

June 2011 Alba mini newsletter

Accelerators:

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

The 1st phase of the Storage Ring commissioning was finished on the 8th of June. During the last weeks, three Insertion Devices have been successfully closed (Elliptical Undulator EU61, Elliptical Undulator EU72, and Multipole Wiggler MPW80). The observed changes in tune are negligible and the changes in beam position are, at this stage of the commissioning, comparable with the noise measured on the beam-position monitors (BPMs) themselves. The slow orbit feedback algorithm has been tested and should be available from next run onwards. During the coming shutdown the last 3 Insertion Devices (2 In-vacuum undulators and 1 superconducting wiggler) will be installed on the storage ring. SR Commissioning will restart on the 22nd of August (Figure 1).

IDs:

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

On Friday May 20th, the first light coming from an insertion device was produced at ALBA. The gap of the undulator EU62 feeding the CIRCE beamline was closed to the nominal value (15.5 mm) and tested at several polarizations. Despite the correction coils were not activated during tests, not appreciable disturbances in the electron beam were seen. The current in the Storage Ring was very low (2 mA) in order to take a picture of the emitted light using a fluorescence screen and a CCD camera (Figure 2).

Beamlines:

<http://www.cells.es/Beamlines>

* BL04-MSPD: Materials Science and Powder Diffraction.

- MAD26 assembly and surveying is complete.
- The final section of the liquid nitrogen pipes (inside the experimental hut) is installed.
- The bakeout of the optics elements is progressing as planned.
- Diamond Anvil Cells have arrived (see Figure 3).

* BL09-MISTRAL: X-Ray Microscopy.

- The Mistral beamline had 2 afternoons of beam on week 23. The beam at the entrance slit of the monochromator was scanned in different conditions. From June 10th to August 22nd there is a long machine shutdown and therefore no beam will be available in this period to commission the beamline.

* BL11-NCD: Non-Crystalline Diffraction.

- All beam line components up to the vacuum-to-air interface window defining the end of the optical layout have been installed, aligned, and verified to work according to specifications and vacuum conditioned.
- The filters for the attenuators were delivered and are to be installed as soon as is possible.

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- The water thermalization bath was delivered and is currently being installed. One connector from Swagelock is missing but is to arrive shortly.
- The new support for the acoustic delay line with a variable height control using pneumatic control has been installed and aligned.
- Data analysis packages have been identified and are currently being installed and made to work on Linux systems at Alba.

* BL13-XALOC: Macromolecular Crystallography.

- The second site acceptance tests (crystallization plates) of the automated sample changer (robot) have been carried out (Figure 4).
- The mechanical installation of the table of the detector has been finalized and all the cables and tubing has been installed.
- The detector's chiller, cooling line, dry air line, data cables, and server have been successfully installed. The site acceptance tests of the detector PILATUS 6M are scheduled for the end of June.

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

- The critical vacuum sections of the beamline optics have been pumped and baked out.
- The Equipment Protection System (EPS) of the optics and front-end has been tested.
- The front-end and optics are ready for accepting the synchrotron light (Figure 5).

* BL24-CIRCE: Photoemission Spectroscopy and Microscopy.

- On June 9th we have opened the front end (See Figure 6 for more details).

* BL29-BOREAS: Resonant Absorption and Scattering.

- The beamline has received the first photons from its undulator on the afternoon of Tuesday 7th June. Figure 7 shows a few images of the undulator x-ray beam.

