Turbulent Transport of Toroidal Angular Momentum in Drift Wave Turbulence

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Comparative studies of toroidal angular momentum transport in collisionless trapped electron mode (CTEM) and ion temperature gradient (ITG) mode turbulence with kinetic electrons are presented. Convective, diffusive and residual components of momentum flux are separated. It is found that perturbed momentum profile in zero background rotation case is mainly determined by zonal flow structure. The residual momentum flux, being significant locally, does not play an important role on the devise-size scale. Momentum convective flux is separated into momentum pinch and particle convective parts. We demonstrate that particle convection plays important role in momentum transport in the CTEM turbulence leading to the possible reversal of the momentum convective flux. The parameter dependence of momentum pinch shows no explicit dependence on plasma temperature inhomogeneity scale length. The intrinsic Prandtl number, describing momentum diffusivity, is calculated for CTEM and ITG turbulence regimes. Both diagonal and off-diagonal components of toroidal momentum flux are found to be smaller in the CTEM turbulence.

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