

Positron Camera at NIRS

N. NOHARA, E. TANAKA, T. TOMITANI and T. IINUMA

National Institute of Radiological Sciences, Chiba

A positron camera system was constructed for imaging short-lived positron emitters produced by a cyclotron. It consists of a delay-line gamma camera and a focal detector. The image detector has a field of view of 33 cm in diameter and the focal detector having an effective field of 24 cm in diameter is placed in a plane at 70 cm distant from the image detector on the detector axis. The focal detector is a multicrystal type that consists of a hexagonal array of 61 small NaI(Tl) crystals viewed by a hexagonal array of 19 photomultipliers. Each photomultiplier (51 mm in diameter) views seven crystals each of which is 25 mm in diameter by 38 mm long. The position of the

crystal in which a scintillation event occurs is determined from the photomultiplier array through fast logic circuits.

In the system, one of the serious problems is the performance of the image detector at high count rate. A coarse focusing collimator is attached to the image detector to reduce non-coincidence count in it and to improve high count rate capability. The collimator has a focal distance of 1 m and its transparency is 35.4%. Analog computation for tomography provides an image focused in an arbitrary plane between the two detectors. In a preliminary test, lateral resolution of the camera was less than 1 cm.

γ -Ray Imaging by Shadow Pattern (2)

K. KOJIMA, G. ITAYA

School of Paramedicine, Kanazawa University

K. HISADA

Department of Nuclear Medicine, School of Medicine, Kanazawa University

Use of holography for imaging of γ -ray which was reported by H.H. Barrett in 1972, has been marked as a new γ -ray imaging. Generally in optical fields hologram was very used for record and processing of image by coherent wave such as laser beam. But γ -ray is incoherent and do not condense by optical lenses. So it was needed that the hologram

of incoherent sources was formed without optical lenses.

The method of recording shadow of zone plate with Fresnel diffraction pattern was used for obtaining an incoherent hologram. By this method fundamental of an incoherent hologram and practicabilities for γ -ray imaging were discussed.