

From ALBA to ALBA II

Caterina Biscari

8 June 2026



From ALBA to ALBA II - Tango Meeting - 8 June 2026



ALBA: past, present and future

2003 – Creation of CELLS Consortium (Spanish Government and regional Catalan Government).

1993 Initial concept

2003 ALBA Approval

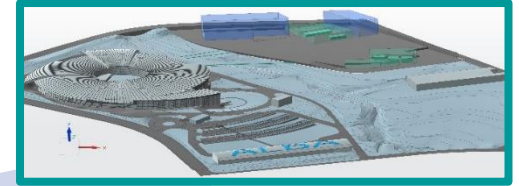
2006 Starting ALBA construction

2012 Starting ALBA Operation

2020 Starting ALBA II design

2025 ALBA II and long-term (2025-38) Funding Approval

2032 ALBA II Operation



Signing the agreement between the administrations.

ALBA Synchrotron Radiation Facility

National public institution with 50% Spanish + 50% Catalan **funding**:
Consortium owned by **Ministerio de Ciencia, Innovación y Universidades** and
Department de Recerca i Universitats

National and international (28%) staff
National and international (40%) academic users
National and international (50%) industrial users
National and international collaborations

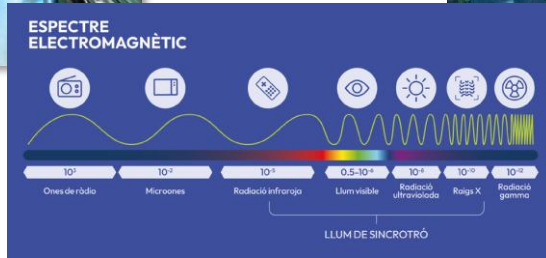


What is ALBA

Large Research Infrastructure: instrument dedicated to solving questions for advancing in knowledge and innovation, at the service of society



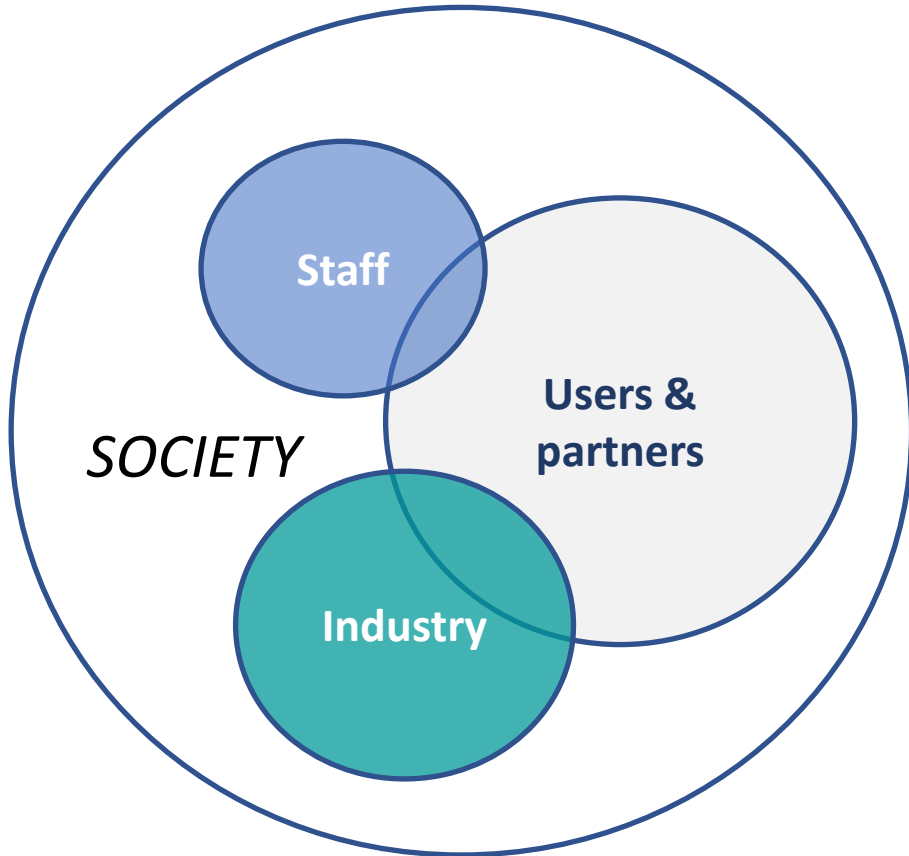
Particle accelerator
3 GeV electrons
300 m circumference



Synchrotron light emitted by the accelerator in the storage ring



Main players



Balanced combination of

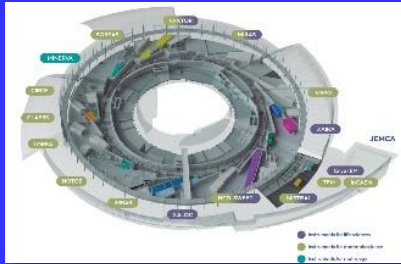
- Scientific vision and creativity
- Technical knowledge
- Robustness and reliability in the RI
- Spirit of service
- Will and capacity of sharing
- Enthusiasm for exploring new paths

