Abstract Submitted
for the SHOCK17 Meeting of
The American Physical Society

Studies in shocked nitromethane through High dynamic range spectroscopy[1] MITHUN BHOWMICK, ERIN NISSEN, SERGEY MATVEEV, DANA DLOTT, University of Illinois Urbana-Champaign — In this talk we describe a tabletop apparatus that can reproducibly drive shocks through tiny cells containing liquid arranged in an array for high-throughput shock compression studies. This talk will focus on nitromethane, a liquid reactive to shocks and capable of detonation. In our studies, a laser-driven ?yer plate was used to shock nitromethane, and a spectrometer with high dynamic range was employed to measure emission spectra from nanosecond to millisecond time scales. Typically, 50 single-shock experiments were performed per day with precisely controllable shock speeds below, above, or equal to the detonation shock speed. The emission spectra provide temperature histories using the grey body approximation. The ability to conveniently shock nitromethane on a benchtop was used with isotopically substituted and amine-sensitized nitromethane and in future will be combined with other spectroscopies such as infrared absorption.

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Date submitted: 27 Feb 2017 Electronic form version 1.4