Abstract Submitted
for the DPP20 Meeting of
The American Physical Society

Numerical simulation of planar multiple shock interactions on the National Ignition Facility[1] H. F. ROBEY, C. A. DI STEFANO, E. C. MERRITT, F. W. DOSS, K. A. FLIPPO, R. SACKS, Los Alamos National Laboratory
— A numerical design study was performed to explore the parameter space of multiple co-propagating planar shock interactions in a laser-driven shock-tube on the National Ignition Facility (NIF). The experiment geometry is unique in that it is capable of producing a wide range of multiple co- or counter-propagating shock / material interface interactions in a planar geometry with interfacial perturbations at a diagnosable scale. Integrated hohlraum / shock-tube package simulations were performed using both HYDRA and xRAGE, and comparison between the two shows good agreement on the trajectory of unstable interfaces. Comparisons are made with both experimental data [1] and previous simulations [2] from this platform. The parameter space of possible shock interactions is very rich and allows for the study of multi-shock instability growth from the incompressible limit to strongly compressible conditions. [1] E. C. Merritt et al., "Results of the first same-sided successive-shock HED instability experiments", abstract submitted to APS DPP (2020). [2] C. A. Di Stefano et al., "First experimental measurement of two co-propagating shocks interacting with an unstable interface", submitted to Phys. Rev. Lett (2020).

[1]This work conducted under the auspices of the U.S. DOE by LANL under contract 89233218CNA000001

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Date submitted: 29 Jun 2020 Electronic form version 1.4