

“Polaris Gamma-Ray Imaging Spectrometer Systems”

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Three-dimensional position-sensitive CdZnTe gamma-ray detector technology, pioneered by University of Michigan, can provide high resolution gamma-ray spectroscopy close to that of high purity germanium detectors, but operated at ambient temperatures. It can image intensities of gamma-ray sources in real time with high imaging efficiency. Each Polaris system consists of eighteen $2 \times 2 \times 1.5 \text{ cm}^3$ CdZnTe detectors, with an overall energy resolution about 1.3% FWHM at 662 keV and can image gamma rays in the entire 4π field of view without any blind spot. They can detect and locate gamma-ray sources an order of magnitude weaker than natural gamma-ray background with several hours of operation, making it ideal for detecting, identifying and locating gamma-emitting sources in nuclear power plants, for environmental clean-up applications, and for radiation protection monitoring.

The performance of the first two Polaris systems constructed by University of Michigan group will be presented in the energy range of 30 keV up to 3 MeV. This project has been jointly funded by US Department of Defense – Defense Treat Reduction Agency and Department of Energy NA-22 Office.