New Gamma-ray scanner for tracking arrays

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Research and development are being carried out in the production of highly segmented Ge detectors, understanding the signal, and development of tracking algorithms [1]. Recent work suggests that this type of detection system is doable and would significantly impact a wide range of physics. The interaction points associated with a particular gamma-ray would then be identified based on their position and energy using a technique known as "tracking." The tracking will provide direction and location based on the known source point [2].

The motivation for the present work is to improve further the GSI 3D scanning system, particularly the position detector readout, its resilience, and speed, allowing for faster scanning of the entire segmented detector. This significant development will have a considerable impact on the medical domain as well [3]. Silicon PhotoMultiplier (SiPM), i.e., the array of square Avalanche PhotoDiodes is being employed, replacing the previous position-sensitive Photo Multiplier Tube [4], [5]. Considering this, a scanning device using LYSO scintillator crystal coupled to an array of 96 position-sensitive SiPM has been developed. The LYSO has dimensions of 7 cm x 3 mm, and SiPM has dimensions of 3 mm x 3 mm. The detector's readout has been obtained using GSI developed electronics TAMEX system [6]. Before scanning any detector, the calibration of the scanner is required [7]. The detector characterization results will be presented at the conference.

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