New features, 2019-2 run

New focusing optics on the IDD beamline

This is just a reminder that Compound Refractive Lenses (CRL) have been installed on ID-D at the beginning of the last run. As a result, the beam intensity is much higher and nearly back to the intensity we had during the 2016-3 run. At the moment, there are also some limitations on the accessible energy range (11 – 13.5 keV) and beam sizes. Table 1 and Table 2 below show the energy range, the beam sizes and the beam intensity at various settings. The two tables contain the same data, sorted differently.

New beamstop on IDD

Newly designed beamstop was installed in IDD station. The beamstop can now be placed as close as 10 mm from the sample. As a result, the air scatter is reduced almost by factor of 10.

Data collection

- "Mesh collect" was added to the data collection modes for large number of small crystals. In this mode, user first rasters the sample mount; then selects the threshold for the number of spots as criterion for deciding which hits to use for data collection; then sets the number of images per hit, and collects data. Centering in two directions is sufficient in this case because it is assumed that small total angle is measured from each crystal.
- Note that gmcaproc is the fastest data processing pipeline for the mesh collect, xia2_dials and autoproc are much slower and fast_dp pipeline does not run at all.
- Raster mode was removed from data collection

Remote access

- In the effort to improve the NOMACHINE Webplayer responsiveness we introduced WebRTC connections providing x264 desktop streaming instead of "classic" Motion JPEG (MJPEG). This is a new technology currently supported by Chromium-based web browsers only, which includes Google Chrome, Chromium, MS Edge and some others.
- When the GMCA remote portal detects that you are using eligible browser, it attempts to connect you using WebRTC. In this case the Webplayer connection URL will look like https://blNwsX-gmca.aps.anl.gov:4443/nxwebplayer?config=**gmca_webrtc.nxs** while for the other browsers the URL will look like https://blNwsX-gmca.aps.anl.gov:4443/nxwebplayer?config=**gmca_classic.nxs**
- If something does not work, or you do not see improvements in desktop responsiveness, or you simply prefer the old-style behavior, replace "webrtc" with "classic" in the URL.
- Be aware that if your Webplayer login takes long time with a wheel spinning, you may need to resize the browser window. It is a bug which will hopefully be fixed soon by NOMACHINE.
- Consult the Remote FAQ page for more information about WebRTC.

Other

- Guest printing is now available:
  https://www.gmca.aps.anl.gov/userprogram/printing-wireless.html

- There are new instructions how to connect to Guest WiFi:
  https://www.gmca.aps.anl.gov/userprogram/guest-wifi.php

Table 1. Beam size and Intensity at different energies with different collimators on ID-D with the KBM and 15 CRL lenses

Energy_collimator	Horizontal size (microns)	Vertical size (microns)	Intensity (photons / s)
With Scatter Guard (sg), largest beam			
13.50keV_sg:	28.4	33.8	6.13E+12
13.00keV_sg:	24.3	26.7	7.42E+12
12.66keV_sg:	23.3	19.6	8.51E+12
12.00keV_sg:	21.5	20.0	9.85E+12
11.50keV_sg:	23.3	20.0	1.02E+13
11.00keV_sg:	30.3	30.0	9.13E+12
With 20 µm collimator			
Energy_collimator	Horizontal size (microns)	Vertical size (microns)	Intensity (photons / s)
13.50keV_20:	13.3	13.8	1.19E+12
13.00keV_20:	13.7	12.4	1.66E+12
12.66keV_20:	13.3	12.8	2.13E+12
12.00keV_20:	15.1	10.5	3.06E+12
11.50keV_20	16.0	9.5	3.49E+12
11.00keV_20:	17.8	6.2	2.25E+12
With 10 µm collimator			
Energy_collimator	Horizontal size (microns)	Vertical size (microns)	Intensity (photons / s)
13.50keV_10:	8.6	8.6	4.81E+11
13.00keV_10:	9.6	8.5	6.47E+11
12.66keV_10:	10.1	7.7	8.24E+11
12.00keV_10:	11.9	8.6	1.32E+12
11.50keV_10:	12.4	5.8	1.86E+12
11.00keV_10:	10.4	5.2	1.20E+12
With 5 µm collimator			
Energy_collimator	Horizontal size (microns)	Vertical size (microns)	Intensity (photons / s)
13.50keV_05:	7.8	5.7	1.45E+11
13.00keV_05:	7.8	5.7	1.99E+11
12.66keV_05:	8.6	6.8	2.59E+11
12.00keV_05:	10.9	6.1	4.32E+11
11.50keV_05:	8.7	5.2	6.13E+11
11.00keV_05:	8.7	5.3	4.73E+11

Table 2. Beam size and Intensity with different collimators at different energies on ID-D with the KBM and 15 CRL lenses

Energy_collimator	Horizontal size (microns)	Vertical size (microns)	Intensity (photons / s)
At 13.5 keV			
13.50keV_sg:	28.4	33.8	6.13E+12
13.50keV_20:	13.3	13.8	1.19E+12
13.50keV_10:	8.6	8.6	4.81E+11
13.50keV_05:	7.8	5.7	1.45E+11
At 13.00 keV			
13.00keV_sg:	24.3	26.7	7.42E+12
13.00keV_20:	13.7	12.4	1.66E+12
13.00keV_10:	9.6	8.5	6.47E+11
13.00keV_05:	7.8	5.7	1.99E+11
At 12.6keV			
12.66keV_sg:	23.3	19.6	8.51E+12
12.66keV_20:	13.3	12.8	2.13E+12
12.66keV_10:	10.1	7.7	8.24E+11
12.66keV_05:	8.6	6.8	2.59E+11
At 12.0 keV			
12.00keV_sg:	21.5	20	9.85E+12
12.00keV_20:	15.1	10.5	3.06E+12
12.00keV_10:	11.9	8.6	1.32E+12
12.00keV_05:	10.9	6.1	4.32E+11
At 11.5 keV			
11.50keV_sg:	23.3	20	1.02E+13
11.50keV_20:	16.0	9.5	3.49E+12
11.50keV_10:	12.4	5.8	1.86E+12
11.50keV_05:	8.7	5.2	6.13E+11
At 11 keV			
11.00keV_sg:	30.3	30	9.13E+12
11.00keV_20:	17.8	6.2	2.25E+12
11.00keV_10:	10.4	5.2	1.20E+12
11.00keV_05:	8.7	5.3	4.73E+11