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Dynamic mode decomposition identifies internal wave and vortical modes in stably stratified wakes[1] XINJIANG XIANG, KEVIN CHEN, TRYSTAN MADISON, GEOFFREY SPEDDING, University of Southern California — Though detailed information has been assembled to describe the late wakes behind various objects in stably stratified fluids, less is known about the dynamics at early stages, when the flow first interacts with the ambient density gradient, beginning the transition to the late wake regime. Detailed velocity fields (and derivatives) were reported by Xiang et al. (*J. Fluid Mech.* 775, 149-177, 2015) for the near wake of a towed grid, with $\mathrm{Re} \in \{2700, 11000\}$ and $\mathrm{Fr} \in \{0.6, 9.1\}$. Here using dynamic mode decomposition (DMD), the spatial and temporal evolution of the lee wave and shearing modes are extracted and examined for the same data set. Both dynamic modes show systematic dependence on Fr and Re, consistent with previous analysis. The results show the potential of DMD in analyzing the contribution of different modes in a complex, near wake evolution, including, but not limited to towed grids, and the wakes of more complicated towed geometries.

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