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Position reconstruction of gamma- ray interactions in monolithic scintillator's

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In this paper, A 6x6x76.2mm CsI:Tl crystal coupled to two SiPMs at each end and coated with PTFE, high reflective 3M and black tape were prepared and tested. Energy and spatial resolution of the three detectors were measured and the effect of the coating material on the interaction position was investigated. Spatial resolution measurements were carried out using a computer motorized scanning table build at the university of York. The gamma ray source was a collimated 1mm ¹³⁷Cs mounted on the top of the scanning table. Measurements of the gamma ray interaction were obtained for 15 different positions. The light ratio gradient and the FWHM of the light ratio were measured for each configuration to calculate the interaction position. The PTFE coated detector was simulated, and its spatial resolution was calculated using the same parameters as our experiment which showed a good agreement. The scintillator's surface treatment was also explored and its effect on improving the gamma ray interaction position reconstruction.

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