

Abstract Submitted  
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**The Design and Testing of an Impact Ignited Deflagration-to-Detonation Experiment** IAN LOPEZ-PULLIAM, PETER SCHULZE, ERIC HEATWOLE, TREVOR FEAGIN, GARY PARKER, Los Alamos National Laboratory — There are elements of the mechanism for DDT in weak confinement materials that are still poorly understood. At LANL, we have developed an impact-ignited DDT test to further explore ways in which the process varies from what has been well described when strong metal confinement is used. The experiment employs a smokeless-powder gun system to accelerate a machined projectile into a tube (DDT tube) containing a column of high explosives (projectile velocities  $\sim 120$ - $160$  meters per second). Precise control over the impact timing allows for the fielding of a suite of high-speed diagnostics to observe the increasingly rapid burn modes building to DDT. Projectile velocity/position, high-speed video, pyrometry data, and gun-bore pressure can be recorded for each test. The experiment allows selected variables to be changed between tests, including projectile length, projectile velocity, DDT tube material/design, and HE column composition/characteristics. From the more than 25 tests already completed using the gun system, we have observed interesting behavior pertaining to DDT in PETN with polycarbonate confinement ( $\sim 150$  m/s impact velocity). The design, function, results of the experiment system will be discussed.

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