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PD/P8-19: A New Animal in the Mesoscale Zoo: Implications of Non-Resonant Convective Cells for Turbulence Intensity Profile, Shear Flow, and Transport

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Understanding of turbulent plasma transport is crucial to achieve and control improved confinement states for steady state tokamaks such as ITER. Present day understanding and modeling of tokamak transport are primarily based on local properties of micro-instabilities with resonant mode structures, the competition of linear mode growth rates with shearing rates, etc. However, there is mounting evidence which shows the importance of nonlocal interaction in plasma profile evolution (e.g. turbulence spreading, transport barrier propagation, etc), which is related to mesoscale structure e.g. fluctuation intensity envelope and zonal flow pattern. In this work, we report on gyrokinetic simulation studies of nonlinear convective cells and present how they are related to the non-locality of transport and the formation of mesoscale structures. We also demonstrate a significant impact on the low frequency content of the heat flux spectrum.

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