Abstract Submitted
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Mechanisms of non-diffusive transport in a simple two-dimensional plasma fluid turbulence model DOUGLAS OGATA, DAVID NEWMAN, University of Alaska, Fairbanks, RAUL SANCHEZ, JOSE-MIGUEL REYNOLDS-BARREDO, Universidad Carlos III, Madrid — Ingredients for non-diffusive transport have been identified in a simple two-dimensional electrostatic plasma fluid turbulence model with a flux-driven background profile. The numerical model advances two turbulence fields (density and potential), and a flux-driven background profile. Directional dependent critical gradients coupled with the flux-driven profile enable super-diffusive transport. Sub-diffusive transport in the cross-flow direction occurs with an externally driven shear flow or a self-consistently generated flow. The competition between super-diffusive transport and sub-diffusive transport occurs in parameter regimes where the shear rate is sufficiently large enough to interfere with the super-diffusive transport induced by the radial critical gradient. A numerical extension to this model enables an investigation into the impact of a local perturbation on transport. This concept allows a comparison between passive scalar measurements and the Lagrangian trajectories in order to investigate the correspondence between transport measurements done experimentally and analytically. The transport quantification due to a local perturbation will also be applied to experimental edge plasma measurements.

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