May 2012 ALBA newsletter

Accelerators

http://www.cells.es/Divisions/Accelerators

- RUN 4 ran between 19/04 and 11/05 with beam for users. The start-up was long and complicated by the water cut over Easter. The accelerator ran most of the time with 100 mA and even though we started with 3 injections per day we have now settled for 2 injections per day, separated by 12 h. The storage ring is now routinely operated over 24 h.

- The main problems that we have had have been: the failure of a quadrupole power supply, of an injection kicker magnet and several RF interlocks. The beam was available for 86% of the planned time.

- In order to increase beam stability we have measured new correction tables for the Multipole wiggler (MPW) and the APPLE-IIs undulators. In the latter case we have taken care and corrected the simultaneous effect of changing the gap and the phase of the undulator. We expect that these devices are now transparent to all users.

Beamlines

http://www.cells.es/Beamlines

*** BL04-MSPD: Materials Science and Powder Diffraction.**

- The high pressure end station components installation and integration is almost complete (see figures 1-2).

- We have got the first focused beam at the High-Pressure (HP) end station sample position (~100 x 100 μm^2), the optimization of the focusing mirrors bending will be performed.

- The CCD camera (Rayonix-165) has been integrated into the control system, it will be ready for user operation in the next weeks.

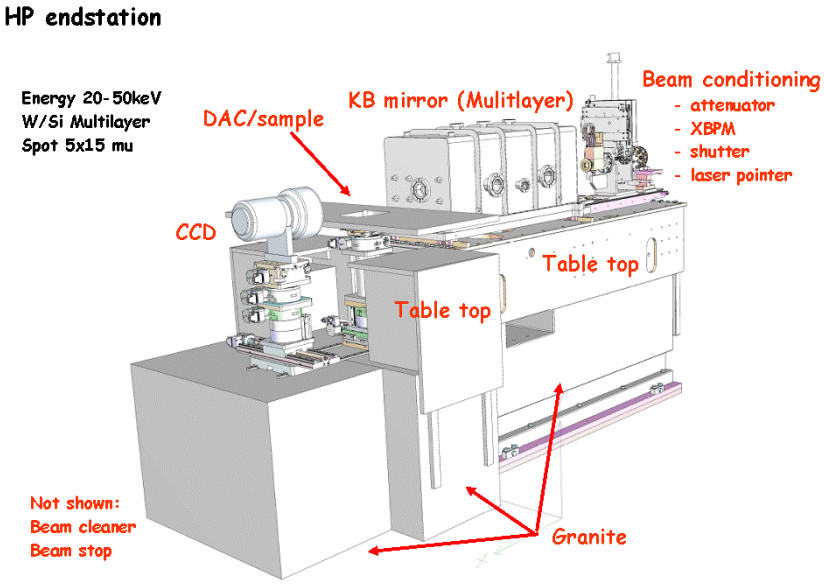

Figure 1. BL04-MSPD. HP end station layout.

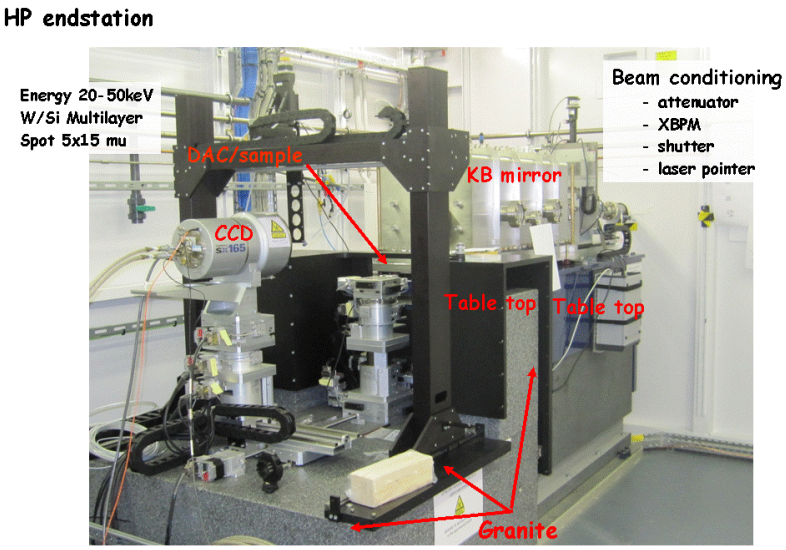

Figure 2. BL04-MSPD. Actual status of HP end station.

*** BL09-MISTRAL: X-Ray Microscopy.**

- After the monochromator intervention we have been realigning the beamline optics with the X-ray beam.

