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Flows and transport in 3D drift Alfvén turbulence

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Abstract

Zonal flow generation is an important aspect of many models of LH transition in magnetic confined fusion plasmas. The transport barrier then usually is located in the edge region. Plasma turbulence there is generally agreed to be of drift-Alfvénic character and it is speculated if this turbulence can self-organize into flows.

Here simulations of electrostatic and electromagnetic drift wave turbulence are performed in simple 3D geometries as well as in flux tube geometry. We analyse the connection between zonal flows and transport at different parameters and comment on the zonal flow drive. The scaling of zonal flow strength with outer parameters as viscous damping and plasma beta is considered and the difference between simple and more realistic geometries is considered.