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UNDERSTANDING THE DYNAMIC PERFORMACE OF MICROCHANNEL PLATES IN PULSED MODE

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The dynamic performance of a microchannel plate (MCP) is highly dependent on the high-voltage waveforms that are applied to it. Impedance mismatches in MCP detectors can significantly vary the waveforms on the MCP compared to the input pulses. High-voltage pulse waveforms launched onto surface coatings on the MCPs have historically been difficult and expensive to measure. Over the past few years, we have developed and tested techniques utilizing probes to measure the voltage propagation on the surface of MCPs. Square and Gaussian pulses with widths ranging from 200 ps to 2 ns have been applied. We have investigated the effects of coating thickness, microstrip width, and open-ended versus terminated strips. These data provide a wealth of knowledge that is enabling a better understanding of images recorded with these devices. This presentation discusses a method for measuring voltage profiles on the surface of the MCP and presents Monte Carlo simulations of the optical gate profiles based on the measured waveforms. Excellent agreement in the optical gate profiles have been achieved between the simulations and the experimental measurements using a short-pulse ultraviolet laser.

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