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Copepod Behavior Response in an Internal Wave Apparatus D.R. WEBSTER, S. JUNG, K.A. HAAS, Georgia Tech — This study is motivated to understand the bio-physical forcing in zooplankton transport in and near internal waves, where high levels of zooplankton densities have been observed *in situ*. A laboratory-scale internal wave apparatus was designed to create a standing internal wave for various physical arrangements that mimic conditions observed in the field. A theoretical analysis of a standing internal wave inside a two-layer stratification system including non-linear wave effects was conducted to derive the expressions for the independent variables controlling the wave motion. Focusing on a case with a density jump of 1.0 σ_t, a standing internal wave was generated with a clean interface and minimal mixing across the pycnocline. Spatial and frequency domain measurements of the internal wave were evaluated in the context of the theoretical analysis. Behavioral assays with a mixed population of three marine copepods were conducted in control (stagnant homogeneous fluid), stagnant density jump interface, and internal wave flow configurations. In the internal wave treatment, the copepods showed an acrobatic, orbital-like motion in and around the internal wave region (bounded by the crests and the troughs of the waves). Trajectories of passive, neutrally-buoyant particles in the internal wave flow reveal that they generally oscillate back-and-forth along fixed paths. Thus, we conclude that the looping, orbital trajectories of copepods in the region near the internal wave interface are due to animal behavior rather than passive transport.

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