Contribution ID: **221** Type: **Recorded Presentation**

Performance evaluation of SiPMs with the PETsys TOFPET2 ASIC

Silicon photomultiplier coupled with scintillating crystals are more and more used radiation detectors in many applications.
In order to evaluate the best photodetector and performance tradeoff between cell sizes, different SiPMs from various companies (FBK, Hamamatsu, Ketek, ON Semiconductor and Broadcom) are coupled with two L(Y)SO crystals and their coincidence time resolutions (CTR) and energy resolutions are measured by the PETsys TOFPET2 readout system. As example, the CTR values range from 414±14 ps (10 µm SPAD size) up to 148±4 ps (50 µm), while the measured energy resolution at 511 keV ranges from 14.7% to 8% for devices from Hamamatsu. For all the SiPMs measured, larger SPAD sizes lead to better performances either in CTR or energy resolution. The best obtained CTR of 118±3 ps FWHM was measured using 40 µm cell sized FBK NUV-HD SiPMs.

Primary experiment

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Track Classification: SiPM