

Silicon Photomultiplieres with enhanced Blue-Light Sensitivity

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Geiger-mode multi-pixel photon detectors are evaluated and discussed since a few years to replace the traditional photomultiplier tubes in several applications due to their potential high photon detection efficiency, miniaturized device size, insensitivity to high magnetic field and their prospectively low production costs. To leverage this device for industrial applications the manufactures have to further enhance photon detection efficiency by a factor of 1.5 compared to PMTs as well as to overcome the crucial problems of high dark count rate and high optical crosstalk.

In order to solve these problems, KETEK has recently introduced a new manufacturing technology based on 200 mm wafers which significantly reduces dark rate and optical cross talk by a factor of two and with potential for further refinement. In addition, KETEK was able to improve the photon detection efficiency to 60% in the blue range for its 50 μ m cell pitch devices (see figure). This is due to an optimization of the geometrical fill factor and the light entrance window. This progress in device performance of the KETEK SiPMs is discussed in detail.

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