

Abstract Submitted
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Measuring densities of high-velocity metallic sprays using piezoelectric sensors CARYS LLOYD, WILLIAM PROUD, University of Cambridge
— Recent research efforts in large-scale hydrodynamic experiments have concentrated on the possibility of using piezoelectric sensors to study the evolution of ejecta. Ejecta are small ($<100\ \mu\text{m}$ diameter) particulates that are ejected at high velocity ($>1\ \text{km s}^{-1}$) from a shocked surface. This paper investigates whether Dynasen PZT piezoelectric sensors are reliable and robust enough to measure accurate time-resolved stresses and densities in high-velocity metallic sprays. The sprays are assumed to have similar characteristics to ejecta sprays, and are generated by a gas gun and in a safe and reproducible manner. A complimentary diagnostic technique, utilising high-speed photography and fast x-radiography, measures the densities of the sprays independently, allowing the accuracy of the sensors to be assessed. The Dynasen sensors have been shown to perform relatively well in spray environments. Their accuracy can be improved by taking their mechanical impedance characteristics into account.

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