

Abstract Submitted
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Stratified shear flow in an inclined duct: measurements of velocity and scalar fields¹ PAUL LINDEN, SIMON VINCENT, STUART DALZIEL, Cambridge University, GKB LAB TEAM — The effect of stable stratification on turbulent shear flow is a fundamental problem in turbulence. We present quantitative experimental results on the flow and density fields in a duct, inclined slightly from the horizontal, connecting two reservoirs containing fluids of different densities and. A counterflow is established in the duct with the denser fluid flowing beneath the less dense fluid. This flow exhibits a range of different flow regimes, from wave-like to intermittent to turbulent, depending on the angle of inclination of the duct, and the relative density difference between the two reservoir fluids. We use two-dimensional PIV and PLIF to measure and compare the velocity and density fields for each of the different regimes. We examine the mean signals to determine governing features such as the average gradient Richardson numbers for each regime. We also determine the characteristic features of the fluctuating fields in the different flow regimes and relate these to the structures observed in visualisations of the flow.

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