions in multi-scale ITG/TEM/ETG turbulence SHINYA MAEYAMA, TOMOHIKO WATANABE, Nagoya University, YASUHIRO IDOMURA, Japan Atomic Energy Agency, MOTOKI NAKATA, AKIHIRO ISHIZAWA, MASANORI NUNAMI, National Institute for Fusion Science — Most of turbulent transport studies assume scale separation between electron- and ion-scale turbulence. However, latest massively parallel simulations based on gyrokinetics reveal that multi-scale interactions between electron- and ion-scale turbulence can influence turbulent transport [S. Maeyama, Phys. Rev. Lett. 114, 255002 (2015)]. The physical mechanism is investigated by applying triad transfer analysis. It is revealed that short-wave-length ITG turbulent eddies stabilize electron-scale streamers. Additionally, it is found that electron-scale turbulence has a damping effect on zonal flows. As a result, turbulent transport spectrum obtained from the multi-scale turbulence simulation differs from the sum of ones obtained from single-scale simulations. We will discuss gyrokinetic triad transfer analysis and the applicability of its fluid approximation, and explain the physical mechanism of multi-scale interactions by means of triad transfer analysis.

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