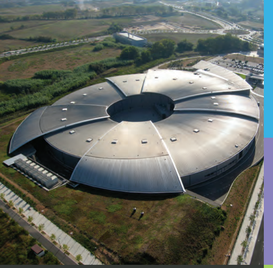

10 YEARS

ILLUMINATING THE UNKNOWN

BRIGHT PEOPLE AT THE SERVICE OF SCIENCE AND SOCIETY

ALBA SYNCHROTRON

The path of ALBA

1990
Motivation and desire move the world: first attempt to obtain financing and build a synchrotron in Spain.

2003
Green light for the ALBA Synchrotron project!

2005
The design and construction of the first 7 beamlines is approved.

2006
Construction of the synchrotron begins. Its circular building will not leave anyone indifferent.

2008
The linear accelerator of ALBA is installed.

2009
The booster and the storage rings are added.

2010
The ALBA Synchrotron is inaugurated in March of this year.

2011
And there is light! For the first time, electrons go round the storage ring and the beam reaches the end station.

2012
The first experiments take place in July!

2013
By the beginning of the year the seven beamlines have already been used by official users.

2016
The eighth beamline, called MIRAS, is inaugurated.

2018
Momentum does not slacken and the construction of 4 new beamlines begins.

2020
ALBA turns 10! The construction of a new beamline is approved, as well as an advanced microscopy platform.

ALBA 10 YEARS | ILLUMINATING THE UNKNOWN

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Generalitat de Catalunya
Departament d'Empresa i Coneixement

European Union
European Regional Development Fund
"A way to make Europe"

What is ALBA?

ALBA is the **only synchrotron light source existing in Spain**. It is a complex of electron accelerators located in Cerdanyola del Vallès (Barcelona). Thanks to synchrotron light we can carry out experiments to **visualize and analyse matter and its properties at the atomic and molecular level**. This is based on the techniques allowed by the high intensity of synchrotron light, such as microscopy, spectroscopy or diffraction.

At ALBA we produce about 6,000 hours of **synchrotron light** a year that are distributed among the research teams that carry out their experiments here.

The ALBA Synchrotron is a public entity managed by the Consortium for the Construction, Equipment and Exploitation of the Synchrotron Light Laboratory (CELLS) and financed in equal parts by the **Spanish and Catalan governments**.

How is synchrotron light produced?

1 **Linear accelerator:** it all starts by accelerating electrons using electric fields.

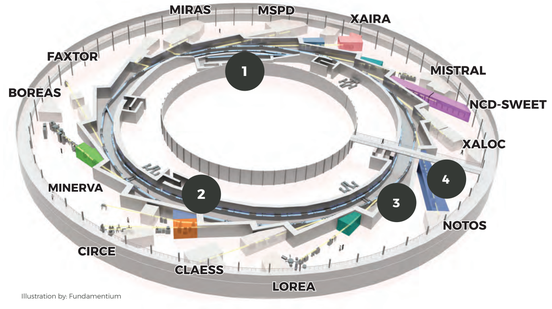

Illustration by: Fundamentium

2 **Booster ring:** then the electrons are accelerated even further, now following a circular path, until almost reaching the speed of light.

3 **Storage ring:** electrons are injected into this ring, the outermost of the two, where they constantly rotate a million times per second.

The accelerated electrons, when passing through magnetic fields, bend their trajectory and emit **synchrotron light**, which reaches the beamlines (laboratories).

4 **Beamlines:** the synchrotron light illuminates the sample to be analysed and a detector collects the data generated by the interaction between the light and the sample. Finally, scientists analyse these data and interpret them for their research.

10 years of science

Applications for the present, the future and the study of the past

Everything that is done at ALBA seems to be remote discoveries, but they have incredible applications in our daily lives. Here are some of the most notable achievements in a decade illuminating the unknown:

A team from the National Centre for Biotechnology (CSIC, Madrid) and from the ALBA Synchrotron managed to observe how drugs caused a reversal of the alterations suffered by cells infected with the **Hepatitis C** virus (MISTRAL).
A new disease, **myoglobinopathy**, has been discovered (MIRAS), and the efficacy of two drugs against **sleeping sickness** has been demonstrated (XALOC).

Important studies have been carried on **nanotechnology**, which have for instance demonstrated the coexistence of **magnetism** and **superconductivity** (BOREAS).
Isolated magnetic skyrmions have also been observed, which will facilitate information storage (CIRCE-PEEM).
Within the field of chemistry, researchers are investigating how to design more efficient catalysts for the production of hydrogen (CIRCE-NAPP).

And with a direct impact on the **environment**, polluting discharges have been analysed in the Murcian bay of Portmán to help recover biodiversity (CLÆSS).

In the field of energy, ALBA has hosted a study on how to synthesize lithium-rich laminar oxides, which are very promising for the next generation of lithium-ion **batteries** (MSPD / CLÆSS).
It also worth highlighting the discovery of a new method to design more efficient and stable perovskite **solar cells** (NCD-SWEET).

ALBA always looks to the future, but it also helps understand and preserve the past: synchrotron light has helped analyse and **restore the 14th century chapel** of Sant Miquel in the Pedralbes Monastery (Barcelona) and the **stained glass windows** of the cathedral of Segovia (XALOC / MSPD).

A team of more than 200 people allows ALBA to remain a unique inspiration

The ALBA Synchrotron team is made up of women and men from different specialities working in accelerators, administration, computing and controls, experiments and engineering. Everyone is responsible for ensuring that this unique infrastructure in Spain continues to host some of the most innovative experiments.

10 years in figures

8 existing + 5 future beamlines	There are currently 8 beamlines in operation, 3 more under construction and another 2 in design or approved.
5.169 people doing research	Research staff who have used the ALBA facility.
1.560 experiments	Carried out in the ALBA Synchrotron beamlines.
1.848 research centres	Institutions of origin of users who have carried out experiments at ALBA belonging to more than 50 different countries.
1.024 papers	Scientific publications in specialist journals.
37.722h hours of beamtime	Synchrotron beamtime generated by ALBA accelerators.