*With the permanent support from
Spanish and Catalan governments
Integrated with some ERDF and
NGEU funds*

From 3rd to 4th Generation Light Sources

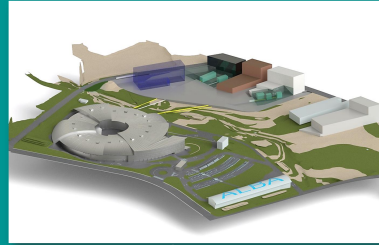
A mayor leap for science, innovation and society

ALBA - 3rd Generation



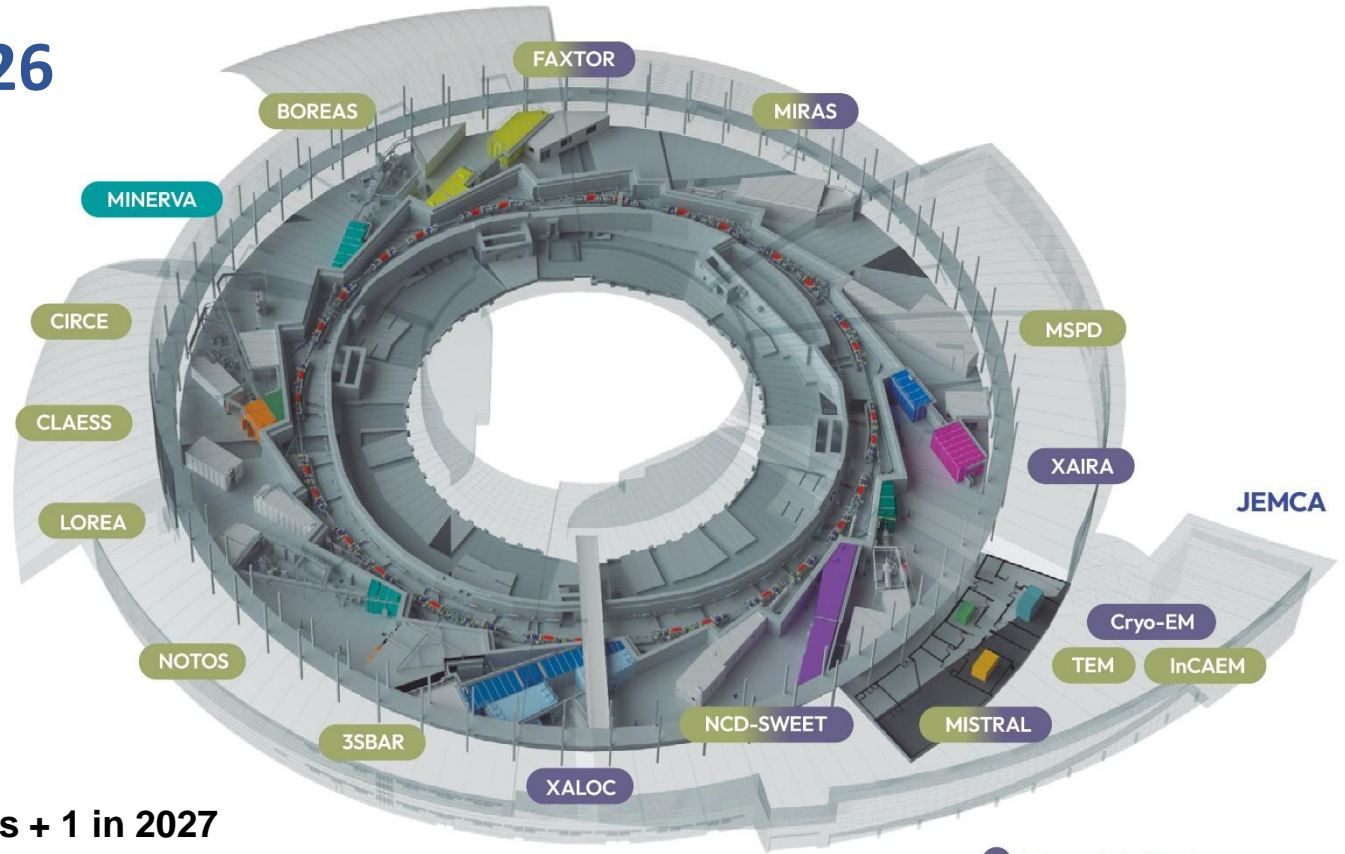
- Well proven technology
- Electron emittance – 4 nm
- Photon beam size – down to 5 μm
- Resolution in imaging from 0.5 μm (volume of cm^3) to 30 nm (volume of μm^3)
- Multimodal instruments set-up
- Large volume data management and AI applications
- Solving complex problems