- Both VLS gratings, Ni for low energies and Pt for high energies, are working as expected and produce a focus at the exit slit of 74 μm (H) x 12 μm (V).

- The energy calibration of the monochromator is in progress and flux measurements have been carried out.

- The commissioning of the end station will start in the next commissioning run from May 23rd to June 15th.

*** BL11-NCD: Non-Crystalline Diffraction.**

- A more refined version of the data acquisition system has been worked out. The SAXS and the WAXS detectors are now controlled and synchronized via software and TTL triggering, respectively. Users will be able to, for example, set up mesh scans, multiple exposures during one measurement cycle, and more.

- Few remaining parts required for completion of the beamline layout have been manufactured in the workshop and are ready for installation.

- Information about the beamline required by the users when they arrive that will allow to decide the length of the x-ray camera flight tube, the combination of attenuating filters and the degree of attenuation that results and so on will be introduced into web applications that can be used before arriving on site are being implemented.

*** BL13-XALOC: Macromolecular Crystallography.**

- On April 25th, we were able to collect our first diffraction dataset of a lysozyme crystal to 1.44 Å resolution (Fig. 1).

- We have advanced in the control of the synchronization between the omega (phi) axis and the detector/shutter.

- The second diamond-based X-ray beam position monitor at the end station has been installed.

- The graphical user interface (GUI) widget for fluorescence scans has been created and is working properly. We are currently testing it with a variety of anomalous scatterers.

- The main GUI widget for data collection is being designed.

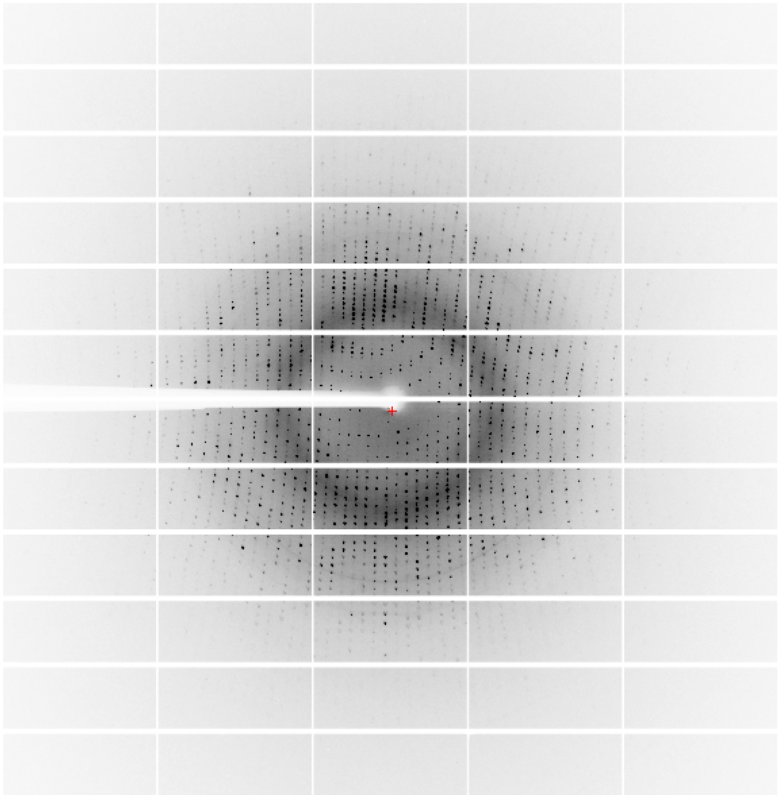

Figure 1. BL13-XALOC. First diffraction frame of a lysozyme crystal (at 100K) at BL13-XALOC. This image corresponds to a 1 degree oscillation and a 1 sec. exposure, the crystal-to-detector distance was 200 mm and the wavelength 0.97949 Å.

*** BL22-CLÆSS: Core Level Absorption & Emission Spectroscopies.**

- The first highest quality EXAFS spectra have been taken! The figures below and in this link demonstrate the ability of CLÆSS beamline in producing (one of) the best spectra in terms of repeatability, noise level, and energy resolution in the world.

