

01-Instrumentation and Experimental Techniques (X-rays,
Neutrons, Electrons)

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be affected so much by it. 3) More data will be recorded on a film, when the Weissenberg geometry will be applied, 4) Bijvoet pairs are recorded with high accuracy on the same film as simultaneous reflections. 5) Almost all X-ray pass should be evacuated or filled with helium gas to reduce the scattering and absorption by air.

The fundamental requirements for the detection of X-ray diffraction from protein crystals are: 1) high detective quantum efficiency, 2) wide dynamic range, 3) linearity of response, 4) high spatial resolution, 5) large detective area, 6) uniformity of response, 7) high counting rate capability and 8) low background noise.

A X-ray integrated-type area detector, called an imaging plate (IP) is one of the most suitable detectors for the data collection of X-ray diffraction from protein crystals. The combination with the camera, IP and SR X-ray becomes a very powerful (N. Sakabe, Nucl. Instr. and Meth., 1991, A303, 448).

The camera type 3 was designed for PF users at BL6A2 station. Normally, one data set around an axis is recorded on 10-30 IP sheets with consuming only one or two crystals and 5-10 sets of data are collected in 24 hours.

The size of IP which we are using is 400x200mm. Strong demanding of the large size of IP, we have designed 800x400mm IP reader which will be installed this April detached room at BL18B (N. Watanabe et al, poster in this meeting).

The application of this data collection system and future data collection system will be discussed.

MS-01.02.05 PRESENT AND FUTURE PROSPECTS FOR MACROMOLECULAR CRYSTALLOGRAPHY AT THE CORNELL HIGH ENERGY SYNCHROTRON SOURCE (CHESS). Steven E. Ealick, Section of Biochemistry, Molecular and Cell Biology, Cornell University, Ithaca, NY 14853

The Cornell High Energy Synchrotron Source (CHESS) consists of five beamlines and 11 experimental stations which receive radiation from the Cornell Electron Positron Storage Ring (CESR). Beamlines A, B and C receive radiation from circulating electrons while beamlines D and F receive positron radiation. Macromolecular crystallography is currently supported on four experimental stations. Station F-1 is a doubly focused, tuneable (6-14 keV) station that receives half the radiation from a 25-pole wiggler. This popular station is used primarily for monochromatic data collection on samples that have large unit cells, small size, weak diffraction or radiation sensitivity. Station F-1 is part of a BL-3 containment facility that can be used for X-ray diffraction studies of bio-hazardous samples. For the past ten years, station A-1 has been a doubly focused, fixed wavelength station (8.0 keV) that receives radiation from a 6-pole wiggler. Station A-1 has been used for routine

monochromatic data collection on a variety of crystallographic systems. In January of 1993, station A-1 was dismantled to make way for a new tuneable station that will be comparable to F-1. Station B-2 receives white radiation from a bending magnet and has been used for Laue protein crystallography and micro-diffraction. Station F-2 receives the other half of the radiation from the F line wiggler and is the most recent station at CHESS to be used for macromolecular crystallography. The F-2 optics consist of a double crystal monochromator with fixed offset and a vertically focusing mirror. Sagittal bending of the second monochromator crystal provides focusing in the horizontal direction. The station can be rapidly tuned over the range 6-40 keV with an energy resolution of a few eV. The station has been used for multiple wavelength anomalous diffraction (MAD) phasing experiments and general purpose diffraction on non-biological samples. The high critical energy of the F line wiggler (24 keV) makes station F-2 an ideal station for high energy diffraction studies. High energy diffraction is potentially useful for maximizing signal-to-noise, reducing radiation damage and reducing absorption effects. Future plans at CHESS include an upgrade of the A line by insertion of a 25-pole wiggler and rebuilding of a tuneable experimental station A-1. In addition, current plans call for a gradual increase of the storage ring current from 100 to 500 mA during the next two years. Finally, the long term capabilities of CHESS will be determined by the outcome of a pending B-factory proposal. If approved, the storage ring will be reconstructed as two separate rings one operating at 8 GeV and 1 A and the other operating at 4 GeV and 2 A. The corresponding CHESS laboratory will consist of eight beamlines mostly based on insertion devices.

MS-01.02.06 PROCESSING OF DATA FROM LARGE UNIT CELL VIRUS CRYSTALS. By *M. S. Smyth, J. G. Tate and D. I. Stuart. Laboratory of Molecular Biophysics, University of Oxford, U. K.

We have crystallized three picornaviruses: bovine enterovirus (BEV), a benign virus of interest as a vaccine vector; coxsackievirus A9 (CAV9), causative agent of a range of human disorders, and human rhinovirus type 2 (HRV2), a common cold virus. The crystal morphologies are suitable for X-ray analysis, and each diffracts to beyond 3Å resolution. The unit cell dimensions and space groups are summarized in the table.

Virus	a	b	c	β	Sp. group
BEV	388Å	390Å	360Å	113°	P2 ₁
CAV	495Å	495Å	695Å	90°	P4 _n 22
HRV	382Å	352Å	681Å	90°	P2 _n 2 _n 2 _n

The collection of such data necessitates the limitation of resolution to 3.5Å in the cases of the CAV9 and the HRV2. Nevertheless, we have collected sufficient data from each of the virus crystals