

Abstract Submitted
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Programmable velocity trap for triggering gun diagnostics¹

GARETH TEAR, WILLIAM PROUD, Imperial College London — Diagnostics that require precise temporal triggering require a gun and triggering system with low jitter. A programmable and calibrated velocity trap for triggering diagnostics accurately without requiring accurate and predictable muzzle velocities has been developed. The design, applications and limits will be presented. Cutting edge measurements often require precise temporal triggering. For example a framing camera with an interframe time of 15ns requires a pre trigger around 1.8 microseconds prior to imaging (to clear the CCD), with a precision of +/-5ns for the imaging frames. This equates to a fractional tolerance of +/-0.3% in the timing. Gas and powder guns typically have high jitter when triggered due to uncertainty in the muzzle velocity. One way of compensating for this is with a velocity trap, a device which measures the speed of the projectile and immediately adjusts the trigger delay to match the velocity difference. These devices have fallen out of favour when compared to digital pre-triggering available on many commercial cameras and oscilloscopes because they are difficult to calibrate and time consuming to setup. We have developed a programmable velocity trap to allow easier triggering of diagnostics on gun experiments.

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