ALBA II - 4th Generation



- New accelerator and beamline technologies
- Electron emittance – 0.15 n
- Photon beam size – down to 10
- Brightness up x 100 ALBA
- Coherent factor X 10 ALBA
- Resolution in imaging from 20 nm (volume of cm^3) to 10 nm (volume of μm^3)
- Velocity in tomograms from hours to minutes
- Long beamlines for ultimate resolution and coherence
- Multimodal instruments
- Large volume advanced data management and AI applications
- Solving complex problems

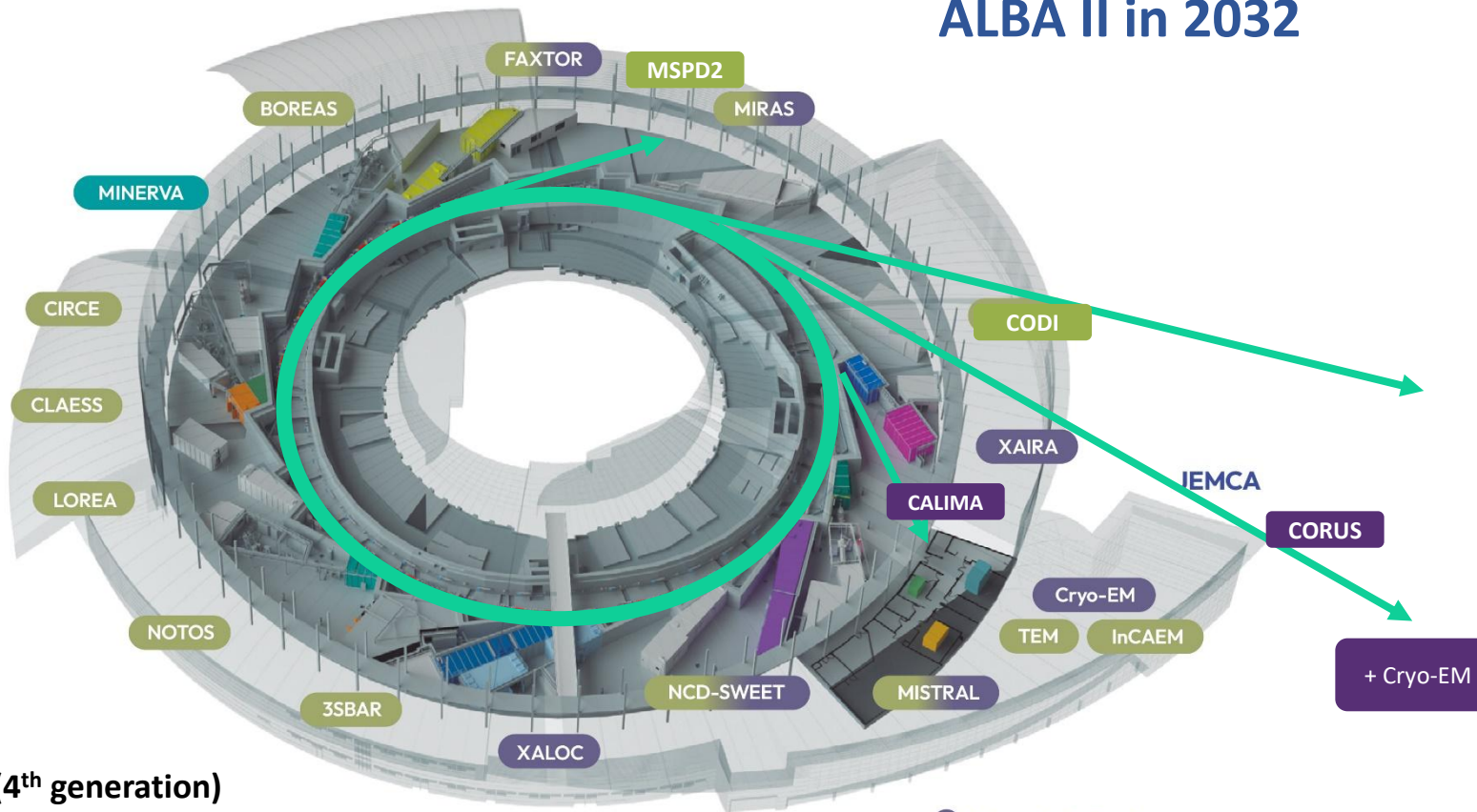
ALBA 2026



13 operating beamlines + 1 in 2027

3 electron microscopes + SPM & AFM

-  Instruments for life sciences
-  Instruments for materials science
-  Instruments for metrology

