September-October 2011 Alba mini newsletter

Accelerators

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

- On August 22nd the ALBA accelerators resumed commissioning. We started by spending 3 weeks for the conditioning and calibration of the 3 RF plants that are dedicated to give back the power lost due to synchrotron radiation to the electron beam.

- On the week of September 12th we dedicated one week to Storage Ring (SR) commissioning, mainly to recover the beam from the long summer shutdown and to close the gap of the 2 in-vacuum undulators which were installed during the shutdown. The process went very smoothly.

- After completing two additional weeks of sub-system tests, the SR commissioning has restarted on October 3rd. The superconducting wiggler was cooled down to 4 K during the previous weekend and is now ready for commissioning.

- The aim of this commissioning period is to make sure that by middle of October the machine provides a stable beam for the beamlines to start performing final tests.

IDs

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

- During September and first days of October, after mechanical installation, both In-Vacuum Undulators (IVUs) have been tested with an electron beam. Also the Superconducting Wiggler was cooled down and it will be tested with beam in the following days.

- On September 13th the gap of the IVU-1 was closed down to 5.5 mm (mechanical minimum gap), and it performed well. The electron beam current was 3 mA. No influence on beam position was observed (as shown in Fig. 1). After repairing the control system of a vacuum valve in the Front End, light from this IVU was detected on the X-ray Beam Position Monitor (XBPM) that is placed in the Front End on October 3rd.

- On September 14th the gap of IVU-2 was closed down to 5.7 mm (nominal minimum gap) and it also performed well. No influence on beam position was observed (as shown in Fig. 2). The electron beam current was 19 mA. Light was detected on the XBPM placed in the Front End.

- On September 29th we started the process of cooling down the superconducting wiggler SCW30 with liquid nitrogen. Around 150 L were needed to lower the temperature to ~90 K. On September 30th the cooling down with liquid helium was started. Stabilization took place during the weekend of October 1st and 2nd. On Monday October 3rd the device was tested without electron beam. A nominal field of 2.1 T was reached without quench. Without current in the Storage Ring, quench was achieved at 2.22 T. Now the device is being stabilized. It will work at a negative pressure with respect to atmosphere, and at a temperature in the cool mass below 3.5 K. In this way, liquid Helium losses will be minimized. The device was filled on Tuesday October 4th and the current liquid Helium level is ~75%. 900 L of liquid helium were needed for the whole cooling-down and filling processes (See Fig. 3).

Beamlines

http://www.cells.es/Beamlines

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

- The granite for the High Pressure (HP) end station has arrived at the experimental hutch (See Fig. 4)

- The MSPD VACCA (VACuum Control Application for Alba synchrotron) is in operation.

- Works at the optics hutch advance as planned in order to have the optics ready for the first beam this November.

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

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

- Installation of a new support for the attenuators located downstream the double crystal monochromator that allows fine adjustments of their alignment in the beam path (Fig.5).

- Lens support assembly housing the collimating beryllium lens for the micro-focus option. The assembly also is equipped with features that allow alignment of beamline component to the beam axis, inserted into the beamline layout between the attenuators and the X-ray beam position monitor unit (Fig. 6).

- Installed the safety curtains on the Sample Table featuring five degrees of high precision motions. Hence, the curtains will allow the users and staff to move the table top mechanically in order to align the sample to avoid any risk of a possible accident (Fig. 7).

- The thermal stabilization water bath will maintain the temperature of the in-vacuum piezo motors allowing fine alignment adjustments of the second crystal of the double crystal monochromator at ca. 30 degrees Celsius.

- The temporary SAXS Detector Table was installed upon arrival at Alba during the summer at the downstream end of the Experimental Hutch. This support will allow to support and align a two-dimensional X-ray detector during beam commissioning of the beamline.

- Starting in August this summer installation of the beamline control hutch began. Installation is nearing its completion as it is now being fitted with services, internet access, electrical power sockets, lighting, and in due course furniture (Fig. 8).

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

- Cooling fluid interfaces for the first elements in the optics hutch have been installed.

- The optics and cameras of the fluorescence screens in the optics hutch have been installed.

- The switch limits of the x-ray beam position monitors have been replaced.

- The beamline is getting ready to receive its first x-ray beam on October 18th.

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

- The cabling of the experimental station has started.

