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Development of Gamma-Ray Position-Sensitive Transition-Edge Sensor Microcalorimeters

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We are developing Position-Sensitive Transition-edge sensor (TES) microcalorimeters (PoSTs) to detect gamma-rays up to a few MeV. Each PoST consists of a long absorber with a TES on each end of the absorber and works as a one-dimensional imaging spectrometer. We fabricated PoSTs with 0.5 mm x 0.5 mm x 18.8 mm lead absorbers and TESs with transition temperature of 171 mK. We irradiated the devices with gamma rays from a Cs-137 source. Gamma-ray pulses of the PoSTs show a correlation between pulse height and rise time, whereas our single-pixel gamma-ray TES microcalorimeters show no such correlation. We divided the PoST pulses in the 662 keV line into 13 groups after sorting them by rise time to determine effective pixels. We compared average pulses of the 13 effective pixels to numerical simulation. The actual pulses and simulated pulses are in good agreement.

Less than 5 years of experience since completion of Ph.D

N

Student (Ph.D., M.Sc. or B.Sc.)

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