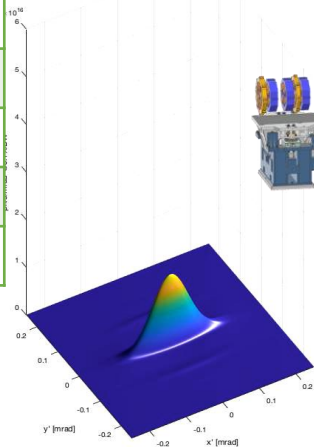
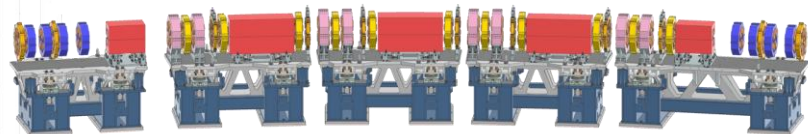


New storage ring (4th generation)
17 operating beamlines
4 electron microscopes + SPM & AFM

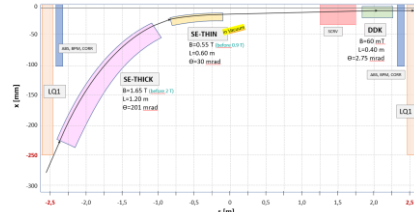
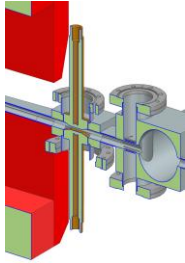
- Instruments for life sciences
- Instruments for materials science
- Instruments for metrology

Storage ring – from DB to MB Achromat

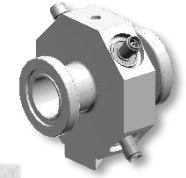
	ALBA	ALBA II
Energy	3 GeV	3 GeV
Circumference	268.8 m	268.8 m
Symmetry	4-fold	4-fold
Lattice	8×2-DBA cells	16×5BA cells
Emittance	4.5 nm·rad → ÷20 →	205 pm·rad
Nº of cells	8+8	16
# of straights	4 / 12	4 / 4 / 8
Straight length	7.8 / 4.0	5.2 / 4.4 / 3.5 m



Accelerator systems

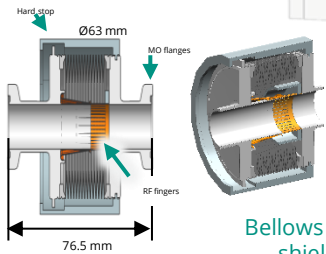


INJECTION

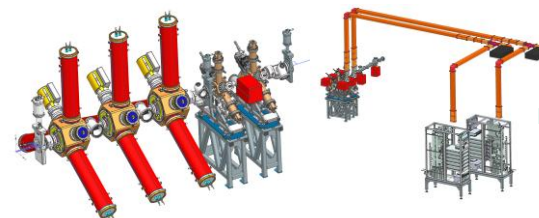


BPMs

Magnets, power sources, vacuum, girders, electronics, RF amplifiers and cavities... including electrical infrastructure, wiring, cooling



