

Abstract Submitted
for the SHOCK19 Meeting of
The American Physical Society

Dynamic deformation of additively manufactured lattice structures¹ MUKUL KUMAR, JONATHAN LIND, ANDREW ROBINSON, Lawrence Livermore Natl Lab — Recent advances in additive manufacturing have allowed for the production of new structures with hierarchical topologies. As in any new material development cycle what remains to be investigated is the macroscale dynamic deformation response, which in this instance is expected to be quite unlike that of bulk, homogeneous solids. Dynamic deformation processes can now be observed in-situ using recent advances in time-resolved phase contrast imaging in conjunction with gas-gun drivers at the Dynamic Compression Sector. Recent work by Branch et al. demonstrated the formation of jets from the target material in a simple cubic “woodpile” structure. Here, we present results from an experimental study of this phenomenon over a wide range of velocities from 0.2 to >2 km/s. In parallel with the experiments, direct numerical modeling relate the origins of the jets back to the underlying stress state in the target and projectile.

¹This work was performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344. This publication is based in part upon work performed at the Dynamic Compression Sector at the Advanced Photon Source supported by the Department of Energy, National Nuclear Security Administration, under Award Number DE-NA0002442. This research used resources of the Advanced Photon Source, a U.S. Department of Energy (DOE) Office of Science User Facility operated for the DOE Office of Science by Argonne National Laboratory under Contract No. DE-AC02-06CH11357.

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Date submitted: 28 Feb 2019

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