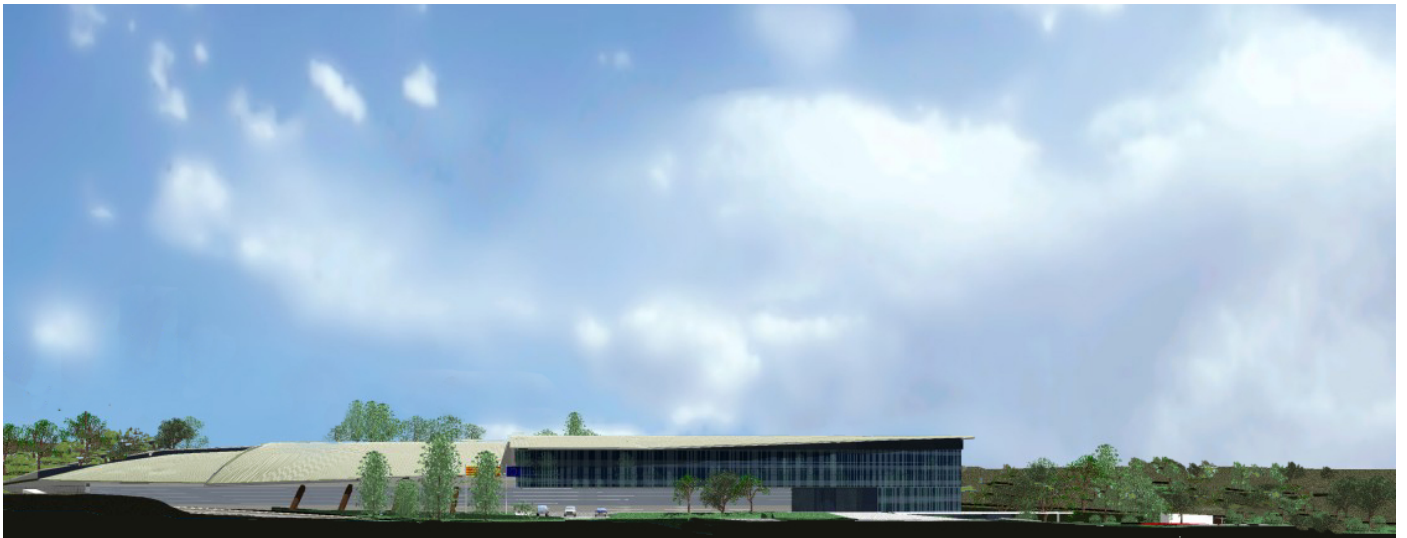




# ALBA Newsletter



Nº 1 - February 2006

## 1. Introduction

This is the first ALBA newsletter presenting information on the progress of the project. This type of bulletin will not be published at regular intervals.

## 2. Personnel

ALBA's staff numbers are rapidly increasing. On January 1<sup>st</sup> 2004, the number of employees was 14, one year later it was 44 and on 1<sup>st</sup> of January 2006 it was 75. Most of them are from Spain (50) followed by Germany (6), France (5) Italy (4) and Russia, Sweden, Jordan, Iran, United Kingdom, Canada, Brazil, Belgium and Algeria with one or two people from each of these nations.

## 3. Accelerators

During 2005 the ALBA Storage Ring has seen the completion of its design and the start of the ordering for the main components. The lattice has been settled upon and the details of the closed orbit correction scheme as well as the effect of the insertion devices on the beam dynamics are currently being examined.

The 3 GeV complex will consist of a 100 MeV electron linear accelerator (LINAC), a 3 GeV booster synchrotron and finally the 3 GeV storage ring where eventually a beam of 400 mA will circulate while at the beamlines the scientists will perform their experiments. ALBA will use the so-called top-up injection mode, in which the current is kept almost constant in the storage ring by injecting currents as small as 1 mA every few minutes. In this case all elements of the Storage Ring and more importantly the beamline optical components will operate under a constant heat load to ensure proper stability of the beam at the sample position.

The Linac, with the option for top-up, was ordered as a turn key system in October of 2005 and will be ready in two years.

The Storage Ring will have 32 bending magnets, 112 quadrupoles and 120 sextupoles. The contracts for the quadrupole and sextupole magnets have also been awarded. The start of tender for the bending magnets is due at the end of February 2006. The Accelerator Division has decided on a normal conducting HOM free RF cavity, based on the recent developments at BESSY. The tender exercise is closed and completion of the contract is expected soon. Also the design of the vacuum system for the Storage Ring is completed and the Call for Tender is ready to be published.

