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Energy calibration of hybrid GaAs:Cr-based Timepix detector with alpha particles

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The advanced GaAs:Cr material for radiation detection is in the scope of many scientific and technological institutions in the world, as consequences of its proved superior properties and economic advantages. Experiments made at the JINR Dzhelepov Laboratory of Nuclear Problems for the energy calibration of a hybrid GaAs:Cr-based Timepix detector with alpha particles reaffirm that this device is able to register this particle in energy range from 3140 keV to 7687 keV. The mathematical simulation was used to calculate the transmitted energy, making possible the experimental calibration with the use of Mylar as absorbent. By calibrating the detector with characteristic X rays of some target materials and using a two steps fitting procedure was determined the relationship between the photon energies and the registered by the detector TOT counts. The energy calibration with alpha particles was performed according to linear function $y = 362.08 + 2.41 x$, with $R^2 = 0.99$, and verified with the measurement of the ^{218}Po line of radon in air.

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