1099-76-278 **C. D. Tomkins*** (ctomkins@lanl.gov), **B. J. Balakumar**, **G. Orlicz**, **K. P. Prestridge** and **J. R. Ristorcelli**. *Evolution of the density self-correlation in developing Richtmyer-Meshkov Turbulence.*

Turbulent mixing in a Richtmyer-Meshkov unstable light-heavy-light (air-SF_6-air) fluid layer subjected to a shock (Mach 1.20) and a reshock (Mach 1.14) is investigated using ensemble statistics obtained from simultaneous velocity-density measurements. The mixing is driven by an unstable array of initially symmetric vortices that induce rapid material mixing and create smaller scale vortices. The density self-correlation $b = -\langle \rho v \rangle$ (where ρ and v are the fluctuating density and specific volume, respectively) and terms in its evolution equation are directly measured experimentally for the first time. Amongst other things, it is found that production terms in the b equation are balanced by the dissipation terms, suggesting a form of equilibrium in b. A lengthscale analysis suggests that an inertial range is beginning to form, consistent with the onset of a mixing transition. Second-order two-point structure functions of the density field exhibit a power-law behavior with a steeper exponent than the standard 2/3 power found in canonical turbulence. The absence of a significant 2/3 region is observed to be consistent with the state of the flow, and the emergence of the steeper power-law region is discussed. (Received February 10, 2014)