Abstract Submitted
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Flow topology, Lagrangian statistics, and transport in resistive drift-wave turbulence B. KADOCH, IUSTI-CNRS, Aix-Marseille Université, France, DIEGO DEL-CASTILLO-NEGRETE, Oak Ridge National Laboratory, W.J.T BOS, LMFA-CNRS, Université de Lyon, France, K. SCHNEIDER, M2P2-CNRS, Aix-Marseille University, France — Transport is strongly influenced by coherent structures. In particular, trapping in vortices tends to arrest transport and zonal flows can induce large Lagrangian displacements. It is thus of interest to characterize coherent structures from a Lagrangian perspective. For 2-D flows, the *Eulerian* Weiss criterion provides a tool to partition the flow into topologically different regions: elliptic (vortex dominated), hyperbolic (deformation dominated), and intermediate (turbulent background). In Ref.[1] we proposed the *Lagrangian* Weiss criterion (i.e. the Weiss field computed along particle orbits) and applied it to 2-D Navier-Stokes turbulence. Here we apply this criterion to resistive drift-wave turbulence. The probability density functions (pdfs) of residence time in the topologically different regions are computed for ensembles of Lagrangian tracers. It is shown that in elliptic and hyperbolic regions the pdfs have algebraically decaying tails. The pdf of residence time in elliptic regions is proposed as a measure of particle trapping, and the relationship with waiting time statistics in continuous time random walk models of anomalous transport is explored.

[1]B. Kadoch, D. del-Castillo-Negrete, W.J.T Bos, and K. Schneider, Phys. Rev. E 83, 036314 (2011).

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