Nuclear Experiment

Evaluation of Compton scattering sequence reconstruction algorithms for a portable position sensitive radioactivity detector based on pixelated Cd(Zn)Te crystals

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(Submitted on 11 Nov 2010)

We present extensive simulation studies on the performance of algorithms for the Compton sequence reconstruction used for the development of a portable spectroscopic instrument (COCAE), with the capability to localize and identify radioactive sources, by exploiting the Compton scattering imaging. Various Compton Sequence reconstruction algorithms have been compared using a large number of simulated events. These algorithms are based on Compton kinematics, as well as on statistical test criteria that exploit the redundant information of events having two or more photon interactions in the active detector's volume. The efficiency of the best performing technique is estimated for a wide range of incident gamma-ray photons emitted from point-like gamma sources.

Comments:	16 pages, 17 figures
Subjects:	**Nuclear Experiment (nucl-ex)**; Instrumentation and Detectors (physics.ins-det)
Cite as:	**arXiv:1011.2604v1 [nucl-ex]**

Submission history

From: Konstantinos Karafasoulis [view email]
[v1] Thu, 11 Nov 2010 10:23:35 GMT (1149kb,X)

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