InterCAT Technical Working Group Meeting
April 20, 2000

Agenda Review and TWG Activity Summary: (Steve Heald)
Steve called the meeting to order and reviewed the agenda.

Facility Reports

Facility Update/News: (Steve Davey)
Steve reported that plans for the 436 LOM are progressing. The design is being reviewed and input has been collected. Steve thanked the users for participating in the beamline impact assessment regarding the shifting of the BM lines. In general terms, the impact is expected to be minimal with only one CAT having significant issues with the shift.

CAT Reports

Recent developments in high-energy x-ray optics: (Sarvjit Shastri)
Sarvjit reviewed the monochromator optics development team and defined the qualities of an efficient monochromator. Sarvjit explained that a flat, perfect Si(111) mono is acceptable for low energies, but that critical evaluation shows it is not efficient. If one switches to a bent double Laue crystal mono, one can obtain a 10× increase in flux with no change in the energy width. Sarvjit explained how the energy spread remains unaffected. A very precise bending mechanism had to be developed to achieve a very stable bend radius. He showed a diagram of the triangular crystals and explained the thinning-out process used to shape the crystal. He also explained briefly how the optics can be "tweaked" to adjust the bend radii of the crystals using a flat Si(777) analyzer. The system geometry is tunable in line.

Sarvjit then reviewed stacked zone plates, explaining the background, motivation, and participants in the work. Two compound zone plates (3.3 μm Au each) were used. He showed a diagram of the setup including the scintillator screen used to align the plates. The experiment involved microfocusing 50 keV undulator radiation and used two flat crystals. The focal length was 1 meter, spot size 9 × 7 μm^2, and the flux density gain was 30. Some unusual results were obtained and the results of the experiment are still being evaluated. He showed a video of the aligning of the zone plates, noting that the second zone plate must be well within the near-field diffraction distance of the first plate.

Anyone interested in further information about the inverse Cauchois scanning analyzer should contact Sarvjit after the meeting.

COM-CAT update: (Kevin D'Amico)
Technical progress:
- began commissioning of the ID line in December
- protein crystallography capability is available
- XAS is being commissioned
- powder diffraction system is being built
- new-generation front end

Optics:
- new-generation Be window
- L5-90 slits in front of the mono
- water-cooled diamond mono
- single, horizontal deflecting mirror (no vertical focusing)

Performance observations thus far:
- diamond is functioning well (highly reproducible intensity, positioning)
- observed intensity oscillation linked to DI water temperature (Δ 1-1.5 degrees)
- mirror focus of 400 μm horizontal achieved
- vertical striations in beam profile observed

Developmental projects during commissioning:
- detector system for XAS based on fluorescence signal
- quadrant detector for XAS and BPM (similar to SBC-CAT design)
- sample changer being built for XAS
- KB mirror system in hand (similar to CARS design)

Kevin described in more detail the protein crystallography system, which has a simple but highly functional design. Several protein structures have already been solved. He reported that the powder diffraction system is coming along well and that the high-energy XAS set up is operating in the 17 keV range.

Next Meeting
The meeting will be held Thursday, May 18, 2000, in conference room A1100.