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Recent results from the pixel-based accelerated aging of Large Area Picosecond Photodetectors ($LAPPD^{\mathrm{TM}}$)

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We present results from the aging test of a recently fabricated 20 cm × 20 cm Large Area Picosecond Photodetector (LAPPD) by INCOM Inc. A differentiating feature of LAPPD is the use of ALD-GCA-micro channel plates (MCPs) fabricated by utilizing atomic layer deposition (ALD) technology to coat the resistive and emissive films to the surface of bare glass capillary arrays. LAPPD has the largest active area among the commercially available planar MCP-photomultiplier tube (MCP-PMT) photodetectors. Accelerated aging of the LAPPD MCP-PMT has been achieved by exposing a highly localized region of the photodetector to 450 nm photons at high rates. Our previous investigations have shown that the radiation effects of a pixel-based exposure are highly localized with minimal damage beyond the exposed area making it possible to characterize performance results while retaining the future usability of the MCP-PMT. In the present accelerated aging experiment, we extract current densities of about 1.4 μA/cm^2 from the LAPPD MCP-PMT which is made possible by the reasonably high gain of the LAPPD at high event rates. In this presentation, we will discuss the pre-test characteristics of the LAPPD MCP-PMT along with its performance after irradiation up to a few coulombs per cm^2.

Primary authors: Dr CHIRAYATH, V. A. (The University of Texas at Arlington); Prof. BRANDT, A. (The University of Texas at Arlington); Mr CLIFTON , N. W. (The University of Texas at Arlington); Dr AVILES, M. J. (Incom Inc.); Dr BUTLER, S. (Incom Inc.); Dr CREMER, T. (Incom Inc.); Dr FOLEY, M. R. (Incom Inc.); Dr HAMEL, C . J. (Incom Inc.); Dr LYASHENKO, A. (Incom Inc.); Dr MINOT, M. J. (Incom Inc.); Dr POPECKI, M. A. (Incom Inc.); Dr STOCHAJ, M. E. (Incom Inc.); Dr WALNE , C. (Incom Inc.)

Presenter: Dr CHIRAYATH, V. A. (The University of Texas at Arlington)

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