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A Numerical Investigation of Shock Propagation through a Clumpy Medium M.R. DOUGLAS, B.H. WILDE, LANL, B.E. BLUE, GA, A. FRANK, University of Rochester, J. M. FOSTER, P.A. ROSEN, R. WILLIAMS, AWE, P. HARTIGAN, Rice University — High velocity flows into inhomogeneous environments are common occurrences in many astrophysical phenomena, and include the passage of strong shocks through "clumps" or "clouds" in the interstellar medium. To obtain an improved understanding of the complex hydrodynamics involved in shock-clump physics, a small number of laboratory experiments have been performed over the past few years which have focused on shock interactions with single clumps. Most recently, a series of Omega experiments have investigated the dynamics of planar shocks propagating through small-scale clumpy media with one to several clumps. As a possible extension to these latter experiments, 2-D and 3-D hydrodynamic calculations have been carried out to examine the effects of much higher number clumps on shock front morphology and shock speed reduction. These calculations utilize the existing experimental platform, which launches a near planar shock (M$\sim$5) into an RF ($C_{15}H_{12}O_4$) cylinder. The clumps are approximated by 100 μm diameter sapphire balls distributed randomly within a confinement sphere of 1-2 mm diameter. For the 3-D calculations, up to 500 balls in a 2 mm confinement sphere has been simulated. A description of the experimental platform and details of the simulations will be presented.

Melissa Douglas
Los Alamos National Laboratory

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