

## ALBA Newsletter

### December 2012 – January 2013

The ALBA's newsletter is a monthly publication containing the latest news, updates, and developments of the ALBA Synchrotron Light Source.

#### General

- ALBA has signed a statement of endorsement to The European Charter for Researchers and The Code of Conduct for the Recruitment of Researchers. For more information, a copy of this letter has been published in the following webpage of the European Commission:

[http://ec.europa.eu/euraxess/data/usgn\\_orgs/ALBA\\_Synchrotron\\_Light\\_Laboratory%20.pdf](http://ec.europa.eu/euraxess/data/usgn_orgs/ALBA_Synchrotron_Light_Laboratory%20.pdf)

- On January 30<sup>th</sup>, at CERN, Dr. Caterina Biscari and Prof. Steinar Stapnes – CLIC Study Leader – signed a Memorandum of Understanding which makes CELLS a member of the CLIC multilateral collaboration.
- On January 31<sup>st</sup>, at CERN, Dr. Caterina Biscari and Prof. Rolf-Dieter Heuer – CERN General Director – signed a Framework Collaboration Agreement for collaboration in the design, development, construction, and validation of components and systems in the field of particle accelerators.
- These two agreements will allow CELLS staff to be in touch with CERN and worldwide accelerator experts, as well as to participate in the latest developments in accelerator technologies.



**Figure 1:** Prof. Rolf-Dieter Heuer – CERN General Director – and Dr. Caterina Biscari – ALBA Director – signing the Framework Collaboration Agreement. This photo is copyright protected by CERN.

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#### **First Open Day at the Alba Synchrotron**

- On December the 15<sup>th</sup>, 2012, the ALBA Synchrotron Light Facility held its first Open Day. The event was a great success, and more than 1000 visitors, mostly coming from Barcelona and its surroundings, visited the facility. Several hundreds of applications had to be postponed for next edition.
- The visitors enjoyed the circuit along the facility, and they could view from the top the accelerator tunnel – that was opened for the event –, pass near the experimental hutches and go through one of the control rooms, and closely inspect a reproduction of one section of the main accelerator, a monochromator, and an RF cavity. The circuit was supplemented by educational panels showing the principles of particle accelerators, synchrotron radiation production and manipulation, and main scientific applications.
- The event had been organized thanks to the volunteer involvement of ALBA staff.

#### **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:

José Ma. Gómez

Linac Scientist. Linac Group.

Telecommunications Engineer with a Master in Telemedicine and Bioengineering. Experience in RF, instrumentation software, and quality control.

Start date February 4<sup>th</sup>

Pol Solans

Operator. Operation Section.

Physicist and Electronic Engineer. He did the final thesis at the Technical University of Munich. Experience in test equipment, and measurement control.

Start date February 18<sup>th</sup>

Joan Pijuan

Operator. Operation Section.

Technical communication Engineer with a European Master in Research of Information Technologies. Experience in analogue, and digital electronics.

Start date February 18<sup>th</sup>

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#### Accelerators

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

- RUN\_01 of 2013 started on January 22<sup>nd</sup>, after one week dedicated to the start-up of all accelerator sub-systems which had been switch off during the Christmas shutdown.
- The goal of the RUN is to provide 450 h of beam for users with 2 injections per day and current up to 120 mA, although there are ongoing discussions with the Experiments Division to increase this number.

#### Experiments

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

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

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

- The commissioning of the Mad26 detector is progressing well (see Figure 2). The first official users of the high resolution detector will perform experiments in February.
- The first high resolution pattern of the Mad26 with the merged signals of its channels has been acquired (see Figure 3).
- The pressure calibration system developed in-house for the high-pressure end station has been installed at the sample position and was used for in-house research experiments the last week of January. This system provides a laser spot diameter of 10 microns at sample position.

