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Overdriven-detonation states produced by spherically diverging waves MATTHEW BISS, MARK LIEBER, MICHAEL MARTINEZ, Los Alamos National Laboratory — A series of experiments are currently underway at the Detonation Science and Technology group, within the Los Alamos National Laboratory, to study the overdriven-detonation states achievable in energetic materials as a result of detonation-wave interactions. A multi-component, energetic-material array was designed to study the amplification of velocity and pressure states produced by spherically diverging detonation waves in pentaerythritol tetranitrate (PETN) acceptor charges. The unique geometry provides a low-jitter, highly controlled series of interactions between three independent-detonation inputs. Streak-camera imaging was performed on the output face of PETN-acceptor charges ranging in thickness from 2.5 – 10 mm to characterize the resulting breakout profile. Additionally, photonic Doppler velocimetry (PDV) measurements were collected at the acceptor-charge surface to determine simultaneity within the system. Detonation-wave velocities upwards of 14 mm/s were measured, as compared to a steady-state detonation velocity of 7.9 mm/s for the PETN pressing density investigated. Additional experiments are being conducted to measure the pressure amplification generated at key areas of interaction.

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