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## **Development of a Prototype PET Scanner using Dual-Sided Readout DOI-PET Modules**

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In conventional PET scanners, spatial resolution deteriorates near the edges of the field of view due to the uncertain depth of interaction (DOI) within thick detectors. In our previous study, we reported the novel design of a gamma-ray detector that can measure DOI information. This detector was based on a segmented 3-D scintillator array composed of  $0.8 \times 0.8 \times 5\text{-mm}^3$  Ce-doped  $\text{Gd}_3\text{Al}_2\text{Ga}_3\text{O}_{12}$  (Ce:GAGG) crystals and two large-area monolithic Multi-Pixel Photon Counter (MPPC) arrays coupled to both ends of the scintillator array. Moreover, the detector showed good energy resolution of 11.8% and clear separation of each crystal at energy of 662keV. In this research, we developed a one-pair coincidence system using 3-D scintillator arrays composed of  $1 \times 1 \times 3\text{-mm}^3$  Ce:GAGG crystals to simulate a PET gantry, and evaluated the influence of DOI information on spatial resolution.

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