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Modeling Unit Cell interactions for the Microstructure of a Heterogeneous Explosive: Detonation Diffraction Past an Inert Sphere[1] D. SCOTT STEWART, JOHN B. BDZIL, University of Illinois, Urbana, IL — We describe an approach to model multi-phase blast explosive, which is primarily condensed y volume with inert embedded particles. The asymptotic theory of detonation shock dynamics governs the detonation shock propagation in the explosive. The detonation shock moves at a normal speed that depends on the shock curvature. The shock angle with the particle boundary is also prescribed. We describe theory to predict the behavior of a collection of such detonation shock/particle interactions in the larger aggregate. A unit cell problem, of a detonation shock diffracting over a sphere, is analyzed by analytical and numerical means. The properties of an ensemble of such unit cell problems are discussed with implications for the macroscopic limiting behavior of the heterogeneous explosive.

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