Abstract Submitted
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A proposed experimental investigation of a sub-sonic Marshak wave STEPHAN MACLAREN, LLNL — An experiment has been proposed to investigate the behavior of a diffusive x-ray driven heat wave using a laser halfraum and a high-Z aerogel. This problem has been solved analytically in one dimension from a few specific cases to a much more general problem.[1][2][3] The experiment has been designed to optimize comparisons with a 1-D analytic solution. Specifically, a 48-beam, 7ns laser pulse from the National Ignition Facility (NIF), shaped to produce a power-law time dependence for the radiation temperature, is used to create a uniform radiation temperature bath for a 0.5 g/cc, 150 micron slab of Ta_2O_5 foam. Driven by NIF over this distance, the shock separates from the temperature front by >2 ns, improving the accuracy of the timing measurements. Results from radiation-hydrodynamics simulations will be presented, along with the analytic predictions of the temperature front from the solutions of Refs [2] and [3]. Additionally, these solutions offer a prediction of the shock arrival time due to the time dependent ablation pressure; these predictions will also be compared with simulation. Finally, the impact of a simultaneous match of these two arrival times between theory and experiment on the knowledge of the material properties of the Ta_2O_5 foam will be discussed. [1] Marshak, R.E., Phys. Fluids **1** (1), 1958, 24. [2] Pakula, R. and R. Sigel, Phys. Fluids **28** (1), 1985, 232. [3] Hammer, J.H., and M.D. Rosen, Phys Plasmas **10** (5), 2003, 1829.

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