Improving the Efficiency of Photon Collection by Compton Rescue (Paperback)

By Alvin D Murphy, Alexander W Stevenson

Bibliogov, United States, 2011. Paperback. Book Condition: New. 254 x 203 mm. Language: English . Brand New Book ***** Print on Demand *****.A method to improve the efficiency of photon collection in thin planar HPGe detectors was investigated. The method involved implementing a second HPGe detector to collect Compton scattered photons from the primary detector and incorporating coincident interactions in the two detectors that sum to the full energy event into the energy spectrum. This method is termed Compton rescue because the Compton scattered photons make a partial energy deposition in the primary detector and are added back to the spectrum after being detected by the second detector. This research has implications on improving the efficiency of positron annihilation spectroscopy (PAS) techniques including the use of the method in angular correlation of annihilation radiation (ACAR) and Doppler-broadening of annihilation radiation (DBAR) applications. The effect of using Compton rescue on the energy and spatial resolution on these two PAS techniques was investigated. The research was conducted in two phases: simulation, in which a Monte-Carlo program was used to predict the effectiveness of the Compton rescue method based on photon interaction simulations, and experiment, in which a position-sensitive HPGe detector and a...

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