Contribution ID: **727** Type: **Poster**

Investigating Microchannel Plate PMTs with TOFPET2 multichannel picosecond timing electronics

TOFPET2 is the second-generation design of a high-performance multichannel picosecond timing readout electronics ASIC produced by PETsys Electronics SA, Portugal. Originally developed for time-of-flight positron emission tomography using silicon photomultipliers, in this work we describe an experimental programme to evaluate the performance of TOFPET2 with pixelated microchannel plate photomultiplier tube (PMT) detectors.

Investigations were performed using various signal input methods; injected electronic stim signals, SiPMs photodetectors, single anode MCP photomultiplier detector and finally imaging with a Photek MAPMT228 multi-anode MCP-PMT detector using a 16 x 16 pixelated multi-layer ceramic readout.

Measurements were undertaken using the PETsys Time-of-Flight ASIC evaluation kit (mark2) operating in single photon counting mode. We present performance results for time resolution, cross channel coincidence time resolution and energy resolution using internal pulse amplitude measurement and time-over-threshold signal paths.

Photodetector timing performance was evaluated using a 40 ps wide pulsed laser, operating at single photon level using a temperature stabilised setup within a dark enclosure. Amplitude walk correction was applied using the in-built time-over-threshold output from the TOFPET2 system. Single photon timing resolution of better than 110 FWHM was demonstrated and further results are presented.

Authors: Dr LEACH, Steven (University of Leicester); Prof. LAPINGTON, Jon (University of Leicester); Mr SUDJAI, Thawatchai; Mr CONNEELY, Thomas (Photek LTD); HINK, Paul (i2 innovation); MILNES, James (Photek Ltd); DURAN, Ayse (Photek)

Presenter: Prof. LAPINGTON, Jon (University of Leicester)

Session Classification: Poster Session A

Track Classification: Medical Applications