Contribution ID: **252** Type: **Parallel Talk**

Production of Large Area Picosecond Photo-Detectors –LAPPDTM: 2022 Status Update

Saturday, 9 July 2022 10:00 (15 minutes)

Abstract:
Incom Inc is producing a standard version of the Large Area Picosecond Photo-Detector (LAPPD) –the world' s largest commercially-available planar-geometry photodetector based on microchannel plates (ALD-GCA-MCPs). It features a stacked chevron pair of "next generation"large area MCPs produced by applying resistive and emissive Atomic Layer Deposition (ALD) coatings to glass capillary array (GCA) substrates encapsulated in a borosilicate glass hermetic package. These are available with 10 or 20 μm pores.
The fused silica entry window of the detector is coated with a high sensitivity semitransparent bi-alkali photocathode with 373 cm2 detection area.
Signals are read out on either microstrip anodes applied to the inside of the bottom anode plate, or via a capacitively coupled resistive anode. The "baseline"devices have demonstrated electron gains of 107, low dark noise rates (15-30 Hz/cm2), single photoelectron (PE) timing resolution less than 50 picoseconds RMS (electronics-limited), and single photoelectron spatial resolution under 1mm RMS (also electronics-limited), high (up to 31%) QE uniform bi-alkali photocathodes and low sensitivity to magnetic fields up to 0.8 T (no tests at higher field have been performed at this time).
Production throughput of baseline tiles have increased from one/month in 2018, to four/month in 2020 to six to eight/month in 2022. The tiles are made from either Borofloat glass or high purity high density ceramic materials. On-going development of a smaller format, 10 cm X 10 cm High Rate Picosecond Photo-Detector (HRPPD) that, in addition to all of the LAPPD attractive features, would have a fully active area with no window support spacers (structural supports), even lower sensitivity to magnetic fields with new 10 μm pore MCPs and sub-mm position resolution with a new anode design.
LAPPDs can be employed in particle collider experiments (e.g. SoLID, future EIC), neutrinoless double-beta decay experiments (e.g. THEIA), neutrino experiments (e.g. ANNIE, WATCHMAN, DUNE), medical (PET) and nuclear non-proliferation applications. Currently, LAPPDs have recently or will be tested at Fermilab, ANNIE, BNL, INFN, DESY, CERN and sold to several countries in the EU and domestically in the USA.
We report on the recent progress in the production of the "baseline"LAPPD and discuss new developments.

In-person participation

No

Primary authors: Dr LYASHENKO, Alexey (Incom, Inc.); Mr HAMEL, Cole (Incom, Inc.); Mr AVILES, Melvin (Incom, Inc.); Mr FOLEY, Michael (Incom, Inc.); Mr MENSAH, Derrick (Incom, Inc.); Dr POPECKI, Mark (Incom, Inc.); Dr MINOT, Michael (Incom Inc.); Mr STOCHAJ, Michael (Incom, Inc.); Mr SHIN, Shawn (Incom, Inc.); Dr CWIK, Stefan (Incom, Inc.); Mr CLARKE, Stephen (Incom)

Presenter: Mr SHIN, Shawn (Incom, Inc.)

Session Classification: Detectors for Future Facilities, R&D, novel techniques

Track Classification: Detectors for Future Facilities, R&D, novel techniques