Abstract Submitted
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Intermittency and scaling of vorticity in drift-interchange plasma turbulence[1] BOGDAN HNAT, PAULA DURA, JAMES ROBINSON, Centre for Fusion, Space and Astrophysics, Warwick University, RICHARD DENDY, Euratom/Culham Centre for Fusion Energy — Vorticity plays a central role in particle and energy transport driven by fluid and drift turbulence in plasmas with magnetic fields. Characterising the largest spatiotemporal concentrations of vorticity, and quantifying the scaling of vorticity with plasma parameters and system size, is therefore important for tokamak transport studies. We address this using a modified Hasegawa-Wakatani model, extended (J M Dewhurst et al, Phys. Plasmas 16, 072306 (2009)) to include a background magnetic field gradient. Although vorticity is defined in terms of gradients in the underlying fluid velocity, we find that the statistical properties of fluctuations in vorticity can differ significantly from those of fluctuations in velocity and density. We relate this to changes in the morphology of coherent structures within the turbulence, and to the nature of turbulent interactions – cascade, or few-wave coupling. Some of the key properties depend on the direction of the magnetic field gradient. This may give rise to differences between inboard and outboard edge plasma transport in tokamaks.

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