Abstract Submitted
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Investigating the mechanism for layer formation in a stratified fluid: mixing due to a towed vertical rake of bars[1] JAMIE PARTRIDGE, STUART DALZIEL, PAUL LINDEN, University of Cambridge — A common feature of turbulent, stratified flows is layering of the density field. It has been observed, experimentally and numerically, that an initially linearly stratified system breaks down into a series of layers with a well defined length scale. Empirically, the length scale is found to scale linearly with U/N^2, with U a typical velocity scale and N^2 the buoyancy frequency. Despite this empirical scaling, found across a variety of flow configurations, no universal underlying mechanism describing how the layering occurs has been found. We present new data from an experimental study investigating the flow and stratification that develops when an array of vertical bars is towed, back and forth, through an initially linearly stratified fluid. Particle image velocimetry (PIV) results are presented to provide further insight into the layering mechanism and how this may be related to other flow configurations. Of particular focus is the role of the internal wave field, generated by the towing motion, in establishing the layering.

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