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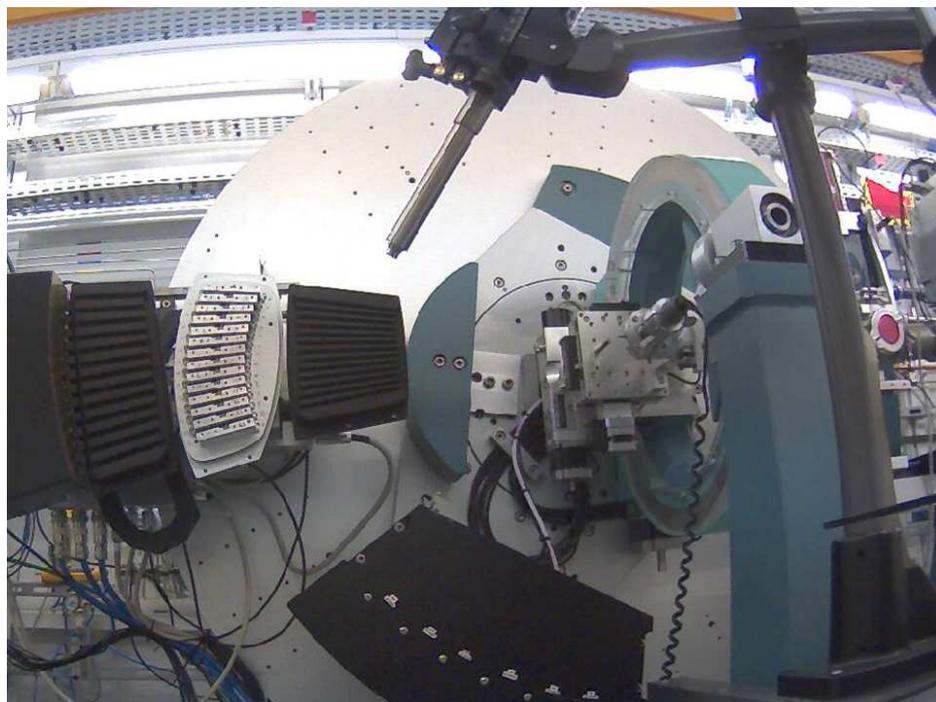


Figure 2: The Mad26 detector installed in the powder diffraction end station.

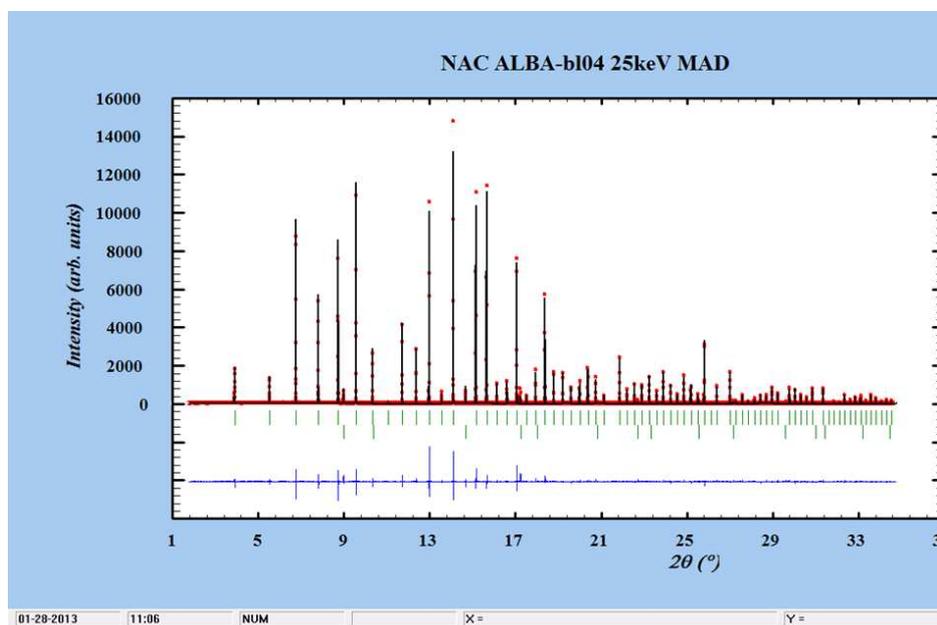


Figure 3: NAC standard sample measured at 25 keV.

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

- The first friendly users at MISTRAL coming from the group of Prof. Carrascosa (CNB - CSIC) have been doing cryo-tomographies of vaccinia virus-infected PtK2 cells. 46 tilt series in total were collected at different post-infection times. One tilt series was readily reconstructed showing that it is possible to distinguish the viral factory inside the cell.

