

DETECTORS

Detectors are constantly being replaced and improved at SPring-8. The following are major updates made in 1998/1999:

- At two protein crystallography beamlines, BL44B2 and BL41XU, MAR CCD detectors were introduced. This detector has a single CCD chip with 2000×2000 pixel resolution. It has speeded up data acquisition drastically, resulting in an enormous increase in the volume of collected data. In fact, since the rate of data transfer to DAT tapes is slower than the speed of data collection, users are advised to bring their own hard disks to store the data directly. Similar CCD detectors are planned to be installed at other protein crystallography beamlines.

- For high resolution imaging experiments, an area detector with high spatial resolution is being developed (Fig. 1). It utilizes a single crystal phosphor (LSO) which is viewed by a microscope objective lens. The image is recorded by a cooled CCD camera. Currently, spatial resolution of $2 \mu\text{m}$ is achieved (Figs. 2(a) and 2 (b)).

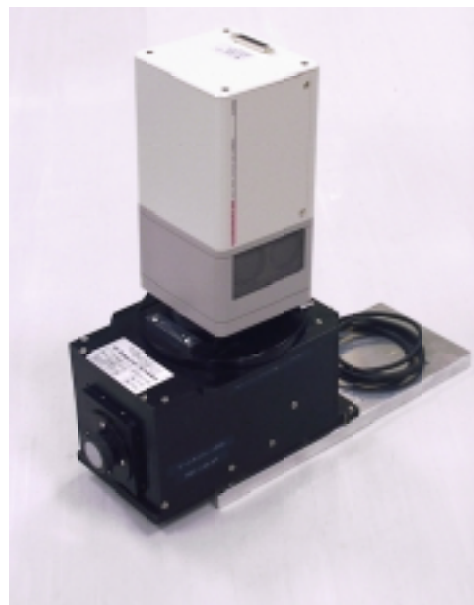


Fig. 1. View of a new area detector using a single crystal phosphor (LSO), a microscope lens and a CCD camera.

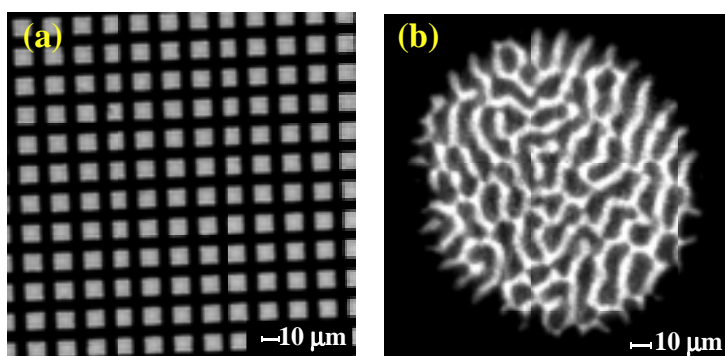


Fig. 2. (a) Projection image of a Au #1500 mesh ($17 \mu\text{m}$ pitch, $3 \mu\text{m}$ thickness) taken by LSO-CCD detector. Fresnel fringe can be seen along the edge. (b) Cross-section image of the eutectic Sn-Pb alloy obtained by 3-D technique using the LSO-CCD detector. The bright and dark areas show Pb and Sn, respectively. This image shows about $5 \mu\text{m}$ spacing of the eutectic texture.

- A Ge array detector for high-energy photon detection is being tested. This is described in more detail in a following section.

- A microstrip gas chamber has been modified to increase the gas gain using a capillary plate. This is also described in greater detail in a following section.

- An avalanche photodiode detector with 32 elements is now used for nuclear resonance scattering experiments. It has extremely high time resolution, on the order of nanoseconds. The use of the multi-element detector has markedly improved data collection efficiency.

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