Abstract Submitted
for the DFD16 Meeting of
The American Physical Society

An anisotropic subgrid stress model for high aspect ratio grids ROBERT MOSER, SIGFRIED HAERING, Institute for Computational Engineering and Sciences, The University of Texas at Austin — Standard algebraic eddy viscosity subgrid stress models are formulated based on scalar measures of the local grid, and implicitly assume that the resolution is isotropic. However, complex simulation domains and computational costs associated with problems of engineering interest often necessitate grids with high aspect ratio cells. We present an anisotropic extension of Metias and Lesieur's structure function subgrid stress model [1]. Unlike existing algebraic SGS models, this model is constructed directly through the composition of resolution and resolved turbulence anisotropy. Comparisons with filtered DNS of forced isotropic homogeneous turbulence show the model to significantly outperform general isotropic SGS models with increasing resolution anisotropy.

[1] O. Metais and M. Lesieur, "Spectral large-eddy simulation of isotropic and stably stratified turbulence," Journal of Fluid Mechanics, vol. 239, 1992

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Date submitted: 01 Aug 2016 Electronic form version 1.4