Abstract Submitted
for the DFD19 Meeting of
The American Physical Society

Growth and Saturation of Instabilities of Stratified Schlichting Jets with Varying Aspect Ratio ALEXANDER MARTELL, University of Calgary, JOHN TAYLOR, University of Cambridge, QI ZHOU, University of Calgary — We investigate the stability of jets in a linearly stratified Boussinesq fluid. The base flow considered has a two-dimensional (2D) velocity profile which resembles Schlichtings profile but is not necessarily axisymmetric. We examine a range of Richardson number, as well as the horizontal-to-vertical aspect ratio of the base flow profile, and perform linear stability analysis to identify the most unstable three-dimensional (3D) normal-mode perturbations to the 2D base flow. We compare our results to previously published linear stability analyses of the Schlichting jet and its planar counterpart, the Bickley jet, most of which, to our knowledge, either require perturbations to be axisymmetric (Schlichting jet) or use 2D perturbations, which do not allow for spanwise variation (Bickley jet). The 3D normal modes are then investigated using DNS to understand the nonlinear saturation (in the sense of growth and maximization of perturbation energy) and the transition of the flow to a fully turbulent state.

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Date submitted: 01 Aug 2019 Electronic form version 1.4