Abstract Submitted
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Investigations of RF Emissions from High-Velocity Impacts of Various Metals[1] WILLIAM BROWN[2], MARK SCHMIDT[3], WILLIAM BROAD[4], Applied Research Associates, Inc — We describe a series of experiments to examine emissions in the radio-frequency (RF) portion of the electromagnetic spectrum, resulting from high-velocity impacts of various metals. A two-stage gas gun was used to impact aluminum (6061-T6) spheres, at velocities of approximately 6 km/s, against aluminum/titanium alloy (Ti6Al4v) target plates. In most experiments, debris ejected from the rear surfaces of target plates impacted against witness plates of various metals (aluminum, copper, zinc). The witness plates were placed at various distances from rear surfaces of target plates, and electric field probes were used to obtain measurements of three near-field orthogonal components of the electric fields at sampling rates of 10 giga-samples/s. Additionally, we describe a series of finite-difference impact calculations to simulate these experiments, and determine approximate values of material state variables. From experimental and computational results, we have developed a semi-empirical model describing dependence of the electric field amplitude and frequency on material strength and impact conditions.

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[2]Arlington, VA 22203
[3]Littleton, CO 80127
[4]Littleton, CO 80127

William Brown
Applied Research Associates, Inc

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