

Abstract Submitted  
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**Design and Construction of a Shock Tube Experiment for Multiphase Instability Experiments** JOHN MIDDLEBROOKS, Univ of Missouri - Columbia, WOLFGANG BLACK , CONSTANTINE AVGOUSTOPOULOS, ROY ALLEN, RAJ KATHAKAPA, QIWEN GUO, JACOB MCFARLAND<sup>1</sup>, University of Missouri FLuid Mixing and Shock Tube Laboratory — Hydrodynamic instabilities are important phenomena that have a wide range of practical applications in engineering and physics. One such instability, the shock driven multiphase instability (SDMI), arises when a shockwave accelerates an interface between two particle-gas mixtures with differing multiphase properties. The SDMI is present in high energy explosives, scramjets, and supernovae. A practical way of studying shock wave driven instabilities is through experimentation in a shock tube laboratory. This poster presentation will cover the design and data acquisition process of the University of Missouri's Fluid Mixing Shock Tube Laboratory. In the shock tube, a pressure generated shockwave is passed through a multiphase interface, creating the SDMI instability. This can be photographed for observation using high speed cameras, lasers, and advance imaging techniques. Important experimental parameters such as internal pressure and temperature, and mass flow rates of gases can be set and recorded by remotely controlled devices. The experimental facility provides the University of Missouri's Fluid Mixing Shock Tube Laboratory with the ability to validate simulated experiments and to conduct further inquiry into the field of shock driven multiphase hydrodynamic instabilities.

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