Abstract Submitted
for the SHOCK17 Meeting of
The American Physical Society

Accessing off-Hugoniot states via multilayer ring-up targets DAVID MCGONEGLE, PATRICK HEIGHWAY, MARCIN SLIWA, JUSTIN WARK, University of Oxford, UK, CYNTHIA BOLME, LANL, ANDREW COMLEY, AWE, Aldermaston, UK, LEORA COOPER, MIT, ANDREW HIGGINBOTHAM, ASHLEY POOLE, University of York, UK, EMMA MCBRIDE, BOB NAGLER, INHYUK NAM, MATT SEABERG, SLAC National Accelerator Laboratory, BRUCE REMINGTON, ROBERT RUDD, CHRIS WEHRENBERG, LLNL
— While laser shocks have long been used as a method for reaching high pressure states, their highly entropic nature limits the range of pressures over which a sample can be kept solid. Laser pulse shaping has been used to ramp compress samples while keeping them close to the isentrope, but this requires long laser pulses that are unavailable to most facilities or expensive pusher materials such as diamond or sapphire. We introduce a technique that uses a multilayer target with different impedance layers that result in the sample 'ringing-up' to the desired pressure via a series of smaller shocks, keeping it cooler. We present data from a recent experiment performed at LCLS using this technique, allowing us to reach 170 GPa in Pb while keeping it solid.

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Date submitted: 23 Feb 2017 Electronic form version 1.4