

## Development of SiPM based Scintillation Detector for Energy Selective X-ray Imaging

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A detector based on a scintillation crystal and a SiPM has been developed and tested for energy selective x-ray imaging. The detector consisted of 27 mm X 27 mm X 1 mm (and 2 mm) CsI(Tl) and LYSO crystals coupled to an 8 X 8 array of 3 mm X 3 mm SiPM pixels with 3.36 mm pitch. The SiPM outputs were multiplexed to 4-channel position signals and the 2D image was constructed using simple anger logic. The Monte Carlo simulation tool, DETECT2000, was utilized for verifying the single x-ray photon counting capability. The number of scintillating photons incident on each SiPM pixel was calculated by varying crystal surface treatment. Then, the minimum detectable x-ray energy was characterized compared to the dark count rate(DCR) of the SiPM. Energy resolution, count rate, and 2D image were measured and evaluated using Co-57 source (122 keV) experimentally. The results showed that the detector can be used for energy selective x-ray imaging.

### Has accepted

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