

Abstract Submitted
for the DFD15 Meeting of
The American Physical Society

Scaling of Lyapunov Exponents in Homogeneous, Isotropic Turbulence PRAKASH MOHAN, University of Texas at Austin, NICHOLAS FITZSIMMONS, Applied Research Laboratories, University of Texas at Austin, ROBERT MOSER, University of Texas at Austin — Lyapunov exponents measure the rate of separation of infinitesimally close trajectories in a chaotic system. Here we use Lyapunov exponents describing the phase divergence of perturbed velocity fields to characterize the chaotic nature of homogenous isotropic turbulence. To compute the Lyapunov exponents we perform a DNS of forced isotropic turbulence and evolve a linear disturbance field along with the turbulence simulation. The average exponential growth rate of the linear disturbance field is the largest Lyapunov exponent of the system. We will discuss the scaling of this exponent with: a) the Reynolds number and b) the ratio of the integral length scale to the computational domain size.

Prakash Mohan
Univ of Texas, Austin

Date submitted: 17 Jul 2015

Electronic form version 1.4