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Study on photon counting detector using CZT and CdTe

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The energy integrating method X-ray imaging devices have made many advances in medical diagnostics, nondestructive and security detection. In order to solve the problem of excessive X-ray exposure to the object which is the biggest disadvantage of the X-ray measurement by the integrating method. Researches on photon counting method using CdTe and CZT in the low energy X-ray imaging device have been actively conducted recently. The photon counting method imaging device can be applied to industrial and medical applications because of the sensitivity of the detector material is higher than that of typical scintillators for X-ray detection and this method is capable of distinguishing X-ray energy.
In this study, we developed a prototype detector module for image acquisition using analog signal processing ASIC chip developed to apply CZT and CdTe (4X4 and 1X16) detector for linear scanner. We tested the performance of energy resolution, detector response as like count rate and validate imaging etc.
The most important feature of the analog signal processing circuit used in this study for developing the low energy X-ray linear scanner is that it can output 5 digital values according to the charge pulse size from the readout ASIC.

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