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Measurements of subdetonative shock interactions in PBX-9502 PHILLIP MILLER, LARRY HULL, ERIC MAS, Los Alamos National Laboratory — Validation of predictive capabilities for safety of insensitive high explosives relies on experiments which test off-normal conditions and non-intentional initiation. One possible condition is the interaction of weakly supported shocks, whose individual amplitudes would not be predicted to run to full detonation for an isolated insult. A wedge test of PBX-9502 subjected to expanding and interacting cylindrical shock waves was conducted and diagnosed with flash x-ray, chirped fiber Bragg gratings (CFBG), photon doppler velocimetry (PDV), and fast framing camera images of a flasher plate. The shock waves collide in the center of the wedge, where the pressure gradient below the interaction region is controlled by release to the free surface between the tungsten barriers, or an inert plug placed into the air gap to delay release. Flash x-ray images through the wedge show the reaction of the incipient shock collision, while the CFBG, PDV, and flasher plate along the wedge face measure the thickness dependent propagation and acceleration from shock reflection. The experiments demonstrate the influence of the pressure gradient behind the shock interaction region, which may transition to detonation, or which may remain subdetonative due to the release rate controlled by the inert plug.

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