Abstract Submitted
for the DFD20 Meeting of
The American Physical Society

Large-scale Anisotropy Determines Mixing Regimes of Stably-stratified Turbulence YOUNG YI, JEFFREY KOSEFF, ALI MANI, Stanford University — Using both unsheared and sheared simulations of stably-stratified turbulence, we study the effects of large-scale anisotropy on the mixing coefficient, which is typically required to estimate the eddy diffusivity of density when using a downgradient model. The unsheared and sheared simulations occupy distinct and very different regions of the Lumley triangle, indicating that stratification and shear introduce different anisotropy effects to the large scales of the flow. We propose and test new scalings for the mixing coefficient of sheared, stably-stratified turbulence that explicitly account for the mean shear rate in addition to background stratification. In line with the recent work by Maffioli et al. (2016) and Garanaik and Venayagamoorthy (2019), our work further highlights the predictive capability of turbulence parameters that describe the large-scale anisotropy of stably-stratified turbulence for estimating the mixing coefficient.

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Date submitted: 03 Aug 2020 Electronic form version 1.4