Abstract Submitted
for the DFD06 Meeting of
The American Physical Society

Dynamics of Passive Scalar Gradients In A Turbulent Kolmogorov Flow BERTRAND ROLLIN, YVES DUBIEF, University of Vermont — Using a direct numerical simulation of a low-Reynolds number Kolmogorov flow, we investigate the dynamics of passive scalar gradients in relation to the dynamics of turbulent structures. The Schmidt number ranges from 1 to 10 with full resolution of the Batchelor scale of the passive scalar. We are particularly interested in the small scale mixing occurring around vortices, in regions that are characterized by their strong anisotropy and their dominant energetic role on the dynamics of turbulence. Coherence in the formation of sharp gradients of the passive scalar concentration is studied using the second Q and third R invariants of the velocity gradient tensor, as well as conditional statistics based on vortices.

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Date submitted: 01 Aug 2006 Electronic form version 1.4