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Stability of a stratified fluid with a vertically moving boundary FRANCOIS BLANCHETTE, University of California Merced, TOM PEACOCK, REMI COUSIN, Massachusetts Institute of Technology — We present the results of a combined theoretical and experimental study of stratified fluids bounded by a vertically moving side wall. This arrangement is perhaps the simplest in which boundary effects can drive instability and layering in a stratified fluid. It may also be used to investigate the stability of sheared laminar flow augmented of a density gradient. Our investigations reveal that for a given stratification, the side wall boundary-layer flow becomes linearly unstable when the wall velocity exceeds a critical value, which is well below the velocity at which turbulence may be initiated in a uniform fluid. The onset of instability is clearly observed in the experiments, and in many aspects there is quantitative agreement with theoretical predictions. This type of instability is expected to occur frequently in nature owing to the small magnitude of the critical velocity.

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