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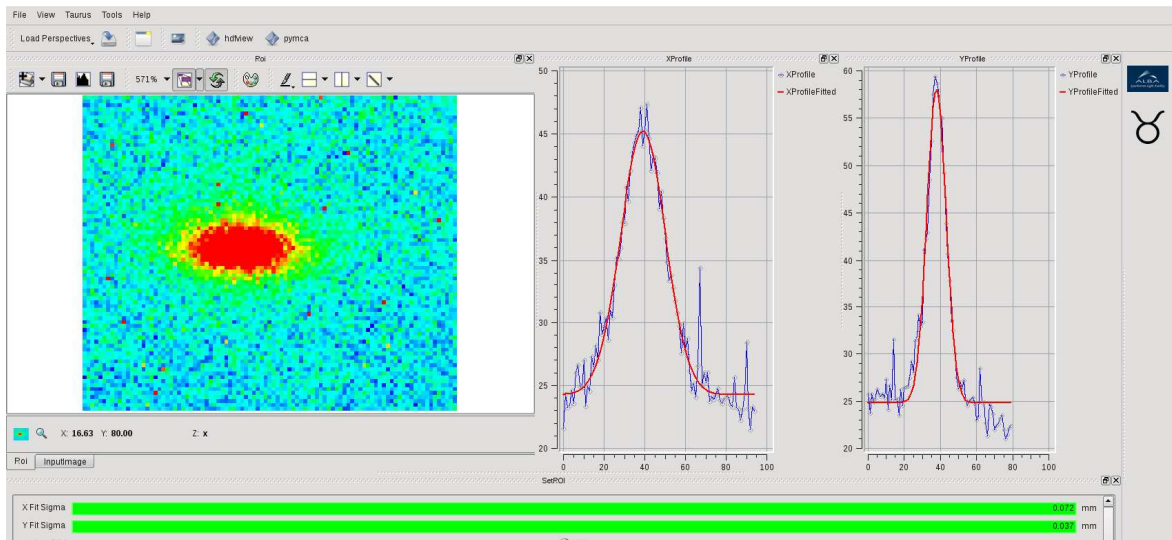


Figure 1. Accelerators: Image of the x-ray beam through a 10 μm pinhole, beam size is 72 (H) x 37 (V) μm^2 .

EU62 image at Front End 24 (CIRCE beamline)

