Abstract Submitted for the SHOCK11 Meeting of The American Physical Society

Development of instabilities in explosively dispersed particles YANN GREGOIRE, Institut Pprime, ENSMA, OREN PETEL, DAVID FROST, McGill University — Previous experimental studies have shown that when a layer of solid particles is explosively dispersed, the particles often develop a non-uniform spatial distribution. The instabilities within the particles and at the particle layer interface likely form on the timescale of the shock propagation through the particles. The mesoscale perturbations are manifested at later times in experiments by the formation of coherent clusters of particles or jet-like particle structures, which are aerodynamically stable. The particle instabilities that occur in explosively dispersed particles are investigated with a mesh-free computational method (Smoothed Particle Hydrodynamics). The simulations are compared with experimental results for the dispersal of a spherical packed bed of particles surrounding a central explosive charge. Of particular interest is the effect of the particle density and charge/particle mass ratio on the susceptibility of the particles to form jets.

David Frost McGill University

Date submitted: 22 Feb 2011 Electronic form version 1.4