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A Study of phase explosion of metal using high power Nd:YAG laser ablation JACK Y. YOH, HYUNHEE LEE, KIHONG KIM, Seoul National University — The high speed blast wave generated by the laser ablation of metal reaches a propagation velocity of several thousand meters per second. The strikingly similar flow conditions to those of detonation wave allow one to apply the governing equations of motion for energetic materials to understand the explosive behavior of metal surface upon laser ablation. We describe the high power (>2.5 J/pulse) laser ablation technique for generating phase explosion for selective metals. The time resolved shadowgraph images of explosive wave fronts show that the point source (the targeted beam spot) blast wave radius is consistent with that given by the classical Sedov-Taylor solution. A multi-material shock physics code originally developed for high explosive detonation is applied for the full simulation of metal ablation based phase explosion. Some details on the experimental setup and the work-in-progress calculations are given.

Ricky Chau
LLNL

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