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Double-diffusive and Rayleigh-Taylor instabilities in particle-laden water stratified over salt water in a Hele-Shaw cell[1] GRAHAM CHAMBERS-WALL, CATHERINE DEMA, MEGAN ANDERSON, Department of Physics and Mathematics, William Jewell College, Liberty, MO 64068 U.S.A., NATHAN KONOPLIV, ECKART MEIBURG, Department of Mechanical Engineering, University of California at Santa Barbara, Santa Barbara, CA 93106 U.S.A., PATRICK BUNTON, Department of Physics and Mathematics, William Jewell College, Liberty, MO 64068 U.S.A. — An experimental and computational investigation is performed for double-diffusive (DD) and Rayleigh-Taylor (RT) instabilities in particle-laden fresh water initially stably-stratified over salt water in a Hele-Shaw cell. *Computationally*, Darcy's Law coupled with an advection-diffusion equation for salt and an advection-diffusion equation for particle concentration that includes a settling velocity is solved for two-dimensional stratified fluids in the presence of particle-loading. The flows are parametrized in terms of a stability ratio, a gravity parameter, and a dimensionless settling velocity. Results are analyzed in terms of relative dimensions of concentration profiles of sediment and salt. *Experimentally*, Schlieren imaging is used to image fresh water containing 3-6 μm glass microparticles layered above salt water both containing glycerol to slow dynamics. Dimensionless wavelength and time and distance until onset of instability are measured. Results are interpreted in terms of a "nose" region of increased density at the interface.

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