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**A comparative study of Rayleigh-Taylor and Richtmyer-Meshkov instabilities in 2D and 3D in tantalum** ZACH STERNBERGER, RAVI RAVICHANDRAN, Caltech, CHRIS WEHRENBERG, BRUCE REMINGTON, BRIAN MADDOX, LLNL, KATHY OPACHICH, NSTec, GREG RANDALL, MIKE FARRELL, General Atomics — Driving a shock wave through the interface between two materials with different densities can result in Richtmyer-Meshkov or Rayleigh-Taylor instability and initial perturbations at the interface will grow. If the shock wave is sufficiently strong, the instability will lead to plastic flow at the interface. Material strength will reduce the amount of plastic flow and suppress growth. While such instabilities have been investigated in 2D, no studies of this phenomena have been performed in 3D on materials with strength. Initial perturbations to seed the hydrodynamic instability were coined into tantalum recovery targets. Two types of perturbations were used, two dimensional (2D) perturbations (hill and valley) and three-dimensional (3D) perturbations (egg crate pattern). The targets were subjected to dynamic loading using the Janus laser at the Jupiter Laser Facility. Shock pressures ranged from 30 GPa up to 200 GPa, and were calibrated using VISAR drive targets. The recovered targets show that the 3D initial perturbations grew more than the 2D initial perturbations at the same shock strength. This result is compared with predictions of existing models in the literature.

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