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Remarks on the Frisch framework of hydrodynamic turbulence and the quasi-Lagrangian formulation ELEFTHERIOS GKIOULEKAS, University of Central Florida — In this talk, we revisit the claim that the Eulerian and quasi-Lagrangian same time correlation tensors are equal. This statement allows us to transform the results of an MSR quasi-Lagrangian statistical theory of hydrodynamic turbulence back to the Eulerian representation. We define a hierarchy of homogeneity symmetries between the local homogeneity of Frisch and global homogeneity. It is shown that both the elimination of the sweeping interactions and the derivation of the 4/5-law require a homogeneity assumption stronger than local homogeneity but weaker than global homogeneity. The quasi-Lagrangian transformation, on the other hand, requires an even stronger homogeneity assumption which is many-time rather than one-time but still weaker than many-time global homogeneity. We argue that it is possible to relax this stronger assumption and still preserve the conclusions derived from theoretical work based on the quasi-Lagrangian transformation.

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