

Monochromatic beam mammography studies using synchrotron radiation

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Preliminary experiments have been carried out on the X27C R&D beamline at the National Synchrotron Light Source (NSLS) to explore the potential improvement in contrast in breast imaging using monochromatic synchrotron x-rays [1]. In our present study, images have been obtained of ACR, contrast detail and anthropomorphic phantoms at 16 to 24 keV. Phantom thickness varied from 42 to 80 mm. Synchrotron images using a Fuji image plate detector and standard mammographic film have been compared to each other and with conventionally produced images. The preliminary results show an improved contrast over the conventional images with lower absorbed dose in the phantoms.

The image plate detector was used for our first experiments because it was readily available and produces digital data. Experiments using an additional analyzer crystal as a scatter rejection element are also underway at the NSLS [2]. We plan to evaluate a variety of detectors and monochromatic beam geometries in order to develop a system which optimizes mammography image contrast and spatial resolution.

[1] R. E. Johnson et al, SPIE (1995) (to be published).

[2] D. Chapman, SRI '95 (1995) (to be published at these proceedings).

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