

SiPM Geiger discharge for high intensity light registration.

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Geiger discharge for a single cell and real SiPMs for under- and oversaturation light intensities has been investigated. It has been shown that not only signal amplitude but even signal charge rises with increasing of light intensity for single SiPM cell illuminated by high intensity light flash for constant applied overvoltage. This effect can be explained by creation of multiple avalanche starting points inside of a SiPM cell which leads to the development of multiple avalanches inside of the cell and thus to a higher discharge current when compared with the case of a single avalanche per cell. Due to this effect a real SiPM device consisting of many connected together cells and illuminated by high light intensity pulse produces a signal with amplitude that is higher than $A_1 \cdot N$, where A_1 – one-cell signal amplitude for low light conditions, N - total number of cells inside the SiPM.

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