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Low Velocity Impact Experiments plus Modeling of the Resulting Reaction Violence in LX-10 Charges STEVEN CHIDESTER, FRANK GARCIA, KEVIN VANDERSALL, CRAIG TARVER, Lawrence Livermore National Laboratory — A new gas gun facility and improved instrumentation were used to study the mechanisms of low velocity impact ignition and growth of violent reaction. Cylindrical charges of the HMX based explosive LX-10 (95% HMX, 5% Viton binder) encased by lexan were impacted by 6.35 mm diameter hardened steel projectiles at velocities ranging from 47 to 500 m/s. Fast Phantom v12 cameras were employed to capture the times of first ignition. The degrees of resulting reaction violence were determined using Photonic Doppler Velocimetry (PDV) probes to measure the free surface velocity histories of attached aluminum foils. Analytical and hydrodynamic reactive flow models were used to estimate the relative violence of these LX-10 reactions compared to the intentional detonation of an equivalent LX-10 charge. This work was performed under the auspices of the U. S. Department of Energy by the Lawrence Livermore National Laboratory under Contract No. DE-AC52-07NA27344.

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