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Testing marginal stability in stratified shear layers CHRISTOPHER HOWLAND, DAMTP, University of Cambridge, COLM-CILLE CAULFIELD, BP Institute and DAMTP, University of Cambridge, JOHN TAYLOR, DAMTP, University of Cambridge — We perform two dimensional direct numerical simulations of a stratified shear layer to investigate the effect of variations in the minimum Richardson number (Ri_m) on the early evolution of Kelvin–Helmholtz (KH) instability. Using these simulations, we examine the development of KH billows up to the time when the perturbation energy saturates at its maximum value. We show that in the limit as $Ri_m \to 1/4$ the perturbation growth rate tends to zero and the saturated perturbation energy becomes very small. Our results imply that 'marginally unstable' flows with Ri_m only slightly less than 1/4 are highly unlikely to become turbulent without additional forcing.

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