

Abstract Submitted
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Front velocity of lock exchange gravity currents on a slope VI-NEET BIRMAN, ECKART MEIBURG, UCSB, JAMES ROTTMAN, PAUL LINDEN, UCSD — We present an investigation of lock exchange gravity currents in sloping channels. Two-dimensional Navier-Stokes simulations show the existence of two phases for the flow. During the initial phase, the front velocity is seen to be constant. Its magnitude depends on the slope angle and reaches a maximum near 40 degrees. This quasisteady initial phase gives way to a second phase of higher, unsteady front velocity. This second phase is dominated by the accelerating motion of the two stratified fluid layers past each other. We develop a simple model that predicts the time of the transition between the two phases. Experimental observations are presented that support the numerical findings.

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