Large Area Picosecond Photodetectors push timing envelope

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The Large Area Picosecond Photodetector (LAPPD) collaboration has developed big detectors that push the timing envelope, measuring the speed of particles with a precision down to trillionths of a second.

As described in the journal *Review of Scientific Instruments*, which is produced by the AIP Publishing, a team of researchers within the LAPPD collaboration developed an advanced facility for testing large area photodetectors—with a level of spatial precision measured in micrometers and time resolutions at or below a picosecond.

"Innovation in science often comes from advances in instrumentation," said Matthew Wetstein, a Grainger Fellow at the University of Chicago's Enrico Fermi Institute who was a co-author on the study. "It can come in the form of a completely new capability or be as simple as making existing instrumentation affordable and accessible for many different types of experiments.

In many areas of particle physics, detectors have seen steady improvements in resolution, but timing is an envelope that deserved a push, he added.

"We're designing detectors that are the fastest ever built for their spatial granularity, size, and cost," Wetstein said. "Our goal is to put a very powerful tool into the hands of the scientific community."

A central aspect of the project is a technique known as Atomic Layer

Deposition (ALD), the authors reported in their paper. Beyond the realm of high-energy physics, potential applications for the photodetector range from basic X-ray physics to medical imaging to large-area X-ray detection for homeland security.

More information: The article, "A Test Facility for Large-Area Microchannel Plate Detector Assemblies Using a Pulsed Sub-picosecond Laser" by Bernhard Adams, Matthieu Chollet, Andrey Elagin, Eric Oberla, Alexander Vostrikov, Matthew Wetstein, Razib Obaid, and Preston Webster is published in the journal *Review of Scientific Instruments*. dx.doi.org/10.1063/1.4810018

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