Characterization of transport dynamics emergent from the self-consistent interaction between fluctuations and zonal flows in ITG gyro-kinetic simulations with the UCAN code

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In this contribution, we will describe the application of several tools imported from the theory of non-Markovian, non-local stochastic processes to the characterization of the transport dynamics that emerge from the self-consistent interaction of fluctuations and zonal flows in ion-temperature-gradient (ITG) turbulence. The simulations have been performed using the delta-f, PIC gyrokinetic UCAN code on a tokamak geometry with DIII-D like parameters. In order to fully comprehend the implications derived from the analysis, the results from the self-consistent case have been carefully compared with an additional ITG simulation performed with UCAN using identical parameters in which the feedback action on the fluctuations carried out by the zonal flows is artificially suppressed.

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