Abstract Submitted
for the SHOCK19 Meeting of
The American Physical Society

Investigation of non-critical pore size effects on detonation front shapes for conventional and 3D printed explosives GABRIEL MONTOYA, NICK CUMMOCK, MONIQUE MCCLAIN, DIANE COLLARD, STEVEN SON, Purdue University, TERRY SALYER, Los Alamos National Laboratory — Micropores in explosives have been shown to play a role in detonation wave propagation even though it is unlikely that many of these pores reach critical temperature. Additive manufacturing allows for the controlled addition of these pores, making the understanding of their effects crucial for design and explosive performance tailoring. A series of experiments is used to observe the effects of pore diameter on detonation propagation in PBX 9501. Streak camera imaging is used to track detonation velocity into the pore, pore collapse, and detonation velocity variations downstream of the pore. Additional streak images are taken with the one-dimensional field of view perpendicular to the detonation direction to investigate wave profile distortion as a function of initial pore size and distance from the pore. Additional shots of 3D printed explosives with tailored pores will allow for comparison with detonation wave profiles from traditionally pressed pellets. This will then be used to help identify ideal pore structure and manufacturing tolerancing for 3D printed explosives.

Gabriel Montoya
Purdue University

Date submitted: 28 Feb 2019 Electronic form version 1.4