

# Developments of Si and CdTe Semiconductor Imaging Detectors and their Application to Compton Cameras

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## ABSTRACT

We have been developing a next generation Compton camera to open up a highly sensitive gamma-ray observation for high energy astrophysics. The detector is based on a concept of the Si/CdTe semiconductor Compton camera, in which many layered Si and CdTe imaging devices are utilized as scatters and absorbers, respectively. The combination of Si and CdTe is suitable for gamma-rays from several tens keV to a few MeV, because of the small photo-absorption cross section and the relatively large Compton cross section of Si and the high photo absorption efficiency of CdTe. By using a prototype consisting of six layered double-sided Si strip detectors (DSSDs) and CdTe pixel detectors, we have successfully obtained Compton reconstructed images and spectra of line gamma-rays from 80 keV to 662 keV. In order to improve the efficiency and the sensitivity, we have been developing new modules of DSSDs and CdTe pixel detectors. In this paper, we will report the developments and results of the new modules of DSSDs and CdTe pixel detectors. The performance of a new Si/CdTe Compton camera with these modules will also be presented.