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Exploding Wire System for Use in Study of Two-Dimensional Shock Focusing[1] BARRY LAWLOR, LINGZHI ZHENG, CLAIRE MCGUIRE, JANE ZANTESON, KEVIN NGUYEN, BENJAMIN KATKO, VERONICA ELIASSON, Jacobs School of Engineering — Shock focusing is an area of interest within a wide range of disciplines, ranging from biomedical devices to structural design. Extensive study has been performed on shock waves by means of horizontal shock tube devices which typically only allow for the study of constant flow properties. A blast wave typically is defined as a shock front, followed by an exponential decay in flow properties. The intention of this study is to develop a tool with which to investigate and define the behavior of shock waves with decaying flow properties, including the transition from regular to irregular reflection. Such capability has been accomplished through an exploding wire system, which functions by subjecting a wire to a large and sudden voltage difference, producing a radially expanding explosion. The novelty of this system lies in (1) the ability to produce shock waves consistent with blast type flow conditions; (2) its modularity by virtue of the driver; and (3) its application in gaseous environments. The outcome has been an experimental setup with novel application in air, proven repeatability, as well as initial qualitative and quantitative results in its two-dimensional, cylindrical format.

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