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Instability phenomena in stratified, particle-laden flow PETER BURNS, DOMINIK SAILE, PETER BOEKELS, ECKART MEIBURG, Department of Mechanical Engineering, University of California at Santa Barbara — When a layer of particle-laden water is placed above clear water of different temperature and salinity, various instabilities may arise. Depending on whether the top layer is warmer or colder than the bottom layer, distinct nonlinear convection patterns ("fingering" vs. "leaking") have been reported from experiments (Parsons et al., 2001). We present linear stability results for such situations, with a focus on the role of particle settling. The effect of the settling velocity on the temporal instability growth rates is investigated in combination with various salinity and temperature distributions. The nonlinear evolution of the resulting instability structures is studied via DNS. Comparison between linear analysis, DNS and experimental literature links the occurrence of "leaking" ("fingering") to the presence (absence) of a double-diffusive linear instability.

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