

Contrast Enhance Imaging with Micro-focus X-ray Generator and CCD

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X-ray imaging of materials with low Z elements is difficult through conventional photo-absorption contrast method while much higher contrast can be achieved through phase-contrast imaging.

Previous experiments showed high contrast images by using moderate size (20 micron) X-ray generator (e.g., Wilkins, et al. 1996) or synchrotron orbital radiations (e.g., Kagoshima, et al. 1999).

In the current work, we plan to make use of very small (1 micron) micro-focus X-ray generator for the X-ray source and photon counting direct imaging X-ray CCDs for the imaging device. For the CCDs, we are developing large format (1 inch x 2 inch) 2 Mega-pixel chips. These CCDs are buttable and we can combine multiple chips to cover large spatial area. For example, we will be able to image 5 cm x 10 cm area with 8 chips.

Furthermore, we can improve the spatial resolution of the CCD better than the pixel size by referring to the split events. We are planning to develop a compact imaging system with a combination of our CCD and a micro-focus X-ray generator.

In the current poster, we will present the design and initial experimental results.

References:

- Kagoshima, Y., et al. 1999, Japanese Journal of Applied Physics, 38, L470
- Wilkins, S.W., et al. 1996, Nature, 384, 335