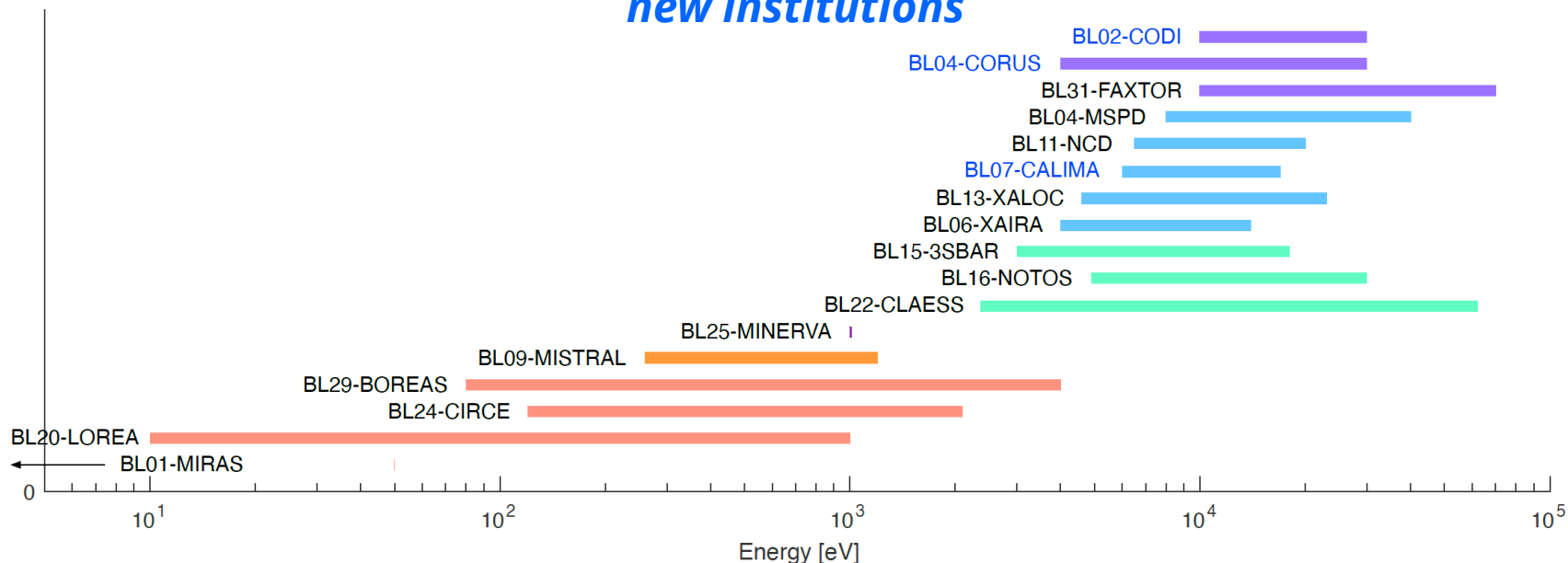
Bellows with RF shielding



Fundamental RF Cavities and 3HCAs

ALBA to ALBA II

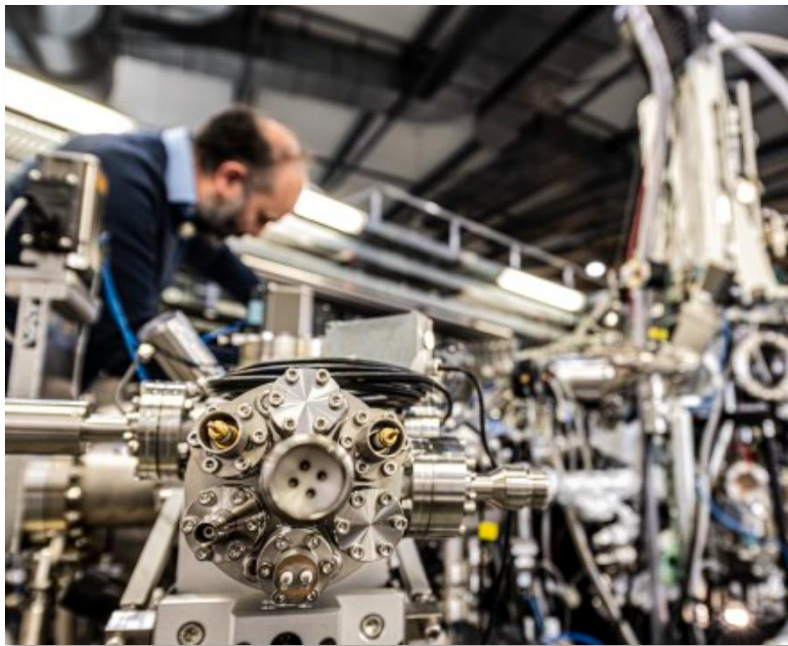
new beamlines, new methodologies, advanced data infrastructures, opening to new institutions



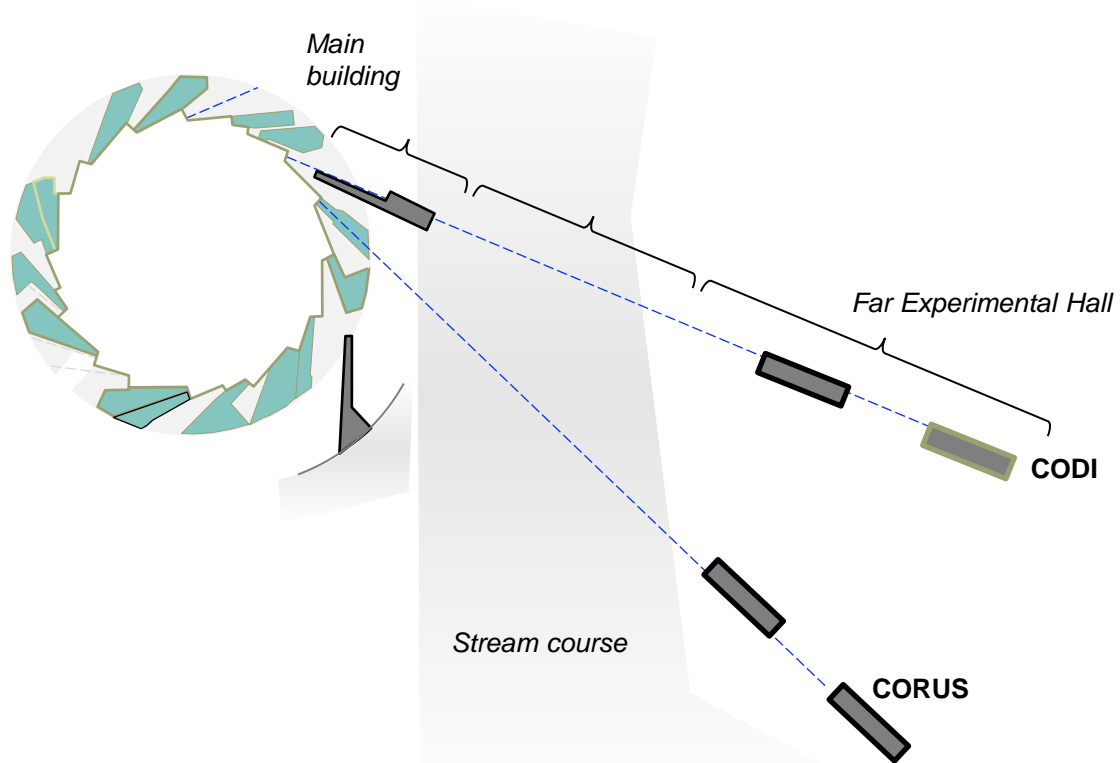
Absorption and emission spectroscopy, Soft X-ray tomography, IR microscopy, Small and Wide Angle Scattering, HR and HP Powder Diffraction, Crystalline Diffraction, Photoemission, NAPP, ARPES, Resonant Absorption and Scattering, Metrology, Macromolecular crystalline diffraction, Hard X-ray tomography, *Surface spectroscopy and ambient pressure photoemission, BioSAXS, Coherent Diffraction, Spectral Imaging and Tomography*

