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Wavemaking by a vortex pair in stratified flow SURUPA SHAW, JOHN MCHUGH, University of New Hampshire — Recent simulations of a vortex pair in a stratified fluid show that for small Froude number W/Nb the vortices disintegrate into internal waves, where W is the vortex strength, b is the vortex spacing, and N is the buoyancy frequency. The kinetic energy loss from the vortex pair in this regime can be remarkably fast, essentially annihilating the coherent vortex pair before any noticeable propagation. If the Froude number is large the vortices remain coherent and propagate as they would in constant density flow. The transition in behavior occurs near a Froude number of unity, but is apparently not a sharp transition, as some wave-making appears to happen for Froude numbers above unity. Here we quantify the wave-making with an integral of the momentum flux around a sequence of circles centered on the vortex pair and moving with it. Numerical solutions are obtained using a spectral method, the flow is treated as Boussinesq and viscous, and the initial conditions are approximately the flow due to a line vortex. The results confirm that the transition is gradual, although the complexity of the wavy flow makes interpretation difficult. These results are related to vortex roll-up in a stratified fluid.

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