

Development of Protein Crystallography Beamlines at the Photon Factory for Automated Experiment

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We have completed the construction of two ID beam lines (AR-NW12 and BL-5) for protein crystallography at the Photon Factory, both of which were designed for efficient MAD experiments. In addition, a new beamline BL17, dedicated to the measurement for crystals of micron size, is under construction while refurbishing existing beamlines. The newly developed beam lines have the following features: (1) high-speed data acquisition using CCD detectors, (2) fast and reliable tuneability of X-ray energy with DCM, (3) extremely precise sample rotation axes, and (4) motorized stages in the experimental stations. To operate all the beamlines efficiently, a network-based beam line control system has been developed, which provides not only a common user interface but also a function to enable remote experiments through secure TCP/IP communication. As part of the system, software using relational database has also been developed to keep all the necessary information related to PX experiments. Together with the sample exchange robots installed on the ID beamlines, fully automated experiments will become available.

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