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Experimental study of the Rayleigh-Taylor instability at multimode interfaces JEREMY WHITE, JASON OAKLEY, MARK ANDERSON, RICCARDO BONAZZA, University of Wisconsin-Madison — The gravitationally driven 2-D Rayleigh-Taylor (RT) instability is studied experimentally using simple, quantifiable multimode interfaces for two different Atwood numbers, A=0.46 and A$\sim$ 1. This study is performed using a magnetic fluid suspension technique that allows for precise interfacial shaping by exploiting the unique properties of magnetorheological (MR) fluids. The multimode shapes examined include a handful of modes which were chosen to minimize the effects of the physical test section size and surface tension on the development of the instability. A high speed X-ray radiography based diagnostic system is used to measure the evolution of the RT bubbles and spikes. The method for prescribing the initial condition allows for individual modes, which are chosen a priori, to be tracked for studying saturation, merger, and their collective influence on the overall mixing width.

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