Scaling of compressible turbulent mixing[1] EUNHYE AN, ERIC JOHNSEN, University of Michigan — The decay of homogeneous, isotropic turbulence is well understood based on Kolmogorov theory in the incompressible limit. However, the roles of compressibility and inhomogeneities on the turbulence phenomenology are less well known. For this purpose, we conduct direct numerical simulation (DNS) to investigate the behavior of turbulent mixing, in which homogeneous isotropic turbulence regions of different intensities are juxtaposed. We investigate the scaling of the decay of turbulent kinetic energy (TKE) for this compressible, inhomogeneous flow. By considering the turbulent energy balance equation, we determine scaling coefficients predicting the observed behavior by accounting for dilatation. This scaling is verified by the DNS results of turbulent mixing as well as turbulent/non-turbulent interfaces.

Eunhye An
University of Michigan

Date submitted: 30 Jul 2019   Electronic form version 1.4