InterCAT Technical Working Group Meeting
July 18, 2002

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

APS Updates

(Steve Davey, AOD)
The APS will perform an internal assessment of the shielding and PSS configuration of every beamline to insure that the APS documentation for all sectors is consistent with the current beamline hardware. Mohan Ramanathan will contact each CAT to obtain the necessary information.

(Roger Klaffky, AOD)
There will be a new APS multi-bunch mode (>100 bunches) of operation tested next year during the SOM-4 in April 2003. There will also be a workshop on the accelerator operations mode in December to review existing modes of operations and propose possible new ones.

The APS DI Water System (Gene Swetin, ASD)
Gene reviewed the existing processed water system (DI water system) for the APS accelerator. In the initial phase of the APS, the DI water was not made available to CATs. Each CAT had to obtain its own water-skid and maintain it. After many years of experience with the operation of its processed water system, the APS now feels it could also provide DI water to all beamlines. The benefits are from system improvements, reliability, expertise, noise and vibration reduction. Gene described the system in details, and proposed to move 2-3 sectors per shutdown to the APS system (*ref.* the TWG WebPages http://www.aps.anl.gov/cats/twg/ for a copy of Gene's presentation). The ASD Mechanical Engineering group would work with each CAT to define the requirements and plan the installation of the new systems. The APS has water technicians covering two shifts daily and has people on-call on weekends. Nearly all the attendees of the TWG meeting agreed that this system would provide each CAT with a significant improvement in reliability and several reductions in cost for maintenance and support. Gene will start to meet with new CATs that are in need for DI water.

CAT Presentations

High-energy X-ray optics development at SRI-CAT (Sarvjit Shastri, SRI-CAT)
Sarvjit described the need for higher energy resolution ($dE/E \sim 10^{-4}$ instead of the current 10^{-3}) for SRI-1 high energy diffraction program. SRI-1 was using bent perfect crystals as high-energy monochromators but encountered problems in using these optics, in particular when trying to preserve brilliance. Sarvjit described a novel approach to increase the energy resolution by using a one-dimensional compound refractive lens

(CRL) as collimating optics. Aluminum lenses made by Adelphi were tested and found to provide adequate performance for the high energy program. Improvements in manufacturing parabolic CRL (see A.Khounsary's presentation) were also discussed. One attendee pointed out that a 1m long Pt mirror could still perform well in the high energy region (60-100 keV) if used with a comparable aperture of ~1mm.
(A copy of Sarvjit's presentation is available at the Minutes section of the TWG WebPages.)

Fabrication, testing and performance of a variable focus X-ray lens (A.Khounsary, XFD)
Ali reviewed material and fabrication issues for CRLs. He reported on the development of an extrusion technique to make one-dimensional (1D) parabolic CRL from aluminum. This technique is very cost effective and resulted in good quality lenses. The roughness of the CRL lens wall is approx. 10 microns. 2D focusing can be achieved with two 1D lenses mounted in series and orthogonal orientation.
Ali showed results of a parabolic lens tested on SRI-1 to collimate 81 keV x-rays, 35 m from the source. The beam size was measured at distances 0.3 and 24 m from the lens and the results indicate successful collimation. The throughput was modest but already useful in experiments, and future lenses should provide improved performance as the wall-thickness between lenses is becoming smaller (goal: <0.1 mm).
Other materials such as lithium will also be tested for CRL systems in the future.

Next TWG meeting:
The next meeting will be held at 10h30 on August 22, 2002 in Bldg.401, Room A1100.