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DESIGN OF WHOLE BODY POSITRON CONPUTED TOMOGRAPH.

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A whole body positron computed tomograph is under construction. It consists of a scanner, a patient bed, an operators console with CRT displays, and an image processing system. For fine and uniform data sampling, the scanner is designed to have rotary detector rings with unequally spaced detector units. Three detector rings are equipped to produce images for five slices simultaneously. One detector ring contains 40 detector units, each unit having four $15x24x24mm^3$ BGO crystals and two photomultipliers. The coincidence circuits are mounted on the rotary disk with the rings and the detector address signals for coincidence events are transmitted to the image processing system through specially designed rotary photocouplers. A minicomputer, HITAC-10II /L, is used for the image processing system with a data aquisition interface and an image reconstructor. The time for the reconstruction of a 256 x 256 image is about 10 seconds.

This work was conducted under contract with the Agency of Industrial Science and science and Technology, MITI, japan.

1713

IMPROVEMENT OF WOBBLE SCAN FOR POSITRON CTs.

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Many positron CT systems employ wobble scan to improve spatial resolution. The most important design parameters for wobble scan are the number of measuring points and the diameter of the wobble circle. These parameters affect spatial resolution and noise quantity in reconstructed images of positron CTs. Deciding these parameters is critical in the design of new positron CT systems.

The present study investigates the effect of wobble diameter and number of measuring points on positron CT performance by computer simulation. Simulations are made of the whole body system. The number of detectors is 160 and the detector ring diameter is 850mm. This investigation demonstrates that the optimum diameter of the wobble circle can be found if the number of measuring points is fixed.

The effect of half angle rotation is also studied. Half angle rotation does not improve spatial resolution. (9 wobble points and optimum wobble diameter, 0.75D. D is detector spacing.)

This work is contracted by the Agency of Industrial Sience and Technology, the Ministry of National Trade and Industry.

1714

COINCIDENCE ELECTRONICS FOR MULTISLICE POSITRON EMISSION COMPUTED TOMOGRAPH.

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In the design of a coincidence electronic system it is required to attain high count rate capability and to simplify the electronics. Our computed tomograph consists of 3 circular detector rings and is capable of providing 5 slices of the human body. The detectors of one ring are divided into 10 groups and each detector is in coincidence with those of opposing 5 groups. The coincidence electronic system is composed of two coincidence circuits and each circuit detects coincident events in two intra slices and one inter slice. The coincidence of 25 combinations among the detector groups is detected independently each other to attain high count capability. This system is also capable of detecting random coincident events. The maximum data rate is 2Mcps per 5 slices.

This work has been performed under contract with the Agency of Industrial Science and Technology, MITI, Japan.

1715

TRIAL PRODUCTION OF BOLUS INJECTOR FOR RI-ANGIOGRAPHY.

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The dynamic flow study of nuclear medicine is required to deliver a bolus of radionuclide. There are several methods for RI bolus injection. In these methods, Yale-New Haven's method is effective one, but this method needs, at least,two experienced staffs for rapid successive radionuclide delivery. And yet often we couldn't aquire a good bolus. Comparing to the other methods, our deviced syringe (serial double-barrel syringe with bipolar needle) is possible to deliver a bolus rapidly and serially, and is easier to handle. Additionally, residual volume of radionuclide is fewer. Our injector is constructed by double syringe, separated with rubber tip, and by bipolar needle. From the completely inserted condition of all compartment, 1. pull the plunger, and load the desirable volume of saline into the inner syringe. 2. Slightly pull the inner syringe and draw out from the inner needle. 3. Pull the inner syringe as the piston of the outer syringe, and load the outer syringe to its desired volume of radionuclide. 4. When the plunger is pushed in, radionuclide and saline are discharged rapidly and serially. The common syringe shield is available for this injector.