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PDV test of acceleration and impact onto LiF window of a flyer driven by electric explosion WANG WANJUN, LEI FAN, ZHU MINGSHUI, FU QIUBO, China Academy of Engineering Physics — Acceleration of polyimide flyer driven by mini-type electric explosion was measured using PDV technology, the voltage across exploding foil bridge and the transient current was also measured with the help of voltage probe and current loop, respectively. By removing the response time of test devices as well as the signal travelling time in transmission line, the synchronous relation between flyer velocity, current and voltage was obtained with an error less than 10ns. Moreover, the flyer kinetic energy, plasma kinetic energy and plasma internal energy were calculated based on flyer acceleration history under the assumption of liner distribution of plasma velocity and uniform distribution of plasma density and pressure. The percent conversion from Joule heat deposited in exploding foil bridge into efficacious energy was calculated finally. Furthermore, the interface particle velocity of LiF window under the impact of flyer was also measured by PDV, the interface pressure and duration was theoretically studied using impedance match theory. What's more, the comparison of transmission pressure pulse duration between PDV and simulation result suggested that the flyer was slightly ablated due to the high-temperature plasma.

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