

Development of a scintillation detector with a photosensor based on matrices of silicon photomultipliers

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The matrices of silicon photomultipliers (SiPM) are promising multi-channel photosensors for scintillation detectors. A method for their use in this capacity depends on the type of detector and current task. Matrix attached directly to the plastic scintillator can be used for the selection of events in different parts of scintillator. We consider also the possibility to use the arrays of SiPM with a corresponding collector optical radiation to obtain a picture of glowing tracks of charged particles, passing through the scintillator. Such method will allow us to get the image of event within the volume of the scintillator, the analysis of which gives the possibility, in principle, to separate different classes of events. The snapshots of the events inside the scintillator were taken for the two SiPM matrices arrangements. In the first variant both matrices are placed on the surface of the plastic scintillator. In the second variant an optical system with Fresnel lens was used. It is expected that the proposed method of detecting particles may be useful in the creation of new large detectors to neutrino astrophysics, and geophysics.

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