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Disk Acceleration Experiment Utilizing Minimal Material (DAX-UMM) MATTHEW BISS, US Army Research Laboratory, THOMAS LORENZ, Lawrence Livermore National Laboratory, GERRIT SUTHERLAND, US Army Research Laboratory — A venture between the US Army Research Laboratory (ARL) and Lawrence Livermore National Laboratory (LLNL) is currently underway in an effort to characterize novel energetic material performance properties using a single, high-precision, gram-range charge. A nearly all-inclusive characterization experiment is proposed by combing LLNL's disk acceleration experiment (DAX) with the ARL explosive evaluation utilizing minimal material (AXEUMM) experiment. Spherical-cap charges fitted with a flat circular metal disk are centrally initiated using an exploding bridgewire detonator while photonic doppler velocimetry is used to probe the metal disk surface velocity and measure its temporal history. The metal disk's jump-off-velocity measurement is combined with conservation equations, material Hugoniots, and select empirical relationships to determine performance properties of the detonation wave (i.e., velocity, pressure, particle velocity, and density). Using the temporal velocity history with the numerical hydrocode CTH, a determination of the energetic material's equation of state and material expansion energy is possible. Initial experimental and computational results for the plastic-bonded energetic formulation PBXN-5 are presented.

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