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Shock tube Multiphase Experiments JOHN MIDDLEBROOKS, ROY ALLEN, MANOJ PAUDEL, CALVIN YOUNG, BEN MUSICK, JACOB MCFARLAND, Univ of Missouri - Columbia — Shock driven multiphase instabilities (SDMI) are unique physical phenomena that have far-reaching practical applications in engineering and science. The instability is present in high energy explosions, scramjet combustors, and supernovae events. The SDMI arises when a multiphase interface is impulsively accelerated by the passage of a shockwave. It is similar in development to the Richtmyer-Meshkov (RM) instability however, particle-to-gas coupling is the driving mechanism of the SDMI. As particle effects such as lag and phase change become more prominent, the SDMI's development begins to significantly deviate from the RM instability. We have developed an experiment for studying the SDMI in our shock tube facility. In our experiments, a multiphase interface is created using a laminar jet and flowed into the shock tube where it is accelerated by the passage of a planar shockwave. The interface development is captured using CCD cameras synchronized with planar laser illumination. This talk will give an overview of new experiments conducted to examine the development of a shocked cylindrical multiphase interface. The effects of Atwood number, particle size, and a second acceleration (reshock) of the interface will be discussed.

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