

## A method for lateral localization of a compact gamma source in radionuclide diagnostics

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To determine the depth of the area of radiopharmaceutical accumulation a method based on simultaneous registration of two gamma ray lines of different energies and quantitative comparison of the intensity of these lines on the surface of the patient's body is developed. The most widely used medical radioisotope technetium-99m has two gamma-lines - 140 keV and 18 keV, which allows one to apply the proposed method to search for the sentinel lymph nodes and non-palpable malignant tumors in the soft tissues. The result is achieved by the quantitative analysis of the areas of absorption peaks of technetium-99m. A dedicated scintillation detector optimized for low energy gamma rays registration was designed. This miniature detector consists of a LaBr<sub>3</sub>:Ce scintillation crystal and a silicon photomultiplier packed together in a sealed aluminum housing with a wall thickness of 0.2 mm. The proposed detector was used in a set of experimental studies which showed that the lateral coordinate of the Tc-99m source can be determined with an accuracy of  $\pm 4$  mm at the depth up to 30 mm in a tissue-equivalent phantom.

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