

Anomalous and total dissipation due to advection by Navier-Stokes equations

Martina Hofmanová¹,

¹ Bielefeld University

In this talk, we discuss the problem of anomalous dissipation appearing in physical theories of turbulence. We show the existence of a velocity field v , solution of (randomly) forced Navier-Stokes equations, which produces total dissipation of kinetic energy in finite time when advecting a passive scalar ρ , in particular, the solution vanishes at a prescribed time. The total dissipation holds true uniformly in the viscosity parameter and the initial conditions ρ_0 , hence the dissipation is anomalous. Our results extend to the case when ρ is replaced by a solution to the two or three dimensional (deterministic) Navier-Stokes equations advected by v .

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References

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