

Abstract Submitted  
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**Two-Wheel Experiment for detailed measurements of Rayleigh-Taylor Turbulence**<sup>1</sup> AARON HALEY, RAGHU MUTNURI, ARINDAM BANERJEE, Missouri S&T — A novel two-wheel experiment to investigate incompressible turbulent Rayleigh-Taylor (RT) instability is described. The experiment consists of two counter rotating wheels, placed side by side, such that the axes of the wheels are normal to gravity. A test section, carrying a pair of immiscible fluids, is loaded on one wheel such that the heavier fluid is held radially outwards ensuring a stable stratification (no mixing). The test section is then oscillated to impose controlled multi-mode initial perturbations on the interface and finally transferred to the adjacent wheel using a solenoid actuated transfer mechanism. Upon transfer, the fluid stratification in the test section is reversed which leads to development of RT instability. Large centrifugal accelerations (10g) produced by the rotation of the wheels allow investigation of late time RT turbulence. Details of the mixing layer development and growth constants are captured using high speed backlit imaging. A variety of immiscible fluid combinations are utilized to investigate development of the RT mixing over a large range of Atwood numbers (0.1-0.99) and the results are compared with similar data available in the literature.

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