Upgrades of existing Beamlines

Hutches, optics, vacuum systems, diagnostics, mirrors, endstations, detectors, sample holders, data infrastructure, including electrical infrastructure, wiring, cooling



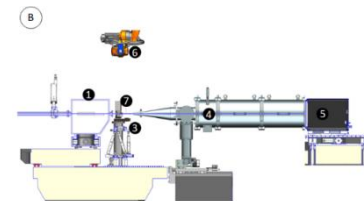
The first two Long Beamlines: CODI and CORUS



BL02 - CODI

Coherence Diffraction Imaging

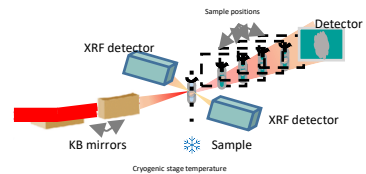
The main scope of CoDI is to perform **in situ** and **operando** characterization of **thick** samples with **nanometer** resolution.



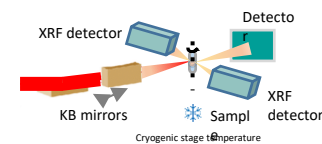
BL04 - CORUS

Cryo bio-nano-imaging beamline

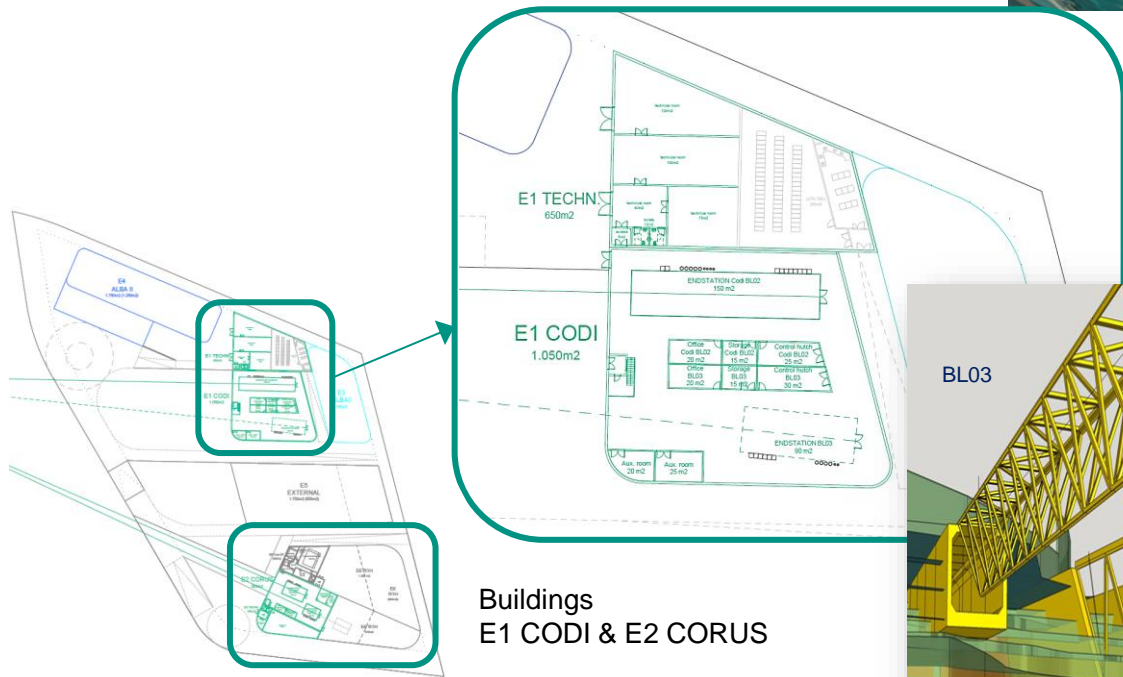
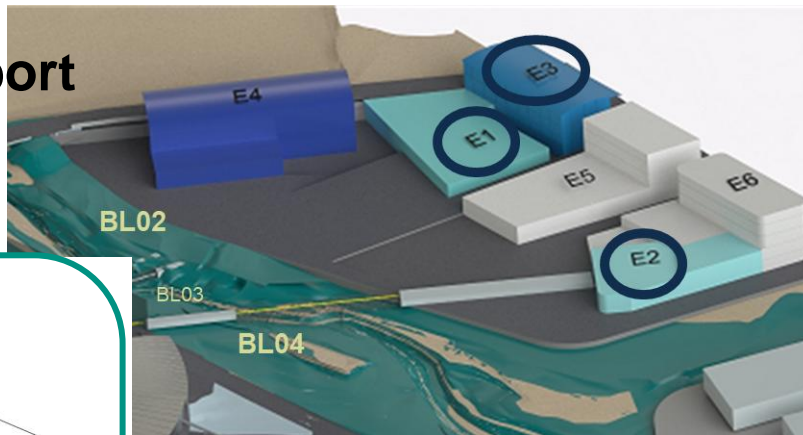
CORUS nanoImag



