Abstract Submitted
for the SHOCK19 Meeting of
The American Physical Society

Commonalities in the Shock-to-Detonation-Transition Acceleration Profiles for PBX 9502 SCOTT JACKSON, Los Alamos National Laboratory — The detonation reaction rate constitutes a key element of reactive models for high explosive prediction, yet there is uncertainty as to the best analytical representation of this relationship due to experimental measurement limitations in reacting high explosive flows. This work analyzes the velocity versus time profiles of a high explosive, PBX 9502, undergoing shock to detonation transition. A common acceleration profile is seen across multiple experiments with different initial shock loading conditions. The trend exhibits features consistent with both Arrhenius reaction rate forms at lower velocities and pressure-dependent burn rate forms at higher velocities approaching detonation. The overall trend is most qualitatively consistent with a stretched exponential form and appears to to exhibit some dependence on the initial shock strength condition.

Scott Jackson
Los Alamos National Laboratory

Date submitted: 25 Feb 2019 Electronic form version 1.4