Abstract Submitted
for the SHOCK17 Meeting of
The American Physical Society

Modelling of Deflagration to Detonation Transition in Porous PETN of Density 1.4 g / cc with HERMES JOHN REAUGH, Lawrence Livermore National Laboratory, JOHN CURTIS, MARY-ANN MAHESWARAN, Atomic Weapons Establishment, Aldermaston, Reading, RG21 3PR, UK — The modelling of Deflagration to Detonation Transition in explosives is a severe challenge for reactive burn models because of the complexity of the physics; there is mechanical and thermal interaction of the gaseous burn products with the burning porous matrix, with resulting compaction, shock formation and subsequent detonation. Experiments on the explosive PETN show a strong dependence of run distance to detonation on porosity. The minimum run distance appears to occur when the density is approximately 1.4 g / cc. Recent research on the High Explosive Response to Mechanical Stimulation (HERMES) model for High Explosive Violent Reaction has included the development of a model for PETN at 1.4 g / cc., which allows the prediction of the run distance in the experiments for PETN at this density. Detonation and retonation waves as seen in the experiment are evident. The HERMES simulations are analysed to help illuminate the physics occurring in the experiments. JER's work was performed under the auspices of the US DOE by LLNL under Contract DE-AC52-07NA27344 and partially funded by the Joint US DoD/DOE Munitions Technology Development Program. LLNL-ABS-723537

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Date submitted: 23 Feb 2017 Electronic form version 1.4