

Abstract for an Invited Paper
for the SHOCK07 Meeting of
The American Physical Society

Direct Shock-Density Measurements using Plate Impact and Proton Radiography

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Proton radiography (pRad) is a powerful new diagnostic with the potential of producing accurate (1%) direct density measurements from dynamically loaded materials. Experiments have been performed to investigate the feasibility of using proton radiography (pRad) to obtain dynamic radiographs of shock-compressed materials during plate impact experiments. This work has involved the design, manufacturing, and testing of a new 40mm single-stage, powder driven gun, the development of methods to synchronize the shock event generated with the gun to proton output, and initial proof-of-principle experiments in Area C at LANSCE. To date, four symmetric impact experiments on aluminum and copper have been performed with successful synchronization. The method used to attain synchronization of the shock event to proton beam output will be discussed and the results of our initial experiments will be presented.