Abstract Submitted
for the DFD10 Meeting of
The American Physical Society

Dispersion of a cloud of particles in the accelerated flow behind a moving shock[1] GUSTAAF JACOBS, THOMAS DITTMANN, San Diego State University, WAI-SUN DON, Hong Kong Baptist University — We discuss the dynamics and dispersion of bronze particles that are initially arranged in varying cloud shapes and are accelerated in the supersonic flow behind a moving normal shock. Particle clouds with a particle volume concentration of 4% are arranged initially in a rectangular, triangular and circular shape, whose angle with respect to the incoming flow are also varied. Simulations are performed with a recently developed high-order resolution Eulerian-Lagrangian method, that approximates the Euler equations governing the gas dynamics with the improved high order weighted essentially non-oscillatory scheme, while individual particles are traced in the Lagrangian frame using high-order time integration schemes. The purpose of these simulations is two-fold: we are aiming to match a published shocktube experiment of the dispersion of an initially, nominally rectangular cloud shape behind a moving shock and we are aiming to validate our high-order methods against these experiments. The dynamics and resulting dispersion patterns of the developing particle-laden flows are distinctly different between different cloud shapes but we will report statistical similarities and correlations between cloud spread and energy budgets of the particle phases.

[1]The first author gratefully acknowledges support for this work from the AFOSR Young Investigator Program

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Date submitted: 06 Aug 2010 Electronic form version 1.4