

Abstract Submitted
for the SHOCK07 Meeting of
The American Physical Society

Proton Radiography of a Thermal Explosion in PBX 9501 LAURA SMILOWITZ, BRYAN HENSON, JERRY ROMERO, Chemistry Division, LANL, BLAINE ASAY, MARY SANDSTROM, DE Division, LANL, PRAD COLLABORATION — The understanding of thermal explosions and burn propagation lags that of detonations and shock propagation. Diagnostics such as high energy radiography have been used to image shocks, but have been previously precluded from use in thermal explosions due to their stringent timing requirements: shock propagation can be synchronized to an external diagnostic while thermal explosion can not. This issue is solved by following the evolution of the ignition volume in a thermal explosion and using a laser pulse to provide a temperature jump in that central volume during the final thermal runaway leading to ignition. Details of the laser heating which minimize the perturbation of the thermal explosion will be discussed with comparisons between auto-ignited and laser ignited tests. Thermal explosion experiments have been conducted at the Los Alamos Proton Radiography facility and have yielded images of the evolution of ignition, post-ignition burn propagation, and case failure in a radially confined cylinder of PBX 9501.

Laura Smilowitz
Chemistry Division, LANL

Date submitted: 23 Mar 2007

Electronic form version 1.4