

S7 operation update

Eric Dufresne, TRR group meeting, March 21, 2006

- BA and ED designed and installed a Compton shield for the 2nd crystal cage of the monochromator. They also added the 1st crystal cage Compton shield. BA did a nice calculation of heating of the second crystal from Compton scattering generated in the first crystal.
- The commissioning period at the beginning of the run went well. We may have to investigate some ID steering issues as our flux now peaks at different gap than before (red shift) and the ID spectrum is wider than before.
- DW is designing a new Be window mount for the 7ID-C X-ray BPM that will enable continuous vacuum operation down to 7ID-D. He has also received new motorized JJ X-ray hutch slits for 7ID-C and 7ID-D to be installed in the next shutdown.
- The new cable tray between 7ID-B and 7ID-C was put up by Scheck in January.

7ID Operation update (cont.)

- HG and EL will be installing new signal cable patch panels for 7ID-D, E, and control areas along with false floors which should improve the cabling appearances and add significant connectivity. The work will start shortly and will be completed before the next laser run.
- Two new labyrinths are also going up on top of 7ID-D next week, to be used for controls. We plan to move dedicated motor controller on the roof of 7ID-D.
- The small general purpose optical table has been repaired. DA, EL and the AMO group fixed the problem, a loose screw, buried deep under...
- BESSRC gave the AMO group a new motorized table. The table will move permanently at the end of 7ID-D. This will now free up the small motorized table for the 7ID-B hutch. The group also moved their cabinets from S12 to S7.
- On Feb. 3, one of bantu's disk failed. DA responded quickly and returned the beamline to operations the next morning.
- The 7ID-A monochromator has developed a vacuum leak to its UHV rotary seal. We've had two vacuum trips due to changing energy this run. The existing mono needs to be pulled out in the May shutdown for repairs. It still scans poorly in a near edge scan.
- But, fortunately, the diamond (111) Kohzu monochromator from 32ID is available and we plan to install it in the beamline in the May shutdown in 7ID-A. We hope that this will provide a more reliable monochromator for spectroscopy on 7ID.

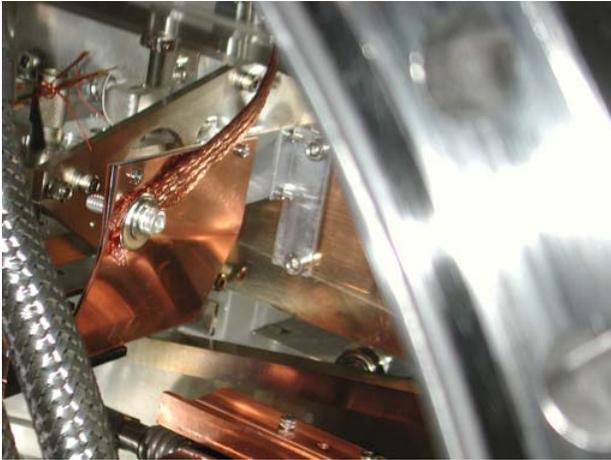
7ID operational update

- The pump laser for the Ti:Sapphire oscillator tripped the oscillator twice this run. EL attributes it to constriction in the water flow of the Verdi (5W green laser). This will be fixed for the next run, and EL plans to have a service technician from Coherent come to service the Verdi diode-pumped laser.
- New sealed sources have been received Fe55 and Cd 109. HG also ordered Co57. All sources are exempt and HG is the main contact now, with ED as backup.
- DW, S-H. Lee and EL commissioned this run a new dedicated flight path system for the 7ID-D Huber with two sets of Thor Labs slits. ED debugged also one CARS box motor drivers that we will dedicate for the Huber detector arms slits.

7ID R&D

- A UofM group with DA performed a nice imaging experiment in 7ID-C.
- DW and EL had a successful run in 7ID-D looking at thin films. They brought in also two new users, David Cahill from UIUC and Vladimir Stoica (Roy Clarke's group UofM) and got nice preliminary results.
- ED, BA and EL did an oscillator experiment with a microfocused X-ray beam generated by a zone plate borrowed from S2, probing a microfocused laser beam with microdiffraction.
- ED and Ali Khounsary (XFD-OFM) tested a new Be CXRL in 7ID-C. We achieved a 2.5 μm focus, a gain of ~ 20 with $f=1.84\text{m}$ at 11 keV. Best results from a 1D CXRL on 7ID.
- BA, EL, Yumiin Sheu (David Reis's group, UofM), and ED tested the streak camera in 7ID-D. BA reports streaking last night, but with relatively poor electron focusing. The camera is sensitive to 10^9 ph/s (at 11 keV) with an integration time of 5 minutes.

