Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

Development of a low-adiabat drive for material science experiments on NIF using release and recompression of low density organic foams[1] CHRISTOPHER WEHRENBERG, SHON T. PRISBREY, HYE-SOOK PARK, L. ROBIN BENEDETTI, CHANNING HUNTINGTON, JAMES MCNANEY, RAY SMITH, CYNTHIA PANAS, ANGELA COOK, BRUCE REMINGTON, TOM ARSENLIS, Lawrence Livermore National Lab, PETER GRAHAM, Atomic Weapons Establishment — A series of experiments were performed on NIF to develop a planar, 3-shock, low-adiabat drive for material science experiments. Physics samples (Ta, Pb, etc.) are loaded to 3-4 Mbar while staying well below the melt temperature. X-ray ablation from an indirect drive launches a strong ($\sim$ 50 Mbar), decaying shock through a precision fabricated "reservoir," consisting of a CH ablator, followed by layers of Al, CH(18.75%I), $\sim$ 375 mg/cc carbonized resorcinol formaldehyde foam, and a final layer of low density (10-35) mg/cc foam. As the releasing reservoir stagnates on a Ta drive plate, VISAR is used to measures the resulting compression waves. The lowest density reservoir layer is responsible for the leading shock and induces the most entropy during the drive. LLNL has developed a new, low-density foam called JX6 ($C_{20}H_{30}$) for the purpose of controlling the leading shock. We will describe a series of experiments done on NIF to test the combined release and recompression properties of JX6 and to develop a new, lower-adiabat drive.

[1]This work was performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract No. DE-AC52-07NA27344.

Christopher Wehrenberg
Lawrence Livermore National Lab

Date submitted: 24 Jul 2015 Electronic form version 1.4