

Optimization of timing performance of large-area FBK SiPMs in the scintillation light readout

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In this work we describe the work that we have carried out at FBK, aimed at the optimization of the timing performance of large-area SiPMs coupled to LYSO crystals, in the detection of 511 keV gamma photons. We focus on the role of the detector noise, namely its Dark Count Rate (DCR), and on possible baseline compensation techniques for the reduction of its effects on the Coincidence Resolving Time (CRT) of the detector. Once the effects of the DCR are strongly attenuated, it is possible to observe an additional limit to the timing performance due to the optical crosstalk (OC) of the device, which is increased by the presence of the scintillator. We report on the experimental evidence of the phenomenon and we discuss possible solutions.

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