Abstract Submitted
for the SHOCK11 Meeting of
The American Physical Society

Richtmyer-Meshkov instabilities examined with large-scale molecular dynamics simulations[1] FRANK CHERNE, GUY DIMONTE, TIMOTHY GERMANN, Los Alamos National Laboratory — We have performed a series of large scale classical molecular dynamics simulations with nearly 54 million atoms utilizing an embedded atom method potential for copper to examine the development of the Richtmyer-Meshkov (RM) instability. The calculations were performed at shock pressures between 82 GPa and 401 GPa which is both above and below the melt transition for copper. A sinusoidal profile with a 257 nm wavelength and varying amplitudes was created on the free surface of the simulated capper. We will show how the spikes and the bubbles grow as a function of amplitude and shock strength. For conditions where the copper is melted, we observe the growth of the RM instability into bubbles and spikes similar to fluid simulations. At conditions below the melt transition, certain amplitudes showed a series of accelerations/decelerations in the growth of the spike until a complete arrest of the spike growth occured due to the underlying strength of the material.

[1]Support for this work was done under US DOE contract DE-AC52-06NA25396.

Frank Cherne
Los Alamos National Laboratory

Date submitted: 18 Feb 2011 Electronic form version 1.4