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Study of mixing efficiency of a buoyant plume using velocity and density measurements HARISH MIRAJKAR, PhD student, Indian Institute of Technology Bombay, SRIDHAR BALASUBRAMANIAN, Associate Professor, Indian Institute of Technology Bombay — Experiments were performed to quantify the mixing dynamics of a buoyant plume intruding vertically into a linear stably stratified environment ($N = 0.2\text{s}^{-1}$). Simultaneous measurements of velocity and density fields were achieved using a combination of Particle Image Velocimetry (PIV) and Planar Laser Induced Fluorescence (PLIF). The refractive indices of the ambient and the plume fluid were matched to avoid optical aberrations. The production flux (P), buoyancy flux (B), and dissipation (ε) in the kinetic energy equation were calculated to understand the energy budget. Along the direction of plume flow, P, B, and ε show a gradually decreasing trend. Using the parameterization proposed by *Osborne 1980*, the mixing efficiency (γ) was calculated to understand the local mixing dynamics of a buoyant plume.

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