

ALBA Newsletter

Oct 2012

New staff

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

We are pleased to announce the following new employees who have recently joined the ALBA synchrotron light source:

Marta Llonch Burgos

Survey & Alignment Engineer. Survey & Alignment group

Marta has a diploma on Surveying engineering (UPC). Currently is following a Degree on Geomatics at the UPC. She has previous survey experience on the field of civil construction.

Laura Torino

oPAC – Marie Curie - Diagnostics

Laura is a physicist and will join the Diagnostics group of the Accelerator Division in November.

She is holding an Early Stage Researcher fellowship of the EU – FP7/People - Marie Curie actions, under the program Optimization of Particle Accelerator, oPAC.

Accelerators

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

- RUN_07 started on 21/09 and finished on 08/10 at 7:00 am with 336 hours of beam planned for the beamlines. The availability of the machine has been better than 96 % during this run.
- Two full days dedicated to the machine have been used to optimize the injector, specially the booster and to further works to increase the reliability of the RF system.
- Unfortunately, since beginning of RUN_08 a failure on the superconducting wiggler (SCW) which provides the photons for MSPD does not allow for the wiggler to run continuously.
- There seems to be an additional head load into the cryostat which leads to a temperature increase that precludes from a continuous use of the SCW.
- The wiggler needs to be turned off periodically so that the working temperature and pressure can be recovered. Further investigations are ongoing to identify the source of the problem.

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Experiments

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

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

* BL04-MSPD: Materials Science and Powder Diffraction.

- The Mad26 has been installed in its final location, i.e. the outer circle of the 3-circle diffractometer (see Figure 1). The hardware installation and control are getting ready and commissioning should start next beamtime run.
- The beamline has been operating with users during October, allocating both powder diffraction and high pressure experiments.
- First results on the long term proposal devoted to get simultaneously nanocalorimetric and powder diffraction data on thin films (proposal of the Nanomaterials and Microsystems research group at <http://gnam.uab.es/>) . The diffraction data is able to follow heating and cooling ramps of ~10 k/s (see figure 2).



Figure 1. BL04-MSPD: Powder diffraction end station photograph. The Mythen and MAD26 detectors can be seen in the photo.

Diffraction peak versus time during heating/cooling ramps ~ 10 K/s

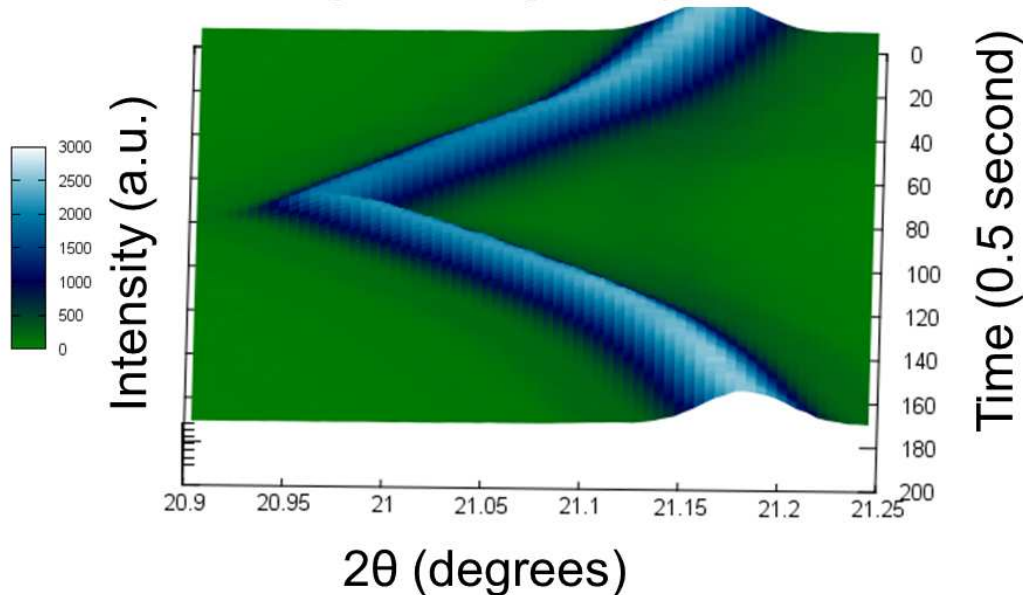


Figure 2. BL04-MSPD: Diffraction peak versus time during heating and cooling ramps ~10 K/s

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

- We are working on the reliability of the robot that allows loading and unloading vitrified samples at cryo-temperatures in the Transmission X-ray Microscope.

