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Miscible and immiscible experiments on the Rayleigh-Taylor instability using simultaneous planar laser induced fluorescence and backlight visualization. MATTHEW MOKLER, MICHAEL ROBERTS, JEFFREY JACOBS, The University of Arizona — Incompressible Rayleigh-Taylor instability experiments are presented in which two stratified liquids having Atwood number of 0.2 are accelerated in a vertical linear induction motor driven drop tower. A test sled having only vertical freedom of motion contains the experiment tank and visualization equipment. The sled is positioned at the top of the tower within the linear motors and accelerated downward causing the initially stable interface to be unstable and allowing the Rayleigh-Taylor instability to develop. Experiments are presented with and without forced initial perturbations produced by vertically oscillating the test sled prior to the start of acceleration. Half of the experimental tank is visualized using a 445nm laser light source that illuminates a fluorescent dye mixed in one of the fluids. The other half is illuminated with a white backlight. The resulting images are recorded using a monochromatic high speed video camera allowing for the measurement of spike and bubble mixing layer growth rates for both visualization techniques in a single experiment.

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