Abstract Submitted
for the DFD08 Meeting of
The American Physical Society

A priori study of SGS flux of a passive scalar in LES SERGEI CHUMAKOV, Los Alamos National Laboratory — The DNS data is used to explore the properties of subgrid-scale flux τ_ϕ of a passive scalar ϕ in the framework of Large Eddy Simulation. Geometrical characteristics such as alignment trends between the flux and resolved and SGS structures are studied. It is shown that the direction of the flux is strongly coupled with the SGS stress axes rather than the resolved flow quantities such as strain $\bar{S}_{ij}$, vorticity $\bar{\omega}$ or scalar gradient $\nabla\bar{\phi}$. We derive an approximate transport equation for the subgrid-scale flux of a scalar and look at the relative importance of the terms in the transport equation. A particular form of LES tensor-viscosity model for the scalar flux is investigated, which includes the subgrid-scale stress: $\tau_{i\phi} = 1/|\bar{S}|\tau_{ij}\bar{\phi}_{,j}$. Effect of different models for the subgrid-scale stress τ_{ij} on the model for the subgrid-scale flux τ_ϕ is studied.

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Date submitted: 04 Aug 2008 Electronic form version 1.4