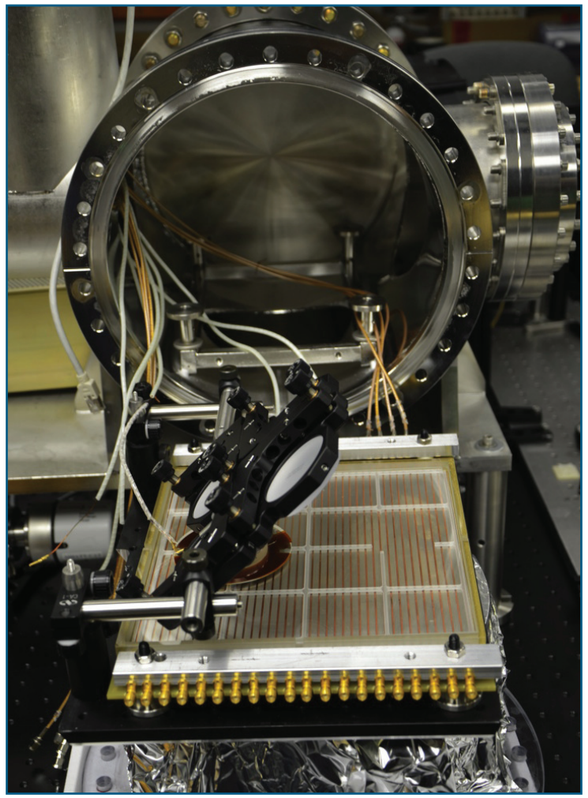
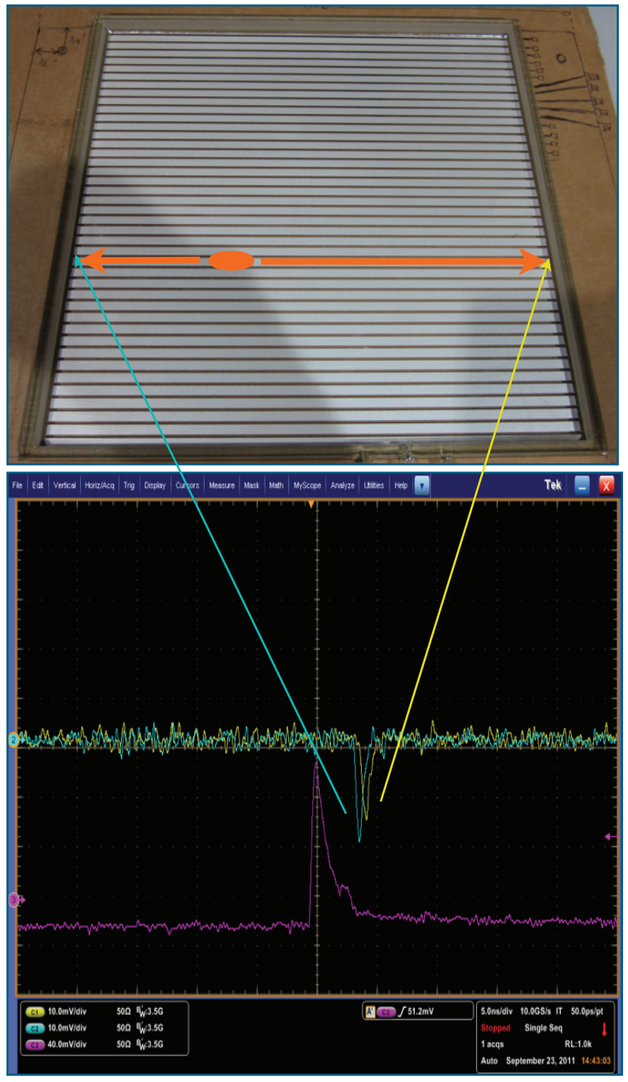
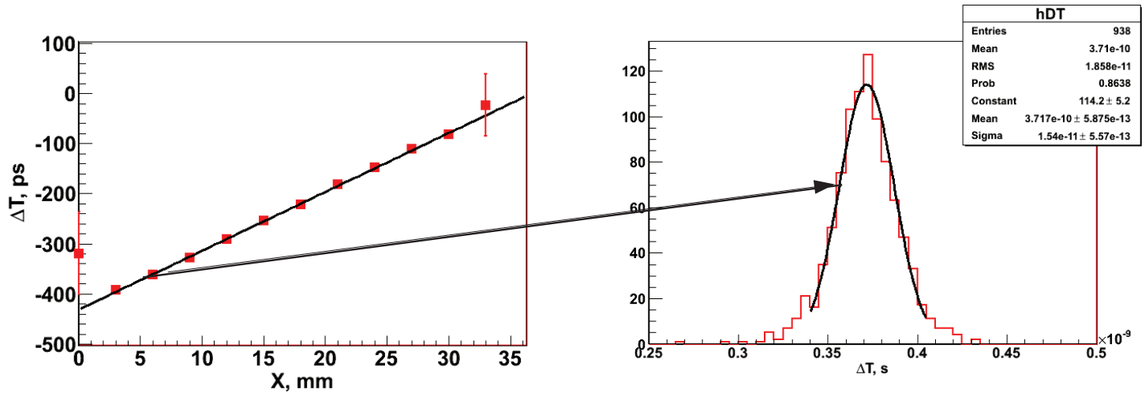
The system seen in the image to the right was built for testing stacks of 8" microchannel plates in a large vacuum chamber. The MCPs are combined with a simple aluminum photocathode. When stimulated by light from a pulsed laser, photoelectrons are ejected from the aluminum and amplified by the MCPs.

The figures seen below represent the difference which was measured in arrival time of the signal at both ends of the anode, as a function of laser position along the transmission line. This figure shows the average difference in arrival time as a function of position (bottom left) and the distribution of differential arrival times at one specific laser position (bottom right). The slope of the fitted line is approximately 2/3 c, which corresponds to the expected signal transmission time along these striplines. The RMS of the measured differential arrival time is better than 15 picoseconds, which corresponds to 3mm spatial resolution.







The figures to the left correspond to the working demonstration of a delay-line anode design consisting of a pair of 8" x 8" MCPs. Signal from the MCP pores is collected on a series of parallel, silver micro-striplines. The oscilloscope screenshot on the left shows a representative MCP signal from the 8" plates (green and yellow traces for the two ends of a stripline), referenced to the triggering laser pulse (purple). The difference between the arrival times of the signals on the two ends of the stripline is used to determine the position of the detected signal along that line. The weighted average of signal collected on neighboring strips is used to determine the position in the perpendicular direction.

Data provided by Incom's innovation partners:
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