Some recent pictures



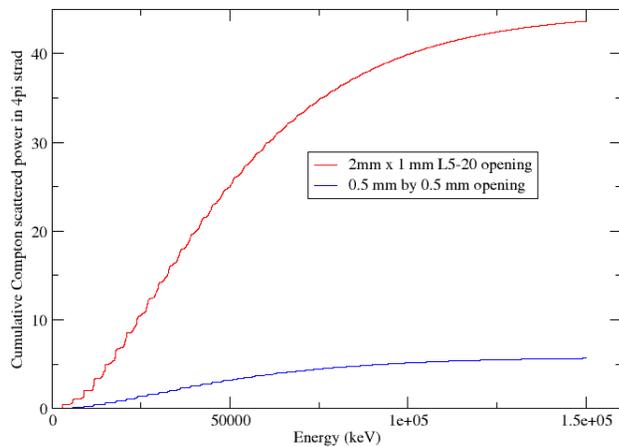
New Compton shields



New cable tray

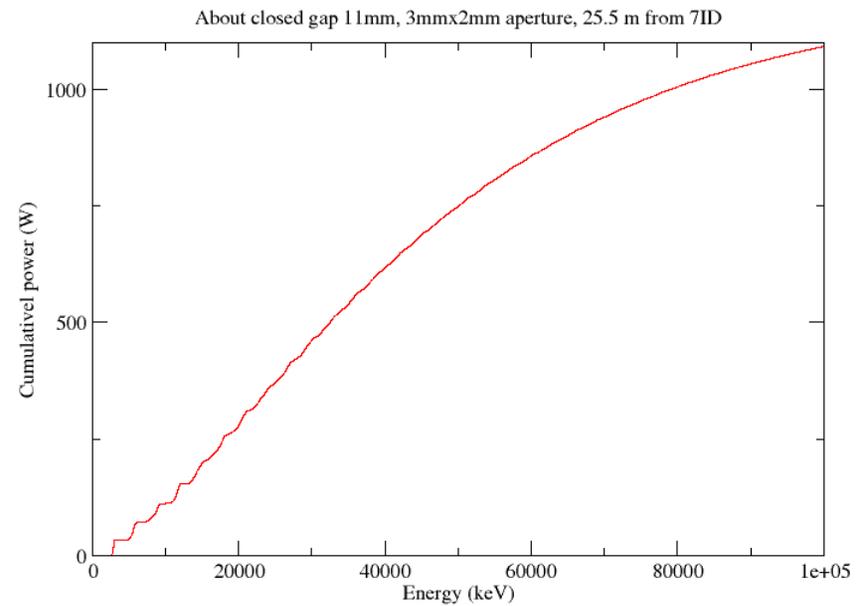
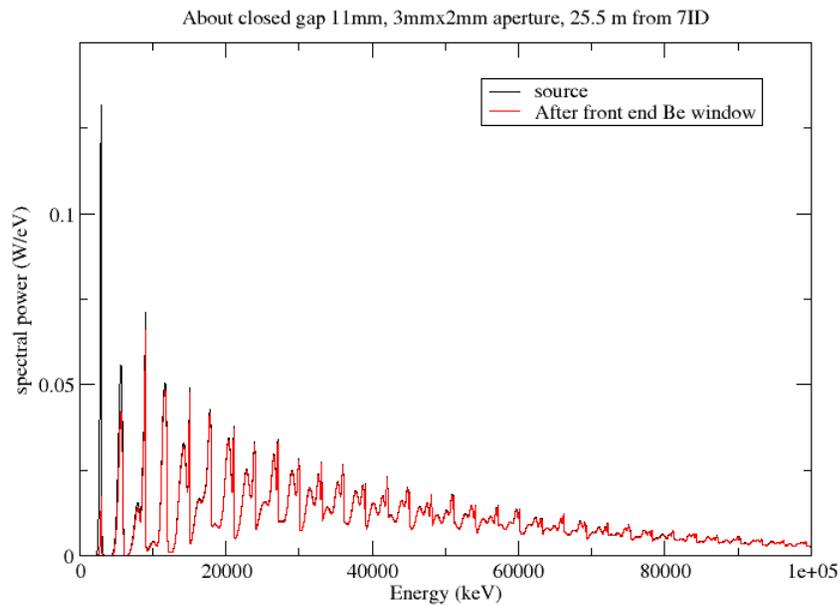


New cryo-hoses



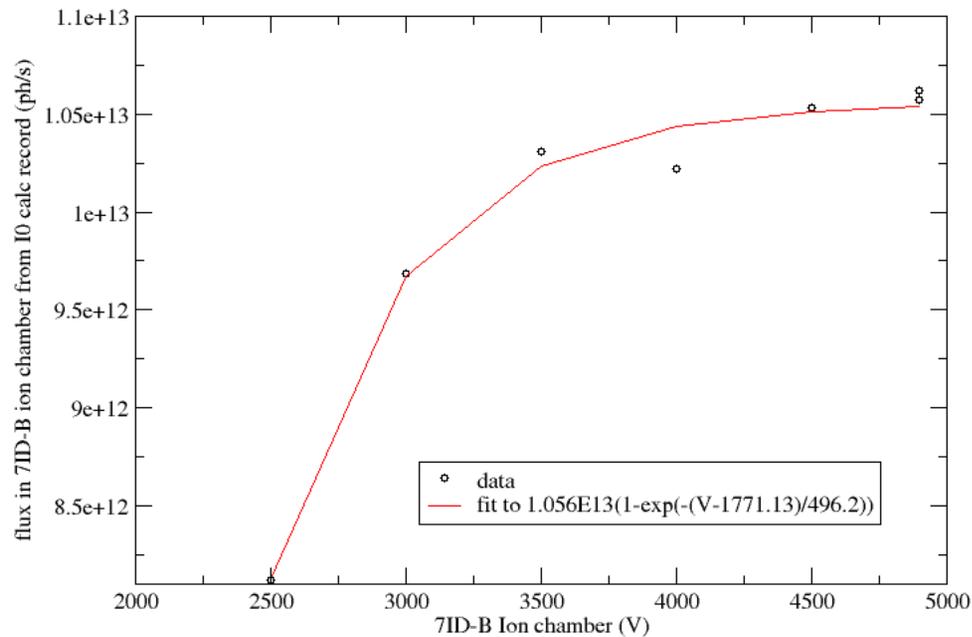
Rough Compton estimate

7ID power calculations Jan 06



The source power above >1091 W, 61.44 W is absorbed in the first window, leaving > 1030 W incident on the mono.

Beamline 101



Monochromatic calculated flux vs applied voltage on IC.
Why one needs a 5kV power supply in air