scan-converter. These positive and negative images in two scan-converter are superimposed with up and down shift of half size, respectively. Then nega and posi image made from its superimposed image was divided in four and each one fourth image was erased every one fourth in turn, then with up and down shift one fourth without image in the mid of rest three fourth. Next, eight division was done as same as four dividion. The superimposition was horizontally as same as vertically. As a result a kind of checker-board like superimposition was done, in which manner HT was executed instantly and able to observe. HT has no phase term. Wave form of HT is rectangular other than sinusoid form in Fourier transformation. HT with matric of 32 × 32 of the liver scintigram was obtained. Concept of sequency in HT has other physical meanings than FT. Detailed meanings must be moreover studied.

A Preliminary Experiment on Compton Scatter Tomography (CST) (2nd report)—Study by ^{192}Ir source

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CST is hopeful imaging method aquiring tomographic distribution of electron density. We have studied this method by phantom experiments. An object is irradiated by a rotating fan-shaped gamma ray and orthogonally scattered irradiations are detected by a conventional scintillation camera, which thereby images the irradiated section of the object.

^{192}Ir was selected as the gamma ray source since high disintegration rate (1-5Ci) necessary for clinical use can be easily obtained and it has moderate half-life (74 days) and peak energy (300 keV). We used 0.5–2.5Ci source in this study and objects were irradiated from four directions whose angular spacing is 90°. A Toshiba GCA-202 camera was used as a detector and a Toshiba TOSBAC-3400 computer was used for image processings, which in this study consisted of (1) superimposing of four images obtained by different dirrections, (2) correction of the non-uniformity of the camera, and (3) correction of the attenuation of the primary ray (if necessary).

Some quantitative characteristics were measured by the phantom study. Counting rate (efficiency) was agreed with calculations. There was a few percent variations for imaging of a uniform object (water phantom). Resolution was 16 mm FWHM and was limited by camera's overall resolution. Measurement values of electron density were some what degraded by self-absorption.

In conclusion the performance of CST is limited by both the characteristics of the scintillation camera (including collimators) and absorption of scattered ray. Development of a new camera system (including collimators) and image processing methods will be necessary for wide clinical applications of CST.

Proton Radiography

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High LET radiation therapy brings out proton radiography or heavy ion particle radiography as a new diagnostic technique. Proton radiography is taken with three techniques such as one to use a great energy loss near the end of proton range, the second to use a kind of edge effect by multiple scattering of incident proton, the enhancement of the proton inetensity distribution of the added scattered proton at the boundary in the object as same as xero-radiographs taken with X-rays,