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Stratified shear flow in an inclined duct: near-instantaneous 3D velocity and density measurements¹ JAMIE PARTRIDGE, ADRIEN LEFAUVE, STUART DALZIEL, PAUL LINDEN, Univ of Cambridge — We present results from a new experimental setup to study the exchange flow in an inclined square duct between two reservoirs containing fluids of different densities. This system can exhibit stratified shear wave motions, and has a distinct parameter threshold above which turbulence is triggered and progressively fills a larger fraction of the duct. To probe these intrinsically 3D flows, we introduce a new setup in which a traversing laser sheet allows us to obtain near-instantaneous 3D velocity and density fields. Three components of velocity are measured on successive 2D planes using stereo particle image velocimetry (PIV) with density information obtained simultaneously using laser induced fluorescence (LIF).

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