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Preliminary performance of a new type of modular gamma-camera prototype

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Gamma-cameras are one of the most popular tool in nuclear medicine for the tomography of human organs with the single photons emitted by the radioactive isotopes. As a rule, these cameras consist of a large continuous scintillator or of many small scintillator pixels. Both types have their own advantages and drawbacks. Here we suggest another type of modular gamma-camera that combines the features of the previous two types. Modular structure has a series of advantages, including scaling, simplicity and reproducibility of the parameters of separate elements of gamma camera. We constructed and tested an element of modular camera that consists of inorganic scintillator CsI(Tl) or CsI(Na) with the dimensions 25x25x8 mm3. The light readout is done by 3x3 matrix of 9 silicon photomultipliers with the sizes 6x6 mm2 each. The performance of this prototype was tested with 57Co radioactive source with gamma-ray energy of 122 keV. The obtained energy and spatial resolution are discussed. New algorithms for the reconstruction of gamma interaction point were developed.

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