Abstract Submitted
for the DFD10 Meeting of
The American Physical Society

**Numerical diffusivity of scalar transport schemes in high Schmidt number flows** SIDDHARTHA VERMA, GUILLAUME BLANQUART — Accurate simulation of scalar transport in high Schmidt number turbulent flows is essential to studying pollutant dispersion, weather, and several oceanic phenomena. Experiments over such large scales are difficult to conduct and simulations often provide a more practical alternative. Scalar transport in turbulent flows is governed by Batchelor's theory which requires further validation for high Schmidt numbers and high Reynolds numbers. The present study focuses on the impact of numerical diffusivity of various commonly used schemes in the turbulent transport of high Schmidt number scalars. This analysis is performed first in laminar flows, including advection of a Gaussian distribution in steady flow field and scalar stretching in Taylor vortex configuration. Then, the study focuses on the ability of the transport schemes to reproduce faithfully turbulent flow fields with high accuracy and low dissipation while maintaining physical boundedness. This analysis is conducted for isotropic, homogeneous forced turbulence and a mixing layer. Finally, a semi-Lagrangian scheme is considered and its performance is analyzed in the limit of zero diffusion.

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Date submitted: 04 Aug 2010 Electronic form version 1.4