Abstract Submitted
for the SHOCK09 Meeting of
The American Physical Society

Measurement of Front Curvature and Detonation Velocity for a Nonideal Heterogeneous Explosive in Axisymmetric and Two-Dimensional Geometries ANDREW HIGGINS, McGill University — Detonation in a heterogeneous explosive with a relatively sparse concentration of reaction centers ("hot spots") is investigated experimentally. The explosive system considered is nitromethane gelled with PMMA and with glass microballoons (GMB's) in suspension. The detonation velocity is measured as a function of the characteristic charge dimension (diameter or thickness) in both axisymmetric and two-dimensional planar geometries. The use of a unique, annular charge geometry (with the diameter of the annulus much greater than the annular gap thickness) permits quasi-two-dimensional detonations to be observed without undesirable lateral rarefactions that result from a finite aspect ratio. The detonation front curvature is also measured directly using an electronic streak camera. The results confirm the prior findings of Gois et al. (1996) which showed that, for a low concentration of GMB's, detonation propagation does not exhibit the expected 2:1 scaling from axisymmetric to planar geometries. This reinforces the idea that detonation in highly nonideal explosives is not governed exclusively by front curvature.

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Date submitted: 15 Feb 2009 Electronic form version 1.4