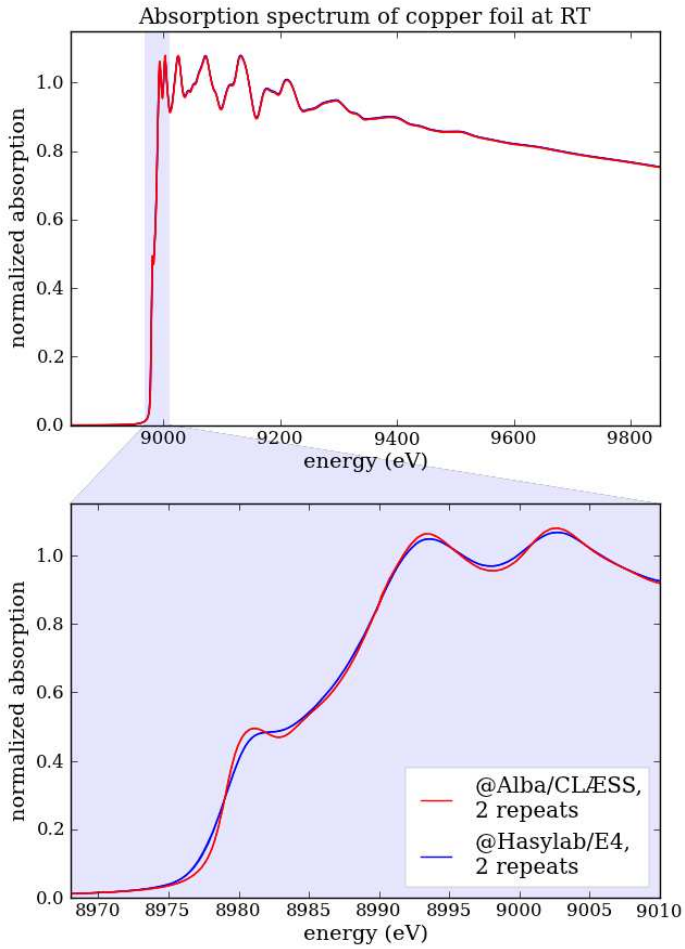

Figure 1. BL22-CLÆSS. The absorption coefficient with magnified XANES.

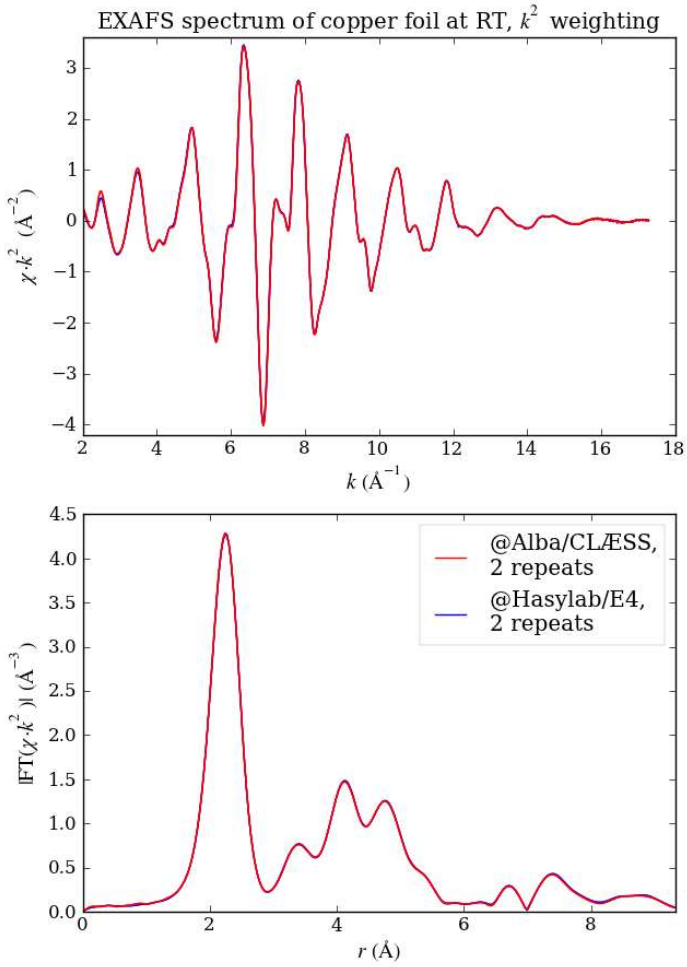

Figure 2. BL22-CLÆSS. EXAFS in k- and r-spaces of copper foil at the Cu K-edge. There are 4 curves in each graph.

*** BL24-CIRCE: Photoemission Spectroscopy and Microscopy.**

- The PGM mechanical recommissioning has shown that the intervention to compensate the limitations imposed by a manufacturing error was successful.
- The NAPP experimental station is assembled and undergoing Factory Acceptance Tests.
- The results of the user proposals for 2012 have been published.

*** BL29-BOREAS: Resonant Absorption and Scattering.**