

Development of Total Body J-PET from plastic scintillators

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Total body PET has started to be used in clinics, however, for its wide applications in hospitals there is a need to decrease the costs of its construction [1], [2]. We are developing cost-effective total body PET based on plastic scintillators [2], [3]. This study discusses the preparation status based on new simulation results and the test of single detectors with the SiPMs. The simulation part has been carried out using the GATE software to investigate sensitivity, scatter fraction, and spatial resolutions of the total body J-PET. In the experimental phase, we tested the single detector units employing SiPMs connected to the plastic scintillator strips at the axial ends. Using a collimated beam of 511 keV photons from the Na-22 isotope we characterized the detector performance for different lengths of the scintillator. Total body J-PET (TB-J-PET) will be built using the newest generation of J-PET technology that will be presented and discussed. The first generation was built from 192 plastic strips with 50 cm lengths read out by PMT [4], and the second one is a 50 cm long, modular, and portable PET built from 312 plastic strips [5]. In this presentation, we report on the 243 cm long system, which is being constructed based on funds provided by the Polish Ministry of Education and Science. The TB-J-PET will enable standard PET imaging, positronium imaging [6], multi-photon imaging [7], and also application in imaging of photon's polarisation [8].

Field

Detectors and electronics

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