Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Pb strength Rayleigh-Taylor drive development on the National Ignition Facility[1] SHON PRISBREY, HYE-SOOK PARK, ROBIN BENEDETTI, CHANNING HUNTINGTON, JAMES MCNANEY, RAY SMITH, CHRIS WEHRENBERG, CYNTHIA PANAS, ATHANOSIOS ARSENLIS, Lawrence Livermore National Laboratory — Strength can be inferred by the amount a Rayleigh-Taylor surface deviates from classical growth when subjected to acceleration. If the acceleration is great enough, even materials highly resistant to deformation will flow. We use the National Ignition Facility (NIF) to create an acceleration profile that will cause sample metals, such as Ta or Pb, to reach multi-Mbar pressures without inducing shock melting in samples. To create such a profile we shock release a stepped density reservoir across a large gap with the stagnation of the reservoir on the far side of the gap resulting in the desired pressure drive history. Low density steps (foams) are a necessary part of this design and have been studied in the last several years on the Omega and NIF facilities. We will present progress that has been made from the ˜5 Mbar Ta drive designs that enable strength experiments on Pb. A Pb drive design has been measured on the NIF that induces peak pressure of ˜3.5 Mbar in the metal while avoiding shock melting during the loading process.

[1]This work was performed under the auspices of the Lawrence Livermore National Security, LLC, (LLNS) under Contract No. DE-AC52-07NA27344. LLNL-ABS-696917

Shon Prisbrey
Lawrence Livermore National Laboratory

Date submitted: 10 Nov 2016 Electronic form version 1.4