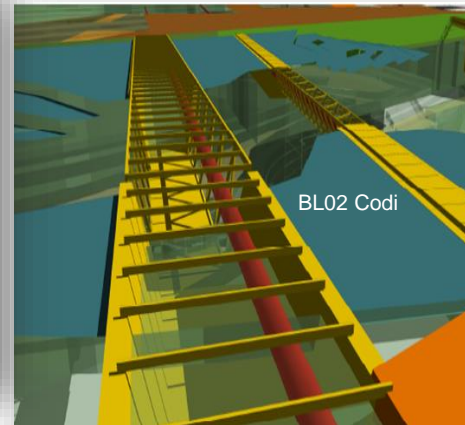
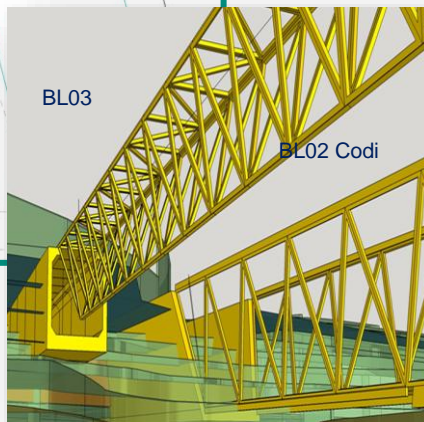
CORUS nanoSpec



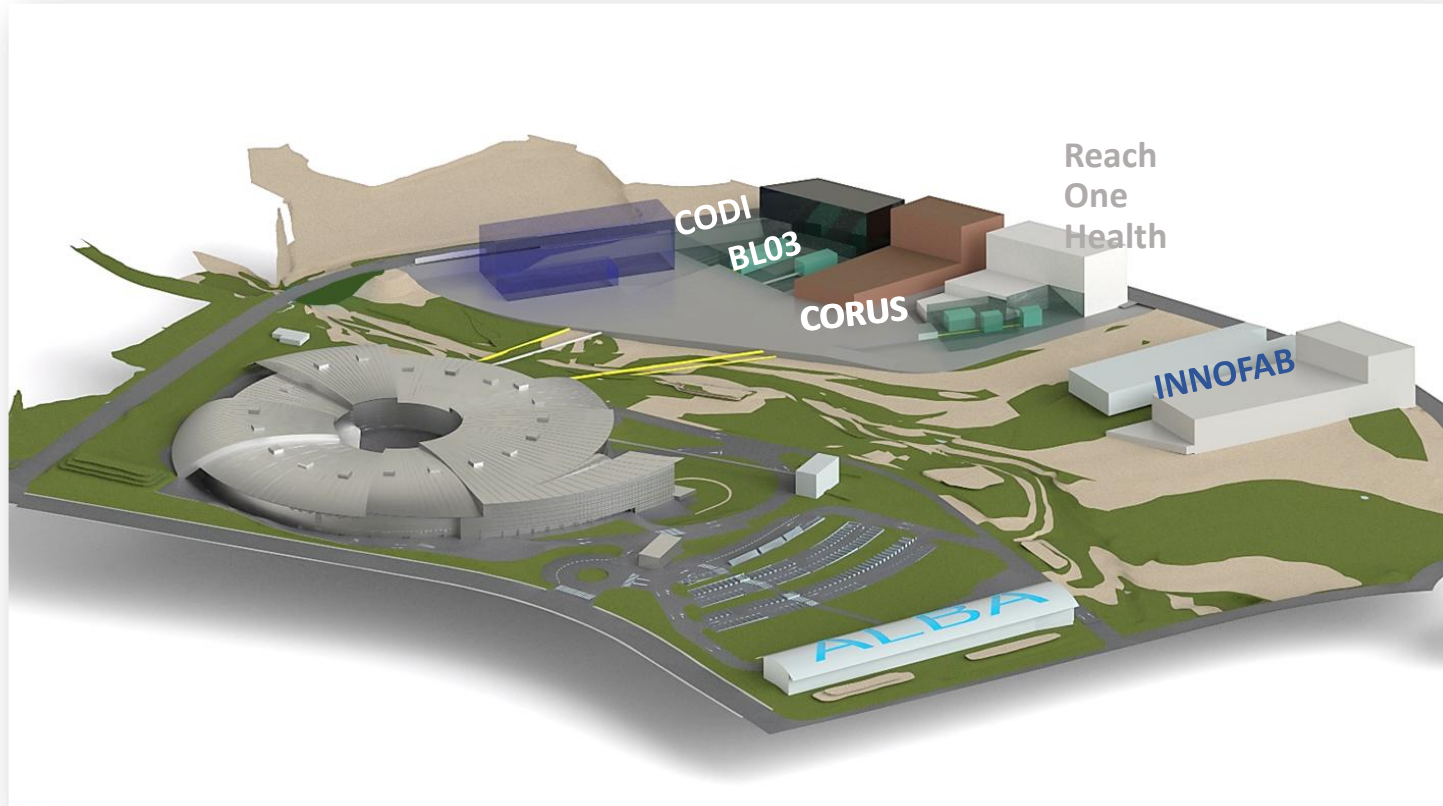
New Buildings and photon transport infrastructures



