

Abstract Submitted
for the DFD07 Meeting of
The American Physical Society

Experimental study of Multi-Particle Lagrangian Dynamics in Intense Turbulent Flows EBERHARD BODENSCHATZ, HAITAO XU, NICHOLAS T. OUELLETTE¹, MPI for Dynamics and Self-Organization, ICTR COLLABORATION — We report experimental measurements of Lagrangian dynamics following multiple particles in intense turbulent flows with Taylor microscale Reynolds number up to 800. We focus on the coarse-grained-velocity gradient measured from 4 fluid particles – the tetrads. We present data obtained from tetrads with sizes in a wide range of the inertial range. For any size of tetrads in the inertial range, the probability distribution of the coarse-grained velocity gradient is skewed towards the bi-axial extensional flows. We also measured the evolution of the coarse-grained velocity gradients following the Lagrangian tetrads, which reveals the importance of pressure in this problem. Finally, we report the effect of polymer additives on the coarse-grained velocity gradients and the comparison with theoretical and numerical work.

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Date submitted: 01 Aug 2007

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