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Development and validation of a compressible nonlinear growth spike velocity model JONATHAN D. REGELE, ALAN K. HARRISON, MARIANNE M. FRANCOIS, Los Alamos National Laboratory — The Richtmer-Meshkov instability (RMI) is responsible for ejecta production after a shock wave passes through a material interface. RMI theory and models can be used to predict the initial spike velocity and infer the velocity of the ejecta particles produced through the instability. Most models are based on incompressible potential flow theory and cannot account for the difference in behavior caused by strong shock waves. Karkhanis et al. [V. Karkhanis et al., J. Appl. Phys., 2018] developed a model for the asymptotic spike velocity that accounts for compressibility. However, particle trajectories are more accurately captured when accounting for the nonlinear growth dynamics that occur between when the interface is initially shocked and when the spikes reach their asymptotic velocity. In this work, the Karkhanis model is converted into a nonlinear growth framework and validated against experimental data.

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