With the tendering of the vacuum system all the main components of the Storage Ring will have been ordered and the Accelerator Division will turn its attention to the design of the Booster Synchrotron and Front Ends.

## 4. Experiments

The program of designing the seven phase I beamlines approved by the Council of CELLS on June 2005 is underway. Some modifications have been introduced relative to the initial proposals from January 05 as suggested by the SAC (meetings March 17-18 and October 13-14). The most relevant ones are:

✓ It was considered that at least one of the phase I beamlines should reach relatively high photon energies ( $\sim 40$  keV) with reasonable flux. For this reason the source of the High Resolution Powder Diffraction Beamline will be a low K superconducting wiggler which is already conceptually specified. The beamline will operate in two regimes. At low energies (up to  $\sim 25$  keV) the beam will be monochromatized with two crystals in Bragg geometry. At higher energies a bent Laue monochromator sagittally focusing will probably be used. This configuration would be very convenient for high pressure diffraction experiments.

✓ The macromolecular crystallography beamline will be optimized for crystals with relatively large unit cells. The optical design is twofold comprising both the traditional small crystal operation and also the large crystal one.

✓ The noncrystalline diffraction beamline will have two branches. A long one for SAXS-WAXS experiments and a side branch for microfocusing.

✓ The XAS beamline will have an slightly extended energy range (compared to the initial proposal) to cope with “soft” edges such as the K edge of sulphur. The source will be a conventional wiggler. The heat load on the optics is one of the critical design issues.

✓ The two variable polarization beamlines will have Apple II type of undulators and grating monochromators. Both of them will have two end stations organized as PEEM and ambient pressure photoemission in one beamline and XMCD plus resonant scattering in the other.

✓ Several ideas on the soft x-ray microscopy beamline are being studied in collaboration with BESSY and ALS.

Besides this, it has been decided to have a centralized liquid nitrogen cooling system for the hard x-ray monochromators. Presently, all the insertion devices are already specified and several beamlines have advanced documents describing the technical specifications of the optical components.

## 5. Engineering

Since May 2004, geotechnical investigations have been carried out at the ALBA site.

The maximum measured differential settlement until December 2005 with the extensometers installed on the site is 0.11 mm which is considered as satisfactory.

The Basic Project for the construction of the buildings and urbanization of external spaces was finished on time and it was approved after an international review in September 2004. The executive project, which foresees a fast track construction approach, is divided into several lots and its completion is foreseen by February 2006.

The first lot of the executive project includes breaking of the soil, foundations, service gallery, critical slab and ALBA tunnel. The call for tender for this package was published in January 2006. The on site civil works will start after the tendering exercise, in spring.

The **workshop building** of the Autonomous University (UAB) in the campus was transferred to CELLS after an agreement by the two parties. During 2006, the 700 square meters building will be adapted for CELLS use. A mechanical shop is already operating with a brand new drill and a milling machine which works at 10 microns accuracy. In addition, TIG welding equipment is now operational. In the immediate future, the vacuum, electronics, optical metrology and detectors laboratories will all be equipped.

## 6. Computing and Control

### ✓ **ALBA has a new computing cluster and a file server**

In addition to the day to day support of the rapidly increasing workforce, we have put into operation a 3 Tbyte fileserver with full tape backup and a new Linux cluster which consists of a 6 dual processor Opteron machine. It is used to do the very CPU intensive calculations needed by the accelerator division.

### ✓ **ALBA will use the TANGO control system**

ALBA is now a full member of the TANGO community which includes the ESRF, Soleil, and Elettra. This collaboration allows us to have access to a modern control system which we will base our developments on. Additionally, this will further

encourage exchange of software, knowledge and ideas in the Tango community. The first success is the availability of Python device servers and the control of the magnet measurement bench which is running under TANGO.

### ✓ **The ALBA website is online**

ALBA now has a fully functional website (<http://www.cells.es/>) with a dynamic context management system. The system allows our staff members to contribute to the site context while ensuring a unique design. The development of intranet applications to facilitate communication and diminish paper work has been started including an application handling absences.

## 7. Future

Next call for beamline proposals will take place in 2008 or early 2009, therefore the process of definition of the proposals should start soon even if it seems a long way from now.