Decaying isotropic turbulence simulations in a binary mixture of different viscosities KURNCHUL LEE, SHARATH S. GIRIMAJI, Texas A&M University — Turbulence in mixtures differs from that in homogeneous medium due to two main reasons: (i) pressure-related effects manifesting through equation of state; and (ii) variable transport coefficient effect. In this study, we examine the variable transport co-efficient effect in isolation. We perform direct numerical simulation (DNS) of turbulence in a binary mixture of fluids with identical densities but vastly different viscosities. The initial turbulence field is isotropic with each fluid occupying one-half of the computational domain. A Boltzmann-equation based numerical scheme is employed for this simulation. The objective of the study is to investigate the various effects of viscosity on turbulence small scales: (i) the relation between viscosity, local dissipation and local strain rate; (ii) orientation of vorticity with the strain-rate eigen-vectors; and (iii) the magnitude of strain-rate eigen-values.

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