Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Aluminum Yield Strength on Quasi-isentropes JEFFREY H. NGUYEN, J. REED PATTERSON, DANIEL ORLIKOWSKI, L. PETER MARTIN, RYAN KRONE, ROGER MINICH, NEIL C. HOLMES, Lawrence Livermore National Laboratory — Advances in the functionally graded density impactors (FGDI) have made it possible to carry out dynamic experiments at previously inaccessible regions of the phase diagram. We employed these advances in recent tailored dynamic experiments to gain insight into the yield strength of aluminum along "hot" quasi-isentropes. The impactor was specifically designed to deliver a triangular compression wave into a sample where the strain rates on the compression and release isentropes were nearly identical. The aluminum samples were initially shocked to a fixed state on the Hugoniot, then quasi-isentropically compressed, and finally allowed to release isentropically. Here, we will discuss the details of the experiments and error analysis in deriving the yield strength of aluminum on a "hot" quasi-isentrope. We will also discuss recent advances in the FGDI technology that made these experiments possible with significantly reduced uncertainties. Methods to characterize these advances will be discussed. This work was performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory in part under Contract W-7405-Eng-48 and in part under Contract DE-AC52-07NA27344.

Jeffrey H. Nguyen
Lawrence Livermore National Laboratory

Date submitted: 13 Dec 2007 Electronic form version 1.4