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Comparison of hydrodynamic simulations with two-shockwave drive target experiments VARAD KARKHANIS, PRAVEEN RAMAPRABHU, University of North Carolina at Charlotte, WILLIAM BUTTLER, Los Alamos National Laboratory — We consider hydrodynamic continuum simulations to mimic ejecta generation in two-shockwave target experiments [1], where metallic surface is loaded by two successive shock waves. Time of second shock in simulations is determined to match experimental amplitudes at the arrival of the second shock. The negative Atwood number ($A \to -1$) of ejecta simulations leads to two successive phase inversions of the interface corresponding to the passage of the shocks from heavy to light media in each instance. Metallic phase of ejecta (solid/liquid) depends on shock loading pressure in the experiment, and we find that hydrodynamic simulations quantify the liquid phase ejecta physics with a fair degree of accuracy, where RM instability is not suppressed by the strength effect. In particular, we find that our results of free surface velocity, maximum ejecta velocity, and maximum ejecta areal density are in excellent agreement with their experimental counterparts, as well as ejecta models [2,3]. We also comment on the parametric space for hydrodynamic simulations in which they can be used to compare with the target experiments.

[1] W. T. Buttler et al., J. Appl. Phys., 116 (2014).
[2] Guy Dimonte et al., J. Appl. Phys., 113 (2013).
[3] W. T. Buttler et al., J. Fluid Mech., 703 (2012).

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