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Experimental investigation of Rayleigh—Taylor mixing in gases using simultaneous PIV-PLIF PRASOON SUCHANDRA, MARK MIKHAEIL, GOKUL PATHIKONDA, DEVESH RANJAN, Georgia Institute of Technology — Dynamics of Rayleigh–Taylor (RT) mixing is studied using statistically stationary experiments performed in a multi-layer gas tunnel. The density ratio of air and air-helium-nitrogen mixture used results in an Atwood number (A) ˜0.13. Two types of diagnostics — particle image velocimetry (PIV) and planar laser induced fluorescence (PLIF) — are employed to obtain mixing width and simultaneous velocity-density data. PLIF using acetone is implemented for the first time for convective-type (flowing) statistically stationary RT experiments with gases. Velocity and density statistics, and their correlations ($u', v', \rho', \rho' v'$) are presented. As Atwood number for current experiments exceeds the widely accepted A ˜0.1 limit for Boussinesq approximation, non-Boussinesq-ness and anisotropy effects at this Atwood number are evaluated using metrics like higher-order moments (skewness, kurtosis) and anisotropy tensor. Results from current experiments are compared with existing turbulent RT mixing models (like BHR models). Reference: AKULA, B. & RANJAN, D. 2016 Dynamics of buoyancy-driven flows at moderately high Atwood numbers. *Journal of Fluid Mechanics 795, 313–355.*

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