Abstract Submitted
for the SHOCK19 Meeting of
The American Physical Society

Constraining flow stress models at high strain-rates through in-situ imaging of hole closure under dynamic compression[1] JONATHAN LIND, ANDREW ROBINSON, MATTHEW NELMS, NATHAN BARTON, MUKUL KUMAR, Lawrence Livermore Natl Lab — The stress at which a material plastically flows depends on the current state of the material, strain-rate, and microstructure among other quantities. Experimental tests at high strain-rates ($>10^3$/s) often use measurement of shape change to infer flow stress behavior and are facilitated by comparisons with advanced simulations. A new plate-impact experimental test will be described consisting of in-situ x-ray imaging the closure of a cylindrical hole in a sample during the passage of a pressure pulse of controlled amplitude and duration. Experiments on tantalum aims to test the validity of present flow stress models within the experimental uncertainty. Results will be compared with direct numerical simulations using several flow stress models. We will discuss the results, the sensitivity of this new experimental test, and the implications for informing models.

[1]This work was performed under the auspices of the U.S. Department of Energy (US-DOE) by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344. Part of this work was performed at the Dynamic Compression Sector at the Advanced Photon Source (APS) supported by the US-DOE, National Nuclear Security Administration, under Award Number DE-NA0002442. This research used resources of the APS, a US-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 Electronic form version 1.4