Contribution ID: **22** Type: **not specified**

Towards precise temporal resolution using highly multiplexed readout schemes for gamma-ray detectors

Friday 3 June 2022 15:45 (15 minutes)

Nowadays, the performance in Time-of-Flight (TOF) for Positron Emission Tomography (PET) detectors, which boosts the effective sensitivity of the system, is reaching the technological limit imposed by the scintillator crystal and photosensors used. Increasing the axial length of a PET scanner improves the solid angle coverage, thus allowing to boost the sensitivity. This are the so-called Total Body PET (TB-PET) scanners. Recently, the TB-PET systems for human use called Biograph Vision from Siemens and the uExplorer from United Imaging have been commercialized and first clinical studies have been shown. The Biograph Vision has remarkable TOF capabilities of 217 ps FWHM. Nevertheless, from the technical perspective, there is still room for further improving these systems with depth of interaction (DOI), and/or readout channel reduction as it is major concern to develop a long axial scanner. In this work, we will show the preliminary results addressing these two major concerns on a TB-PET system, both the reduction of readout channels as well as the DOI capabilities of the system by using a LYSO semi-monolithic scintillator crystal coupled to 3x3 mmˆ2 SiPM. The electronic chain comprises a reduction readout methodology and an ASIC for readout (TOFPET2 from PETsys). This approach allowed us to achieve <300 ps TOF as well as sub-3mm spatial resolution and DOI.

Authors: Dr GONZALEZ-MONTORO, Andrea (I3M-CSIC-UPV); BARBERA, Julio (Oncovision); DIAZ, Karel (Oncovision); Dr SANCHEZ, David (I3M-UPV)

Co-authors: Prof. BENLLOCH, Jose Maria (upv); Dr GONZALEZ, Antonio J. (I3M); VIDAL, Koldo (I3M-CSIC-UPV)

Presenters: Dr GONZALEZ-MONTORO, Andrea (I3M-CSIC-UPV); Dr SANCHEZ, David (I3M-UPV)

Session Classification: System considerations for TOFPET CTR resolution ≤100ps

Track Classification: System considerations for pushing TOFPET CTR ≤ 100ps