

## **Instabilities in Fluids Under Linear Shear**

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In this talk, we discuss the stability of periodic traveling wave solutions describing the interface between two fluids of varying density and vorticity trapped between two rigid lids. Using a generalization of a non-local formulation of the water wave problem due to Ablowitz, et al. and Ashton & Fokas, we determine the spectral stability for the periodic traveling wave solution by extending Fourier-Floquet analysis to apply to this non-local problem.

We develop a numerical scheme to determine traveling wave solutions by exploiting the bifurcation structure of the non-trivial periodic solutions. Next, we determine numerically the spectral stability for the periodic traveling wave solution by extending Fourier-Floquet analysis to apply to the non-local problem. We can generate the full spectra for all traveling wave solutions. We discuss Kelvin-Helmholtz and Benjamin-Feir instabilities, as well as explore the suppression or amplification of such instabilities as a function of shear strength, density stratification, and the ratio of depths between the fluids.