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Parametric study of the spectral characteristics of the internal gravity wave field emitted by a stratified turbulent wake with non-zero net momentum[1] PETER DIAMESSIS, AMMAR ABDILGHANIE, Cornell University — The internal wave field emitted by the turbulent wake of a towed sphere in a linearly stratified fluid is studied numerically for a range of sphere-based Reynolds and Froude numbers. The full three-dimensional time-dependent governing equations are solved using a parallel spectral multidomain penalty solver. Hovmöller (space-time) diagrams of the horizontal divergence field are constructed in the vertical and lateral directions. Spectral analysis of these diagrams enables the identification of the frequency and wave-number of the most energetic waves. Ensemble averaging at multiple stations in the stream-wise direction is performed to remove the influence of streamwise variability. In agreement with previous studies of wave emission from forced turbulent mixed regions, the spectrum exhibits pronounced peaks in a narrow range of frequencies (and hence angles of propagation) and wave numbers. Finally, the role of intermediate-time secondary instabilities and turbulence inside the wake core on wave radiation is discussed.

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