Abstract Submitted
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Simulation of Deformation, Momentum and Energy Coupling Particles Deformed by Intense Shocks[1] B. LIEBERTHAL, D.S. STEWART, J.B. BDZIL, U. Illinois, Urbana, IL 61801, F.M. NAJJAR, Lawrence Livermore National Laboratory, Livermore, CA 9455, S. BALACHANDAR, Y. LING, U. Florida, Gainesville, FL 32611 — Modern energetic materials have embedded solids and inerts in an explosive matrix. A detonation in condensed phase materials, generates intense shocks that deform particles as the incident shock diffracts around them. The post-shock flow generates a wake behind the particle that is influenced by the shape changes of the particle. The gasdynamic flow in the explosive products and its interaction with the deformation of the particle must be treated simultaneously. Direct numerical simulations are carried out that vary the particle-to-surrounding density and impedance ratios to consider heavier and lighter particle. The vorticity deposited on the interface due to shock interaction with the particle, the resulting particle deformation and the net momentum and energy transferred to the particle, on the acoustic and longer viscous time scale are considered. The LLNL multiphysics hydrodynamic code ALE3D is used to carry out the simulations.

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