

THE EFFECT ANGULAR CORRELATION OF GAMMA RAY WITH MEASUREMENT OF CLINICAL USE NaI DETECTOR

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Clinical radioactive measurements are usually setting window with its center photo peak level, but cascade stage nuclei gamma rays have a special angular distributions in system resolving time. Then, pulse height spectrum is change by geometrical conditions.

Sum peak increase in proportional to detector geometry.

This is considerable evidence for angular correlation of gamma rays.

We are studied angular correlation of gamma rays with PHA spectrograms., this study was done I-125, Se-75, Yb-169, Tl-201 and gamma camera, 5inch scanner, 2inch single probe, well type and through hole type.

The results are follow:

Se-75

TYPE	Geometry	136Kev region	265Kev region	400Kev sumpeak
through type 2.9"x3.3"	=100%	17%	18%	57%
well type 2.0"x2.0"	=100%	36%	12%	42%
5inch scanner	30%	54%	34%	11%
" "	50%	42%	34%	24%

265Kev photo peak ratio is not change for geometry with scanner, camera, single probe, But 136Kev and 400Kev peak ratio is remarkable changed.

I-125

This nuclide electron capture process and emitted several K-xrays, those K-xrays have angular correlation.

TYPE	28Kev region	56Kev region
through type 2.9"x3.3"	65%	35%
well type (a) 2.5"x2.5"	46%	54%
well type (b)	74%	26%

Its remarkable changed sum-photo peak ratio (1/2 to 1/3) in difference of detector type.

Source position changed center of detector hole and 4cm apart from center of detector hole, sum-photo peak ratio is 65%(center) and 10% (4cm apart) decreased.

Effective detector geometry changed 10*90*180*270*360*degree with point source, sum-photo peak ratio changed 4.2% to 56%. This is mean K-xrays angular correlation. I-125 photon is low energy, therefore, absorption effect is important problem for water and glass. Absorption comparison of none glass with 2mm thickness glass tube, Its results following: total absorption (all energy) is 64.3% photo peak only is 84.0%, sum peak is 30.8%

We are recognized: angular correlation in nuclear medicine used nuclide, but its sum peak is no effect to image when collimator used scintillation camera.

Well and through hole type measurements is influenced angular correlation, therefore

PHA spectrogram remarkably changed, this means to take care setting energy level.

A NEW COMPUTER SYSTEM FOR DATA PROCESSING IN NUCLEAR MEDICINE, ITS PROBLEMS AND THE POINT OF SELECTION IN CPU AND PERIPHERALS

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After the development of gamma camera in field size and in whole body scanning, the computer system for data processing in nuclear medicine used in our laboratory has become old-fashioned in speed of processing.

And the progress of computerized tomography (CT) makes possible to utilize the technique in the field.

Testing of a new computer system was decided and started in our laboratory.

Method

Following CPUs and peripherals were arranged for testing.

1. Gamma camera
Searle Pho/gamma LFOV type
2. CPU (Central Processing Unit)
DG. Eclipse S/130, Eclipse S/230 with WCS
3. Disk
DG., NMC. 5947B (4.8MW), 5957 (48MB)
4. MT
NMC 1600 bpi (2), 1600/80 (1)
5. Display
Tektronix 4014, 4010
Colour CRT VMCC-1
6. Interfaces

Results

1. WCS (Writable Control Store) in S/130 or S/230 and hardware floating point unit resulted to simplify the programs and speed up the processing time.
2. Large memory of disk (5947 type) and MT-diver (1600 bpi) showed a possibility of data collection in various ways, especially in list mode.
3. Details of ROI and maps were shown on a large CRT (Tektronics 4014) and by colour display.
4. Functional maps were displayed in shorter time than before, using high speed CPU.