Development of a Coded-aperture Gamma Camera for Monitoring of Radioactive Materials

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Abstract

A coded-aperture gamma camera was developed to increase the sensitivity of a pin hole camera made with a pixellated CsI(Tl) scintillator and a position-sensitive photomultiplier tube. The modified round-hole uniformly redundant array of pixel size 13 x 11 was chosen as a coded mask considering the detector spatial resolution. The performance of the coded-aperture camera was compared with the pin hole camera using various forms of Tc-99m source to see the improvement of signal-to-noise ratio or the improvement of the sensitivity. The image quality is much improved despite of a slight degradation of the spatial resolution. Though the camera and the test were made for low energy case, but the concept of the coded-aperture gamma camera could be effectively used for the radioactive environmental monitoring and other applications.

Key words : gamma camera, pin hole, coded-aperture, sensitivity, Signal-to-noise ratio