

Germanium-based detectors for gamma-ray imaging and spectroscopy

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Germanium-based detectors are the standard technology used for gamma-ray spectroscopy when high efficiency and excellent energy resolution are desired. By dividing the electrical contacts on these detectors into segments, the locations of the gamma-ray interaction events within the detectors can be determined as well as the deposited energies. This enables simultaneous gamma-ray imaging and spectroscopy and leads to applications in the areas of astronomy, nuclear physics, environmental remediation, nuclear nonproliferation, and homeland security. Producing the fine-pitched electrode segmentation often required for imaging has been problematic in the past. To address this issue, we have developed an amorphous-semiconductor contact technology. Using this technology, fully passivated detectors with closely spaced contacts can be produced using a simple fabrication process. The current state of the amorphous-semiconductor contact technology and the challenges that remain will be given in this talk.