# Toward Sequential Image Reconstruction with Large Area Detector in Hard X-Ray Diffraction Microscope

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In x-ray diffraction microscopy, it recently became possible to reconstruct the sample image only from the oversampled Fraunhofer diffraction pattern due to a couple of proposed techniques in data analysis and in data acquisition. An example is the iterative normalization algorithm proposed by our group [1]. These techniques have opened a way for sequential image reconstruction in parallel with measurement, which can provide quick feedback for data acquisition. To perform faster image reconstruction during experiment, we are developing a dynamic reconfigurable processor to quickly perform fast Fourier transform, which makes it possible to take a quick look at the reconstructed image in a few minutes.

To achieve higher spatial resolution, we have been using short wavelength hard x-rays at SPring-8. In addition, we are developing a large-area in-vacuum imaging plate detector and a vacuum chamber. The imaging plate is a radiation image sensor using photo-stimulated phosphor. It is easy to make the detector area large and in our design it is 125 mm square, while the single pixel size is as small as 25 micron square to satisfy the oversampling condition.

**Reference**

[1] - Y. Nishino, J. Miao, and T. Ishikawa, Phys. Rev. B **68** 220101(R) (2003).