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Variable Density Turbulent Jet Mixing SERGIY GERASHCHENKO, KATHY PRESTRIDGE, Los Alamos National Laboratory — Variable density mixing arises due to differences in molecular weights of the mixing fluids, or due to compressibility effects. A detailed understanding of the mixing processes has important consequences for many scientific and engineering systems such as inertial confinement fusion, atmospheric flows and oceans, or supernovae explosions. A new experiment has been developed at LANL to study the fundamental statistical properties of variable density turbulence that decays in time in subsonic incompressible flows. Initial experimental results are presented of a heavy fluid (sulfur hexafluoride gas) turbulent jet injected into coflowing air of lower turbulence. Buoyancy-mediated mixing is investigated at two Atwood numbers: 0 and 0.6, for a range of Reynolds numbers. The velocity and density fields are measured with simultaneous Particle Image Velocimetry and Planar Laser Induced Fluorescence. The fundamental statistical characteristics of the mixing important for modeling these flows such as spreading rate, mass flux, density self-correlation, kinetic energy flux, and turbulence decay rate are examined.

Sergiy Gerashchenko
Los Alamos National Laboratory

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