

Abstract for a possible talk in Los Alamos National Laboratory
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Polaris Gamma-Ray Imaging Spectrometer Systems

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Three-dimensional position-sensitive single-polarity charge sensing technique, which has been successfully demonstrated on CdZnTe semiconductor detectors at the University of Michigan, will be reviewed. The performance of Polaris 3D CdZnTe gamma-ray imaging spectrometer systems, each consisting of eighteen $2 \times 2 \times 1.5 \text{ cm}^3$ CdZnTe detectors, will be presented. Five Polaris systems have been constructed under the joint support of DOD DTRA and DOE NA-22 since September of 2010. These systems have been tested by independent operators at Nevada Test Site, Oak Ridge National Laboratory, Idaho National Laboratory and in Washington DC. Energy resolution of better than 1% FWHM for all events at 662 keV has been demonstrated on later systems. Real-time gamma-ray spectroscopy, imaging, isotope detection and identification in the entire energy range of 30 keV up to 3 MeV have been implemented. A number of unprecedented capabilities, such as the detection of shielding material and thermal neutrons, will be presented. In addition, some research results on high flux CdZnTe X-ray detectors, intended for future spectroscopic CT applications, will be introduced.