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Concept of a mobile gamma spectrometer based on the SIPM

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The development of nuclear technologies, the production and active use of radioisotopes, and the production of other radioactive materials are increasing every year. Therefore, the importance of ensuring the safety of highly active isotopes, as well as providing the necessary instruments for measuring and identifying radioactive materials, must be taken into account. Modern equipment such as HPGE is costly and requires specialized staff skills as well as special operating conditions such as low temperatures and high voltages. It is proposed to explore the possibilities of using SIPM with a deep pixel structure in nuclear gamma spectrometry, which will make it possible to increase the efficiency of scintillation detectors. The paper presents the results of a study of the newest silicon photomultipliers MAPD-3NM II and a 16-element matrix based on them, which was the detector part of the proposed LaBr₃ scintillation spectrometer. The study was carried out using radioisotopes of Uranium and Plutonium of various enrichment. The data obtained were compared with data from a laboratory HPGE spectrometer.

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