it is found that the Y rhombic system is suitable for high-speed scintillation camera and the X rhombic system for high-resolution scintillation camera applications.

Operating Characteristics of a Multi-Crystal Positron Camera

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A multi-crystal positron camera has been constructed for diagnostic investigations with short-lived positron emitters produced by the NIRS cyclotron. The camera has two identical detectors each consisting of a rectangular array of 14 × 14 small crystals (20 mmϕ × 38 mm) viewed by an array of 112 photomultiplier tubes (38 mmϕ). Each crystal in the detector is in coincidence with 25 crystals in the opposite detector to form 4096 coincidence crystal pairs in total. The electronic system is simplified by OR-ing the signals from the photomultiplier tubes in each row and column prior to coincidence operation between the detectors. Signals presenting four coordinates for the crystal pairs are converted to 4-bit binary code each and are further packed into 12-bits (64 × 64 levels). Coindence events are stored in one of two 4KW 18-bit memories and the accumulated data are decoded and displayed on a CRT as an image focused in any plane between the detectors.

Detection efficiency and high countrate characteristics of the camera system were tested as a function of coincidence resolving time and energy discrimination level. From these results, we selected these parameters to be 24 nsec as the coincidence resolving time and 50 keV as the discrimination level. The detection efficiency of the camera without collimators was 18.4 cps/μCi for a plane source of 15×15 cm^2 in air, positioned at the center of the detectors separated by 50 cm. The high countrate characteristics were also tested with a phantom of goldfish-shaped toy balloon filled up with $^{11}CO_2$ gas (initial activity: 127 mCi). The maximum coincidence rate was 120 kcps, but a clear image was observed below 60 kcps.

Application and Evaluation of the Computer Program for the Correction of Non-uniformity of Gamma Camera

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In order to study the effect of correction of non-uniformity of gamma camera for better images, a computer program inherent to Scintipac 200 (Shimazu) was evaluated.

A flood phantom (40 cm in diameter, 1 cm thick) filled with Tc-pertechnetate was used. A image of the phantom was taken by LFOV gamma camera (Searl Inc.) with high resolution collimetor. The data with 25,000K counts were simultaneousl) stored in Scintipac to be used as original data for the correction of non-uniformity. Various numbers of bakelite plate absorber (3 × 3 cm, 1 mm thick) or filtration paper (3×3 cm) moistened with ^{99m}Tc-pertechnetate were placed on the phantom to make cold or hot spots, respectively. The distinguishability of those cold and hot spots were