

Abstract Submitted
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Validation and Calibration of Metal Strength Models Using Richtmyer-Meshkov Instability Measurements and Simulations¹

CHRISTOPHER GARASI, JOSEPH OLLES, RYAN COLEMAN, Sandia National Laboratories — The RM instability provides unique experimental insight into the arrest of spike growth due to material strength properties. This is especially important at high strain rates which cannot be probed using Hopkinson bar experiments. Data from experiments with a cylindrical copper flyer impacting a copper target with sinusoidal perturbations has been collected from Argonne National Laboratory's Advanced Photon Source (dynamic compression sector). Simulations have been compared against RM experimental data to address questions such as: - Can the experimental results be modeled using a 2D approximation or is 3D required? - What impact does uncertainty in the target geometry and material parameters have when comparing to the data? - Can a Lagrangian calculation adequately capture the jet growth rate or is Eulerian required? - How well do simple and more sophisticated material strength models capture the data? - Do we arrive at the same strength parameters for 2D and 3D simulations? - Should we examine another machined perturbation geometry? These results are preparatory for future experiments which will examine the strength of polymer coatings.

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