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

- 1) As the beamline is now receiving users regularly, we think it may be helpful to all of you to know how to store data at ALBA and how to transport data from ALBA to your home institutions after completion of beamtime. The data transfer can be achieved either over the network or using portable hard disks, DVDs, or USBs. Below follows a summary of what you must and can do with your data.
    - All users are given a directory in which they will store their data files during their visit to ALBA.
    - First time users must change the default password immediately for protection, and as you will later need this password for accessing the data remotely after completion of beamtime.
- a- Log into <https://citrix.cells.es/> using the username given to the main proposer and the default password;
  - b- Click on the “Settings” icon on the top menu;
  - c- Go to “Change password” and enter a new password, which should be at least 8 characters in length. This password is chosen by the user;
  - d- After setting a new password, users can access their data from any location, inside as well as outside of ALBA. Accessing the data from the outside has to be done by going to <https://vpn.cells.es> from any web browser (no software installation or plugins are required);
  - e- Data collected during the experiments must be saved in:

/beamlines/bl11/projects/2012/<proposalid>/DATA

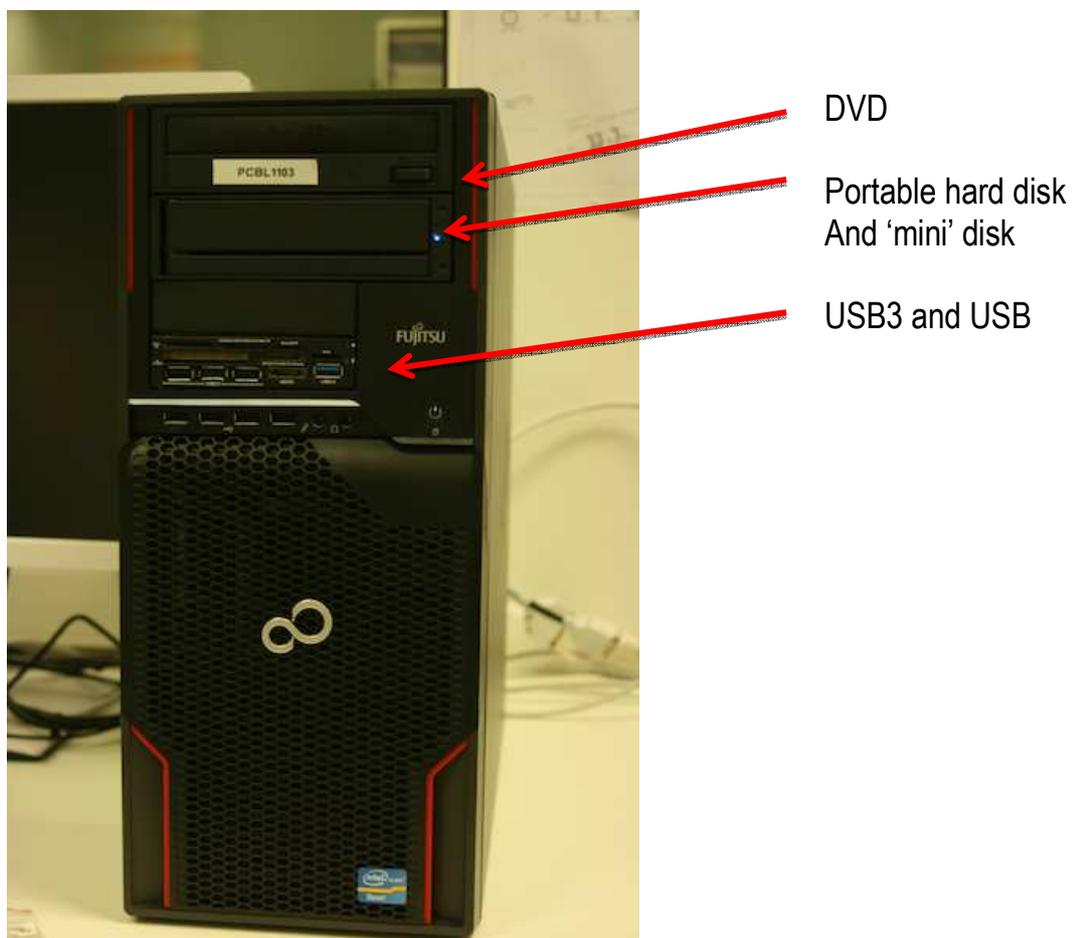
for those of you that have been allocated access in 2012.

It is important to use these file locations, as it is the only folder where the user has access permissions both on and off site.

For smaller data volumes, it is feasible to copy data to a portable storage medium such as DVD, USB and USB3, hard disk, and more from the pcb1103 Linux workstation (Figure 4).

You need to know that the current policy of ALBA is to store your data for at least six months. The time period for data storage at ALBA may be extended in the future.

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**Figure 4. Windows workstation at BL11-NCD** showing the different connectors used for data backup.

- 2) During the Christmas shutdown at ALBA various maintenance tasks have been carried out on the beam line.