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

- The first two weeks of October were dedicated to solving the problems the line had experienced with the water thermal stabilization loop of the double crystal monochromator. A temporary solution has been found that allows operating the beamline.
- Diffraction diagram of wet rattail collagen with a d spacing around 67 nm is shown below (Figure 1). The data is used to characterize the spatial resolution and spatial linearity of the detector system. The pattern shows a slight degree of disorder that is due to the fact that several collagen strands were used. The exposure time was 10 seconds that is probably too long as one can see that the detector is saturating for the lower orders.

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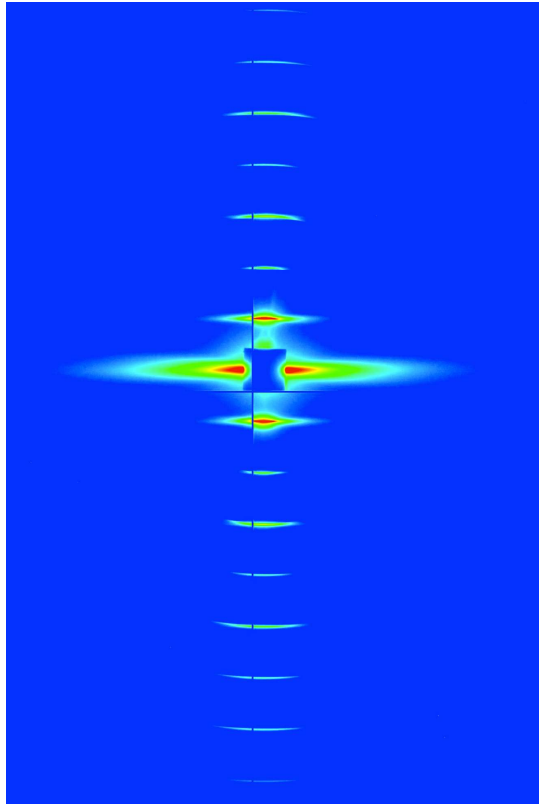


Figure 1. BL11-NCD: Diffraction diagram of wet rattail collagen

- The camera length used is approximately 7 m and the wavelength ca. 0.124 nm. In the vertical the photon beam profile in the focal plane is very close to its theoretically expected value of about 25 μm FWHM. Finally, it can also be seen that at the moment the beam stop is too big.
- During the second part of October the third and fourth user groups used the station in the configuration of small angle x-ray scattering (SAXS). Their comments have helped the NCD project team to define priorities and improve the features available in the data collection system and/or on the end station. We thank all our users for their support.

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

- Successful user operation has been underway during this past month and we have been operating at x-ray energies that range from 7 to 17 keV.
- The design of movable XYZ beamstop is underway.
- We are still testing the automated sample changer (robot) with the new gripper. The phase separator and the cryostream removal mechanism may require redesign.

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- The manual/removable diode has been installed.
- The commissioning of the CVD diamond x-ray beam monitors in the end station is ongoing.
- We are currently implementing and testing an automated focusing system of the on-axis viewing system.
- We have implemented a diffraction test button in the on-axis viewing system widget that allows the user to automatically take snapshots at 0, 90, 180 degrees, and still images.

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

- The first quick XAFS spectra have been measured. Full EXAFS can take as short as 0.5 seconds and XANES can be 25 ms fast!
- See the quick spectra at:
www.cells.es/Beamlines/CLÆSS/commissioning.html

* BL24-CIRCE: Photoemission Spectroscopy and Microscopy.

- The first official user beamtime started on October 17th. The group from *Instituto de Ciencia de Materiales de Barcelona* successfully performed microscopy and spectro-microscopy of self-patterned single crystalline substrates and thin films:

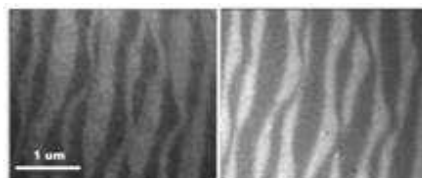


Figure 1. BL24-CIRCE: XPEEM images of STO/LSMO thin films with two distinct terminations.

- Magnetic domains were imaged for the first time by XMCD-PEEM (Figure 2):



Figure 2. BL24-CIRCE: XMCD-PEEM on the Co L3 edge for an ultrathin Co film (Si/SiO/Pt(3nm)/Co(1.5nm)/AlOx).

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- The components of the NAPP end station that need to be upgraded have been shipped to the provider and should be reinstalled in December.
- The ultrapure gas dosing system for the NAPP end station has arrived.

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