- The control cabin has been installed and cabled.

- The last vacuum bakeouts are about to finish.

- The energy scans of the monochromator with variable steps and dwell times have been prepared and optimized for lowest dead time.

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

- The PEEM end station has been installed at the beamline and successfully passed all site acceptance tests not requiring x-ray beam (See Fig. 9).

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

- The XMCD end-station HECTOR (High-field vECTOR-magnet) has been installed and has successfully passed the Site Acceptance Tests (See Fig. 10).

- The double rotary feedthrough for the MARES end-station has successfully undergone its Site Acceptance Tests.

- The control hutch of the beamline has been constructed and furnished.

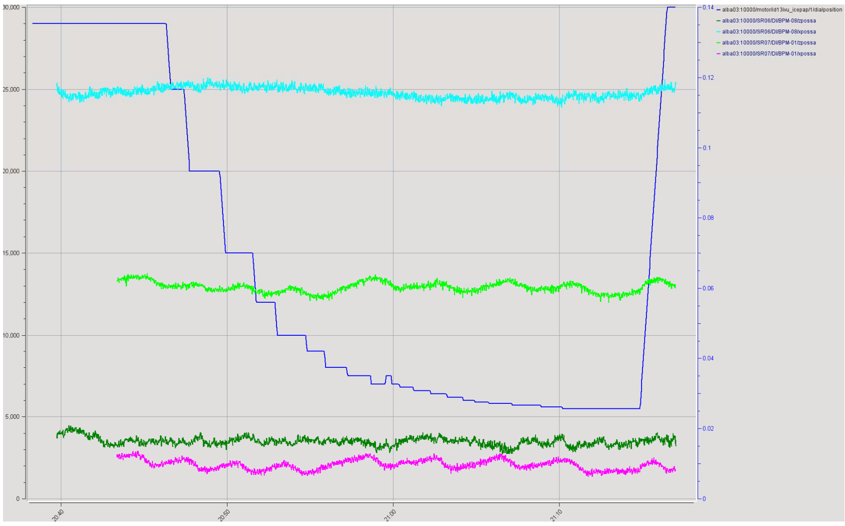

Figure 1. IDs: Dark blue line: the gap value versus time. Maximum value, 30 mm. Minimum value, 5.5 mm. Light blue and pink lines: the Beam Position Monitor (BPM) readings at the entrance (blue) and exit (pink) of IVU straight section in horizontal plane. Green lines: the BPM readings at the entrance (light green) and exit (dark green) of IVU straight section in vertical plane. The observed oscillations are within the ±3 μm range maximum and are attributed to BPM drifts.

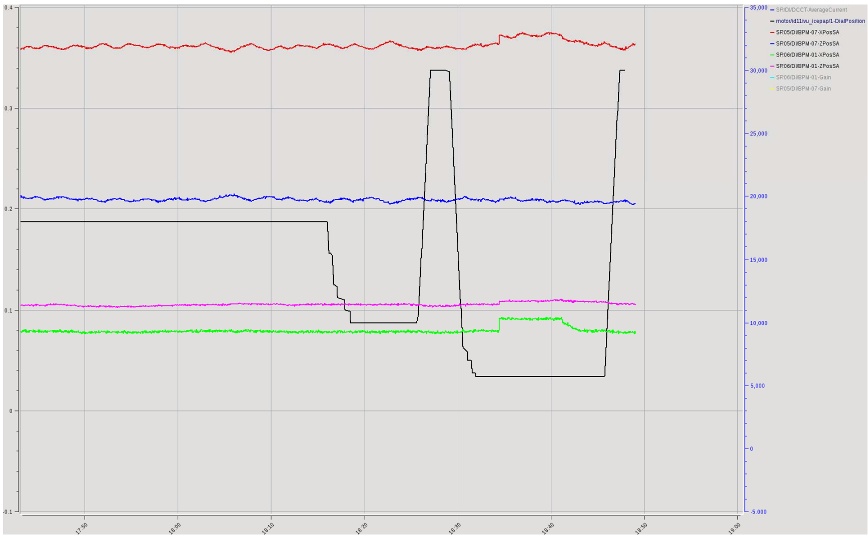

Figure 2. IDs: The gap value versus time. Maximum value, 30 mm. Minimum value, 5.7 mm. Red and green lines: the BPM readings at the entrance (red) and exit (green) of IVU straight section in horizontal plane. Blue and pink lines: the BPM readings at the entrance (blue) and exit (pink) of IVU straight section in vertical plane. The observed oscillations are within the ±3 μm range maximum. The step observed as a green line is attributed to a BPM drift.

