Abstract Submitted
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Investigating flow strength in Tin through plasma-driven Rayleigh-Taylor instabilities[1] CAMELIA STAN, ALEX ZYLSTRA, Lawrence Livermore Natl Lab, MATTHEW HILL, Atomic Weapons Establishment, HYE-SOOK PARK, PHILIP POWELL, DAMIAN SWIFT, JAMES MCNANEY, Lawrence Livermore Natl Lab — The Rayleigh-Taylor instability occurs when a lower density fluid pushes against a higher density one, leading to the growth of any surface perturbations. In the case of solids, this growth is mitigated by material strength (1). Consequently, it has been used as a way to determine the strength of various materials such as Cu, Fe, Ta, and Pb under ultra-high pressure conditions, by comparing against a strength-free system (2-4). Here, we use three lasers at the Omega EP laser facility, University of Rochester, to generate a Be plasma that drives a ramped compression to 1.5 Mbar into a rippled Sn target. The growth of the Sn ripples against the less dense CH is measured using face-on radiography. We then compare these results to hydrodynamic simulations using a Steinberg-Guinan strength model, allowing us to determine the flow stress of Sn at these pressure conditions. 1.Park, H.-S. et al. Phys. Rev. Lett. 114, (2015). 2.Huntington, C. M. et al. Bulletin of the American Physical Society (American Physical Society, 2017) 3.McNaney, J. M. et al. Bulletin of the American Physical Society (American Physical Society, 2019). 4. Krygier, A. G. et al. Phys. Rev. Lett., submitted (2019).

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