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

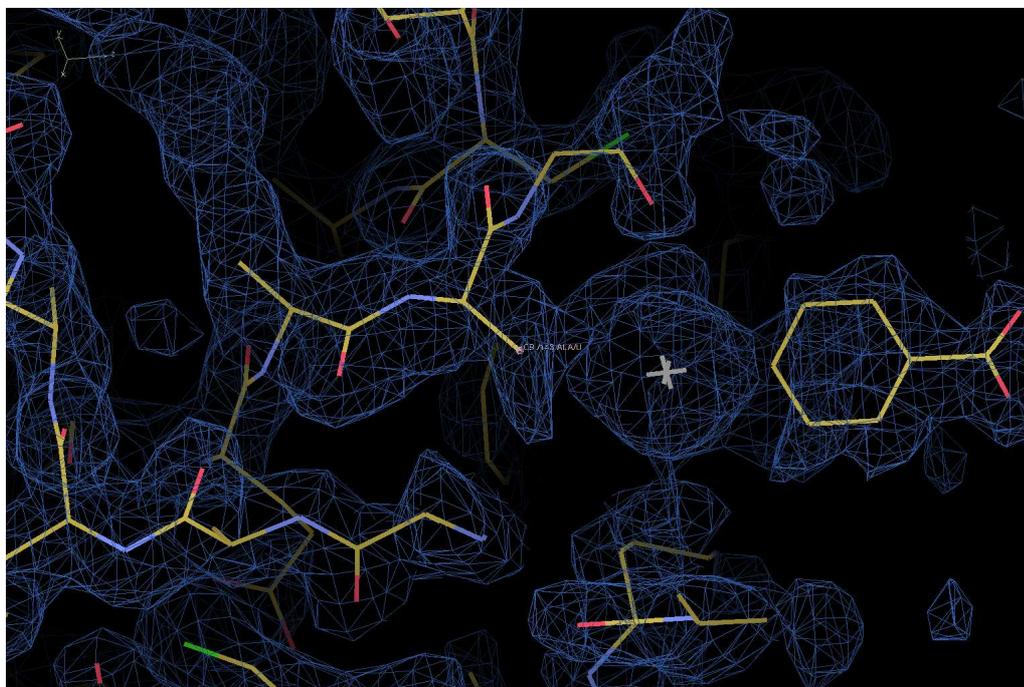
- Since the opening of the beamline in July 2012 until now, we have estimated that the users have tested the diffraction of about 1593 crystals and collected 712 diffraction datasets.
- First entries at the Protein Data Bank (PDB) (currently on-hold):

4HVW Crystal structure of the T98E c-Src-SH3 domain mutant in complex with the high affinity peptide VSL12  
Authors: A.Camara-Artigas

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- 4HVU Crystal structure of the T98D c-Src-SH3 domain mutant in complex with the high affinity peptide APP12  
Authors: A. Camara-Artigas
- 3ZKE Structure of LC8 in complex with Nek9 peptide  
Authors: Gallego, P., Velazquez-Campoy, A., Regue, L., Roig, J., Reverter, D.
- 3ZKF Structure of LC8 in complex with Nek9 phosphopeptide  
Authors: Gallego, P., Velazquez-Campoy, A., Regue, L., Roig, J., Reverter, D.
- We have collected anomalous diffraction datasets at the absorption edges of a large variety of elements, namely: Fe, Ni, Cu, Zn, Gd, Hg, Pt, Au, and Se. We have also collected anomalous data of I-containing and S-containing crystals. In Figure 5, we can see an experimental electron density map obtained from the first solved Hg SAD dataset at the beamline.



- Figure 5. First Hg SAD phasing at BL13-XALOC.** Sca-1, a C-type lectin-like protein involved in biomineralization processes. Phases were obtained by a single SAD experiment performed with data collected at the Hg peak wavelength (Image courtesy of Prof. A. Romero, CIB, CSIC).
- The implementation of the crystal diffraction characterization and diffraction strategy programs (EDNA) at our beamline control software is advancing. Several improvements in crystal and beam centering are also being implemented.
  - Since January 2013 beamtime is allocated on a 24-hours basis (3 shifts) due to the increased reliability of the beamline.

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

- CLÆSS beamline has recently hosted 3 groups of catalysis researchers. The main instrumentation (so far without CLEAR spectrometer) is ready for routine users' operation.

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

- The leak in the vacuum guard of the water cooling of the monochromator was repaired. A bakeout was performed on the monochromator during the Christmas shutdown and is now fully operational.
- The upgraded differentially pumped photon beam entrance of the NAPP end station has been installed.
- The retarding lens power supply of the PEEM microscope has been fixed.
- Dr. Michael Foerster has joined the beamline team; he comes from the University of Mainz.

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