

Field theoretical approach to intermittency in Lagrangian turbulence

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Among the Lagrangian models for intermittency, the Recent Fluid Deformation (RFD) [1] models the pressure Hessian and viscous dissipation terms as local contributions. As a result, it displays no finite time singularities and stationary non Gaussian statistics. We perform an analytical study of the RFD under the Martin-Siggia-Rose path integral language [2], with a hierarchical classification of several perturbative contributions associated to fluctuations around the stationary action. The most relevant Feynman diagrams are integrated into the renormalized effective action. We find, in this way, significant corrections on the velocity gradient probability distribution functions and on their local stretching exponents.

References

- [1] L. CHEVILLARD AND C. MENEVEAU, *Lagrangian Dynamics and Statistical Geometric Structure of Turbulence*, Phys. Rev. Lett. **97** 17 (2006)
- [2] L. MORICONI, R.M. PEREIRA, AND L.S. GRIGORIO, *Velocity-gradient probability distribution functions in a Lagrangian model of turbulence*, Journal of Statistical Mechanics: Theory and Experiment **2014** 10 (2014)