

Abstract Submitted
for the DFD06 Meeting of
The American Physical Society

Large Atwood number, miscible-liquid experiments on the Rayleigh-Taylor and Richtmyer-Meshkov instabilities. MICHAEL ROBERTS, JEFFREY JACOBS, University of Arizona — Experiments are presented in which an incompressible system of two miscible liquids with a large density difference ($A \approx 0.5$) is accelerated to produce the Richtmyer-Meshkov (RM) or Rayleigh-Taylor (RT) instabilities. The initially stably stratified liquid combination is contained within a rectangular tank that is accelerated on a vertical rail system. In the RM Experiments the tank is released from the top of the rail system, after which it impacts a spring that introduces the impulsive acceleration and the RM instability develops while the tank is in freefall. In the RT experiments, the same rail system is used; however, instead of impacting a spring the tank is accelerated downward using a weight and pulley system. The resulting fluid flows are observed using backlit photography. The initial perturbations are either forced (by oscillating the tank in the horizontal direction to produce a standing wave) or random (due to molecular motion or background noise). Measurements taken from the data compare well with theory and models for both the RM and RT instabilities.

Michael Roberts
University of Arizona

Date submitted: 02 Aug 2006

Electronic form version 1.4