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Internal Gravity Wave Fluxes Radiated by a Stably Stratified Turbulent Wake[1] KRISTOPHER ROWE, PETER DIAMESSIS, Cornell University — The study of the turbulent wake generated by a bluff body moving through a stably stratified fluid has important applications for naval hydrodynamics as well as geophysical flows around topography. Significant progress has been made in terms of investigating the structure and dynamics of the turbulent wake core and the associated near and far-field spectral properties of the wake-radiated internal gravity wave (IGW) fields, namely in the context of high Reynolds stratified turbulence within the wake itself. Nevertheless, little has been done to quantify the amount of energy and momentum radiated away by the IGWs generated by the wake. Through analysis of a broad Large Eddy Simulation dataset, spanning values of body-based Reynolds and Froude numbers, $Re = \ 5 \times 10^3,\ 10^5$ and 4×10^5 and $Fr = 4, 16$ and 64, we compute the energy and momentum fluxes of IGWs radiated by the stratified turbulent wake of a towed sphere and explore the relevant parametric dependence. The analysis further aims to determine the potential of the IGWs as a sink for energy and momentum relative to the dissipation of turbulent kinetic energy in the wake itself. Finally, we discuss the implications that for our findings for wake mean-flow self-similarity and turbulence subgrid scale models.

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Kristopher Rowe
Cornell University

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