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Generation Beta-Gamma Coincidence Detectors with Increased Capability

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Beta-gamma coincidence method are used to detect and measure radioxenon isotopes in the field, greatly reducing the background and increasing sensitivity. Research has been performed to explore further background reduction using spatial information provided by pixelated, voxelated, or segmented detectors. This includes segmented and pixelated silicon detectors for the beta or electron detection and voxelated cadmium-zinc-telluride (CZT) detectors for gamma or X ray detection. Segmentation or pixelation, in addition to providing spatial information, reduces the detector capacitance, allowing for lower thresholds at room temperature, providing access to low energy beta, electron, and X rays. With higher levels of pixelation, such as in a charge coupled device, the spatial information can provide particle identification, providing discrimination of alphas and muons from the beta and gamma signals of interest. The potential for increased sensitivity will be presented along with measurements from prototypical detectors.

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Promotional text

The work presented provides insight into the potential sensitivity improvement for radionuclide detectors. Radionuclides are an important signature of nuclear explosions and the International Monitoring System.

Oral preference format

in-person

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