Current in the Storage Ring: 2 mA

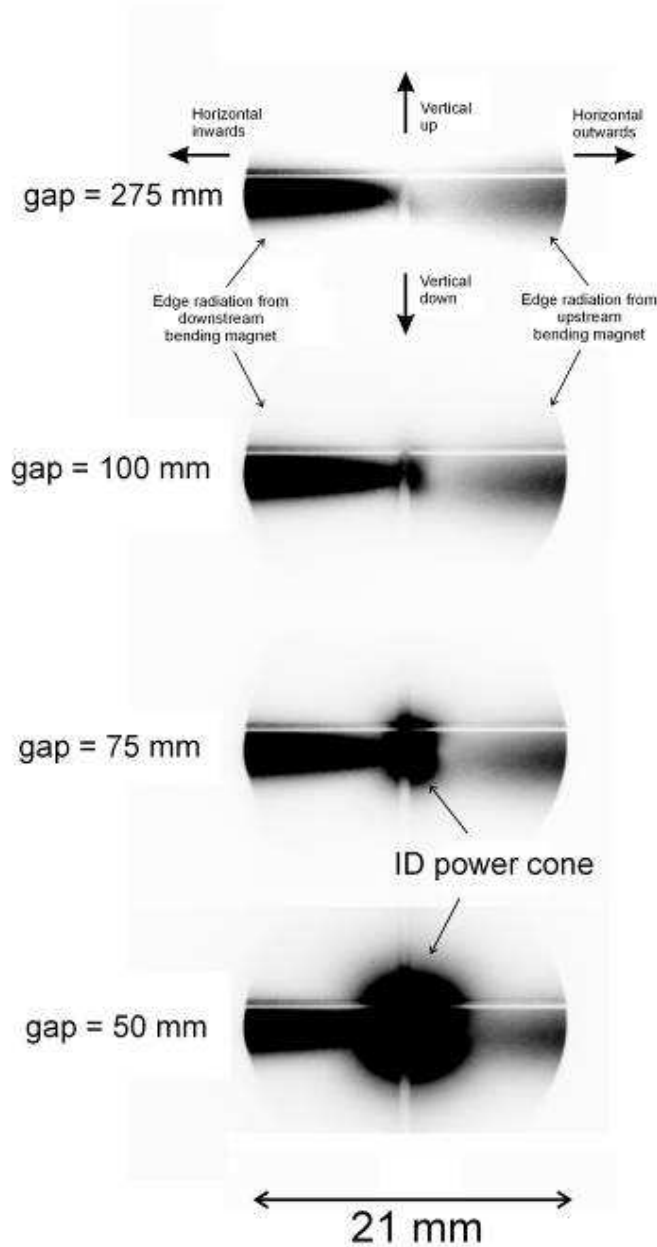


Figure 2. IDs: A series of pictures taken of the light coming out from EU62 (BL24-CIRCE) at a number of gaps. The central spot corresponds to synchrotron light emitted by the undulator. Emission appears for gaps lower than ca. 100 mm. Side spots correspond to light coming from upstream (right) and downstream (left) bending magnets. These pictures are also showing that the undulator is well aligned with respect to the magnets.

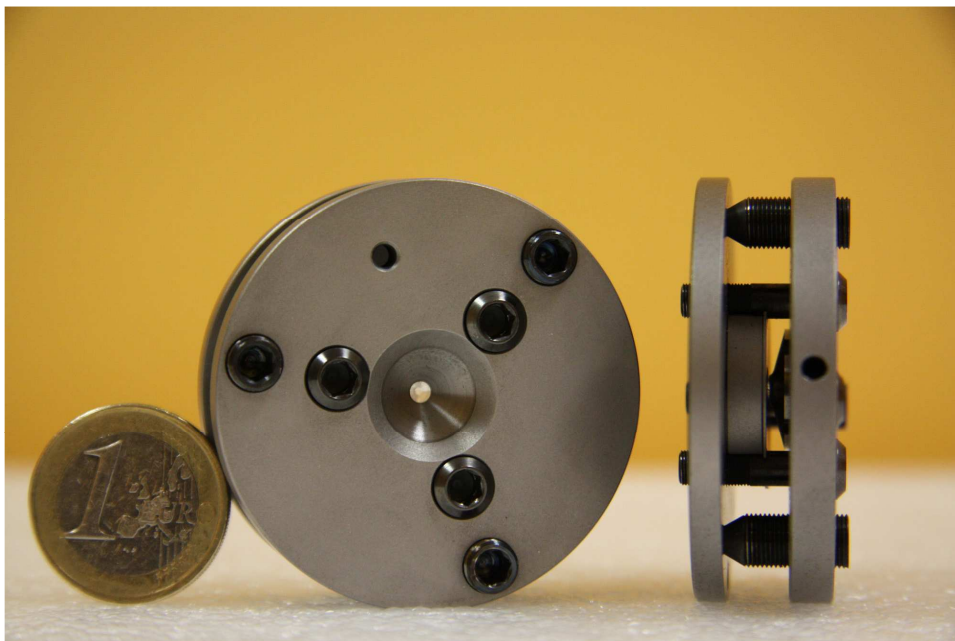


Figure 3. BL04-MSPD: Diamond anvil cells.



Figure 4. BL13-XALOC: A 96-well Greiner crystallization plate being scanned with the automated sample changer (robot) during the site acceptance tests.

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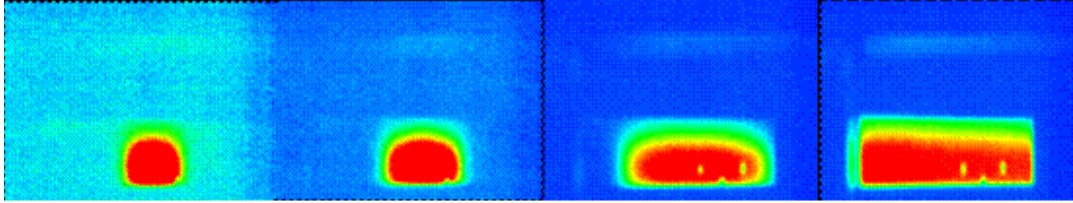


Figure 5. BL22-CLÆSS: Image of the CLAESS wiggler emission for gaps ranging from 60 (left) to 20 mm (right).

