Abstract Submitted for the DFD14 Meeting of The American Physical Society

Explosive-driven shock wave interaction with a propane flame NANCY CANAFAX, MICHAEL HARGATHER, New Mexico Tech, PAUL GIAN-NUZZI, New Mexico Tech EMRTC, GRAHAM DOIG, UNSW Australia — Experiments were performed to analyze the interaction of an explosively driven shock wave and a propane flame. A 30 gram explosive charge was detonated at one end of a shock tube with a 3 m length and 0.6 m diameter to produce a shock wave which propagated down the tube and out into the atmosphere. A propane flame source was positioned at various locations outside of the shock tube to investigate the flame response to different strength shock waves. Retroreflective shadowgraph imaging with a high-speed digital camera was used to visualize the shock wave motion and flame response. The explosively driven shock tube was shown to produce a repeatable shock wave and a large vortex ring. Digital streak images show the shock wave and vortex ring expansion and propagation throughout the field of view. The high-speed shadowgraph images show that the shock wave extinguishes the propane flame by pushing it off of the fuel source. Even a weak shock wave was found to be capable of extinguishing the propane flame.

> Michael Hargather New Mexico Tech

Date submitted: 01 Aug 2014

Electronic form version 1.4