Figure 3. IDs: The superconducting wiggler as is being filled with liquid helium through a refilling line. Refilling can take place from outside the tunnel without affecting the performance of the machine. Restricted access to tunnel is only needed to open and close the valves.

Figure 4. BL04-MSPD: High Pressure (HP) end station granite in the experimental hutch.

Figure 5. BL11-NCD: The support for the attenuators.

Figure 6. BL11-NCD: The lens support assembly housing the collimating beryllium lens for the micro-focus option.

Figure 7. BL11-NCD: Safety curtains on the Sample Table.

Figure 8. BL11-NCD: Beamline control hutch.

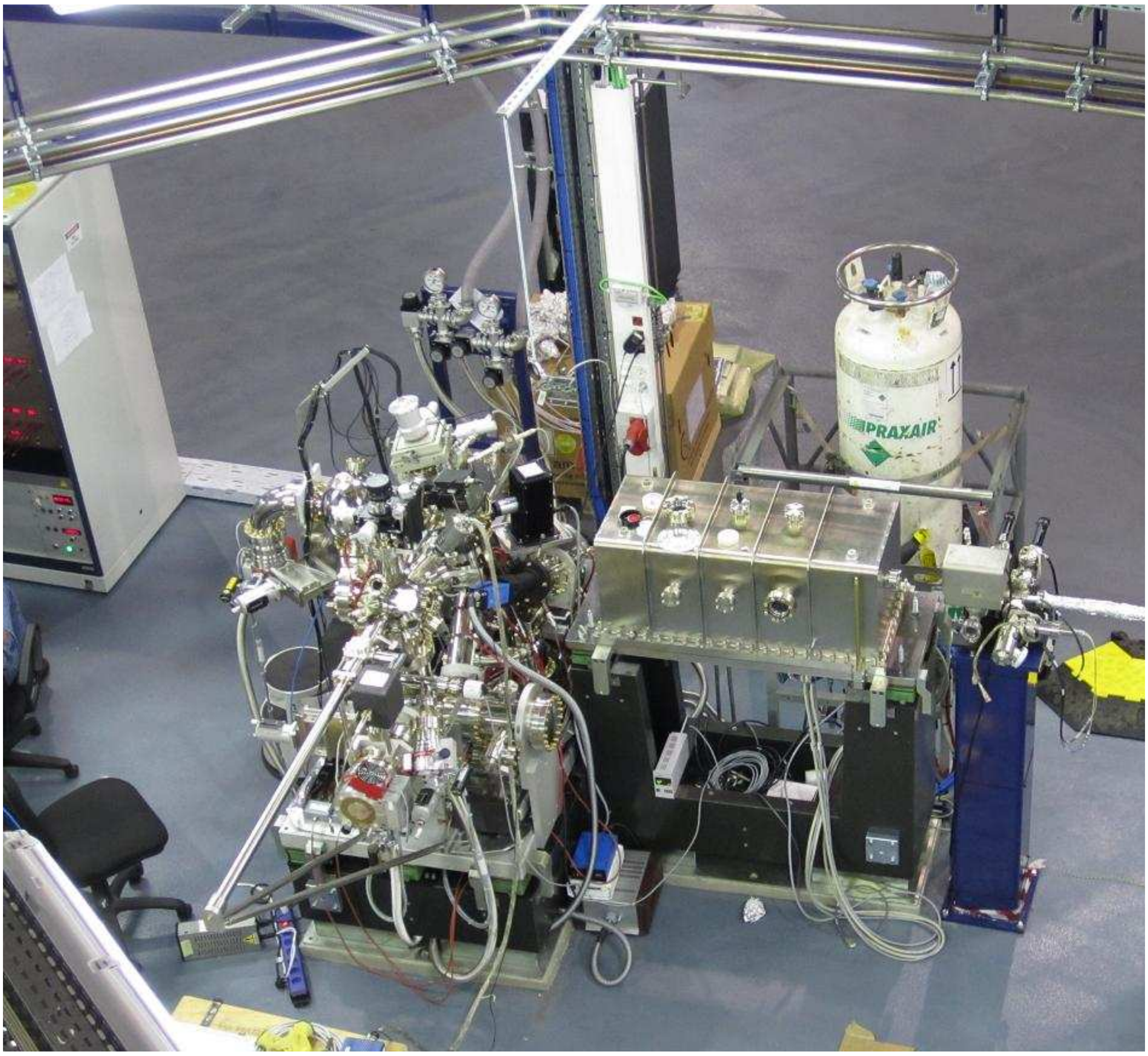

Figure 9. BL24-CIRCE: PEEM end station.

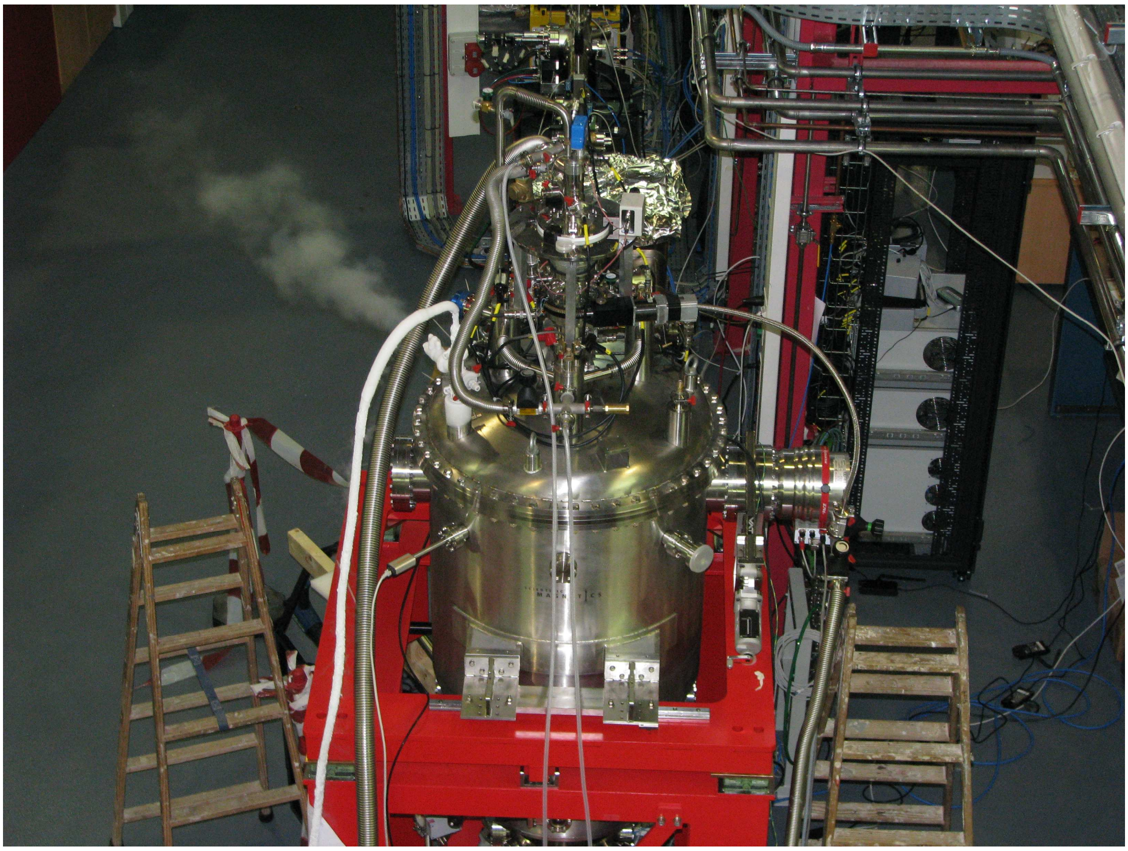

Figure 10. BL29-BOREAS: The HECTOR end-station on its stand at Boreas. It is now fully operational, with a 3-axis magnet (6 T in the beam direction, 2 T in the horizontal plane perpendicular to the beam, 2 T in the vertical direction), a variable sample temperature between 1.7 K and 370 K, a base operating pressure below $4x10^{-10}$ mbar. The sample preparation facilities are now being bought and installed.