

A study on a new imaging method using photon counting detectors for improving the quality of X-ray images

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X-ray imaging is used in variety of fields such as medical, industrial and security fields.

Photon counting type X-ray image detectors have been developed in our group. Compared with current-integration type detectors which is used as a conventional type detectors, photon counting type image detectors can eliminate noise such as thermal noise and leakage current by setting a threshold value for the wave height since count the current pulse generated from each X-ray photon, and can produce transmission images in each energy band. On the other hand, if only signal energy band is used as a transparent image, noise is generated due to photon variations, which makes it difficult to obtain differences in luminance due to the thickness of the object. This study developed an application that can synthesize multiple images in order to change the output ratio of each energy band and make the blurred areas clearer by changing the contrast. As a validation, X-ray transmission images of aluminum plates with different thickness in the range of 10keV to 100keV in every 10keV energy band were imaged. These images have combined by each energy band in an arbitrary ratio and contrast increase or decrease in each pattern was evaluated. As a result, it was confirmed that the visibility of the image was improved by using this method, which indicates the possibility of combining different images by each energy band.

Topics

Session C. Applied optics and engineering

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