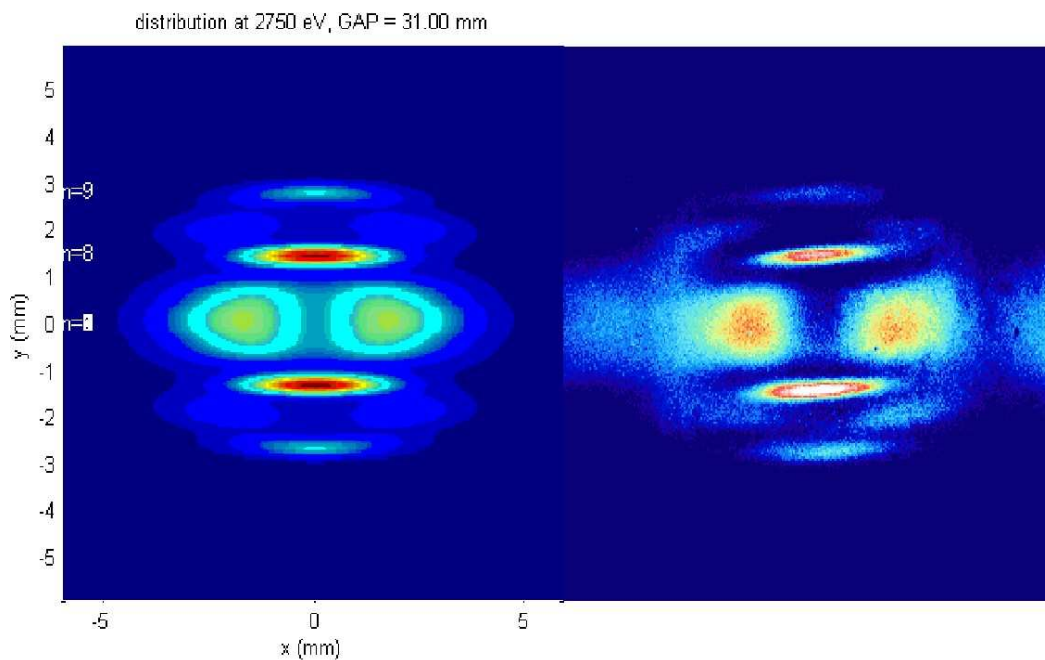
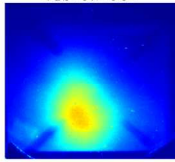


Figure 6. BL24-CIRCE: The left side is calculated and the right one measured on the DiagOn beam diagnostics (diffracted by a Si(111) crystal at 45° , converted into visible in a yag layer and recorded with a CCD). The “eyes, eyebrows and mouth” are the 8th harmonic of the undulator at gap 31 mm and phase 0. The emission “circle” is cut by nodes and each lobule convoluted with the beam emittance to give this funny monkey shape. The more outer features are harmonic 9.

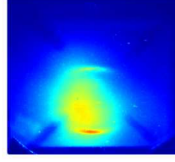
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Raw images

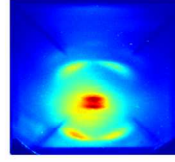
Gap: 273 mm (open)



Gap: 70 mm

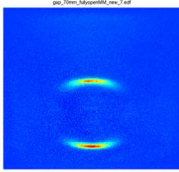


Gap: 40 mm

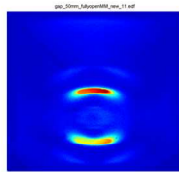


Background subtracted images (background is the image with the gap fully open)

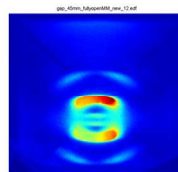
Gap: 70 mm



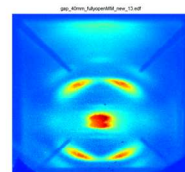
Gap: 50 mm



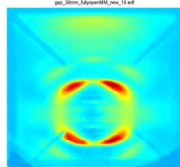
Gap: 45 mm



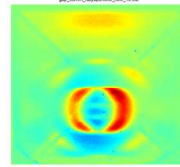
Gap: 40 mm



Gap: 36 mm



Gap: 33 mm



Gap: 30 mm

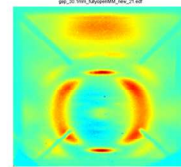


Figure 7. BL29-BOREAS: Images taken on June 7 2011. DiagOn at 370 eV – linear horizontal polarization.