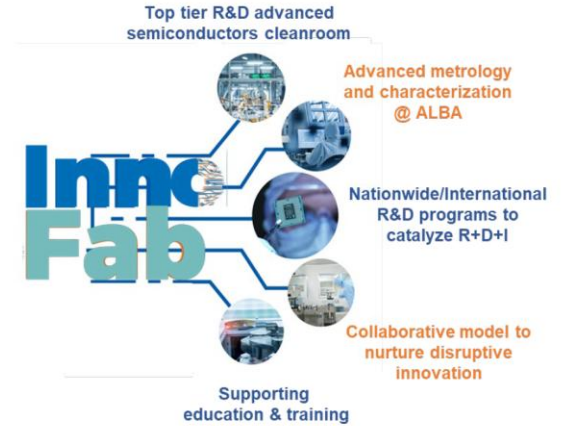
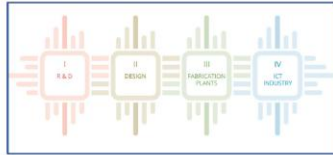
Buildings
E1 CODI & E2 CORUS



New space for experimental halls of long beamlines and capacity for other institutions

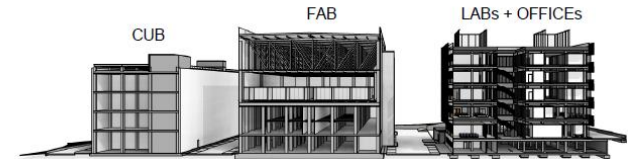


InnoFab Foundation



Strategic objectives:

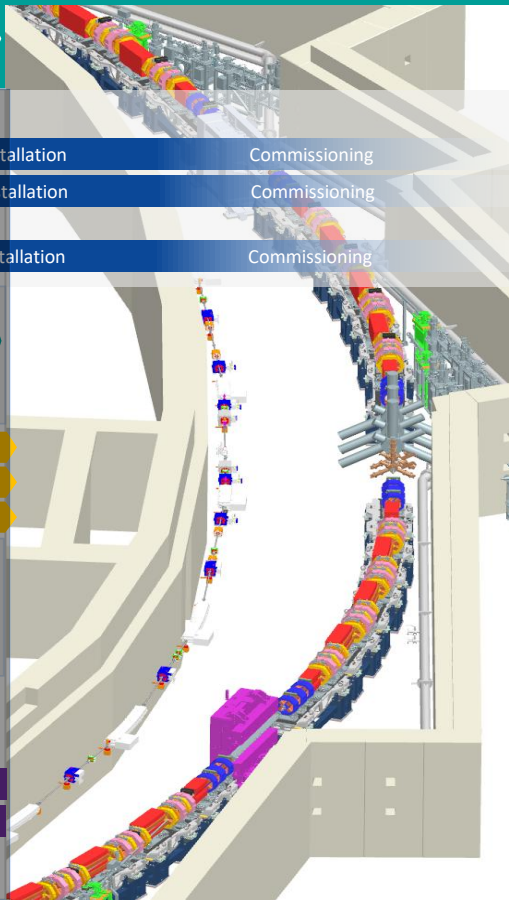
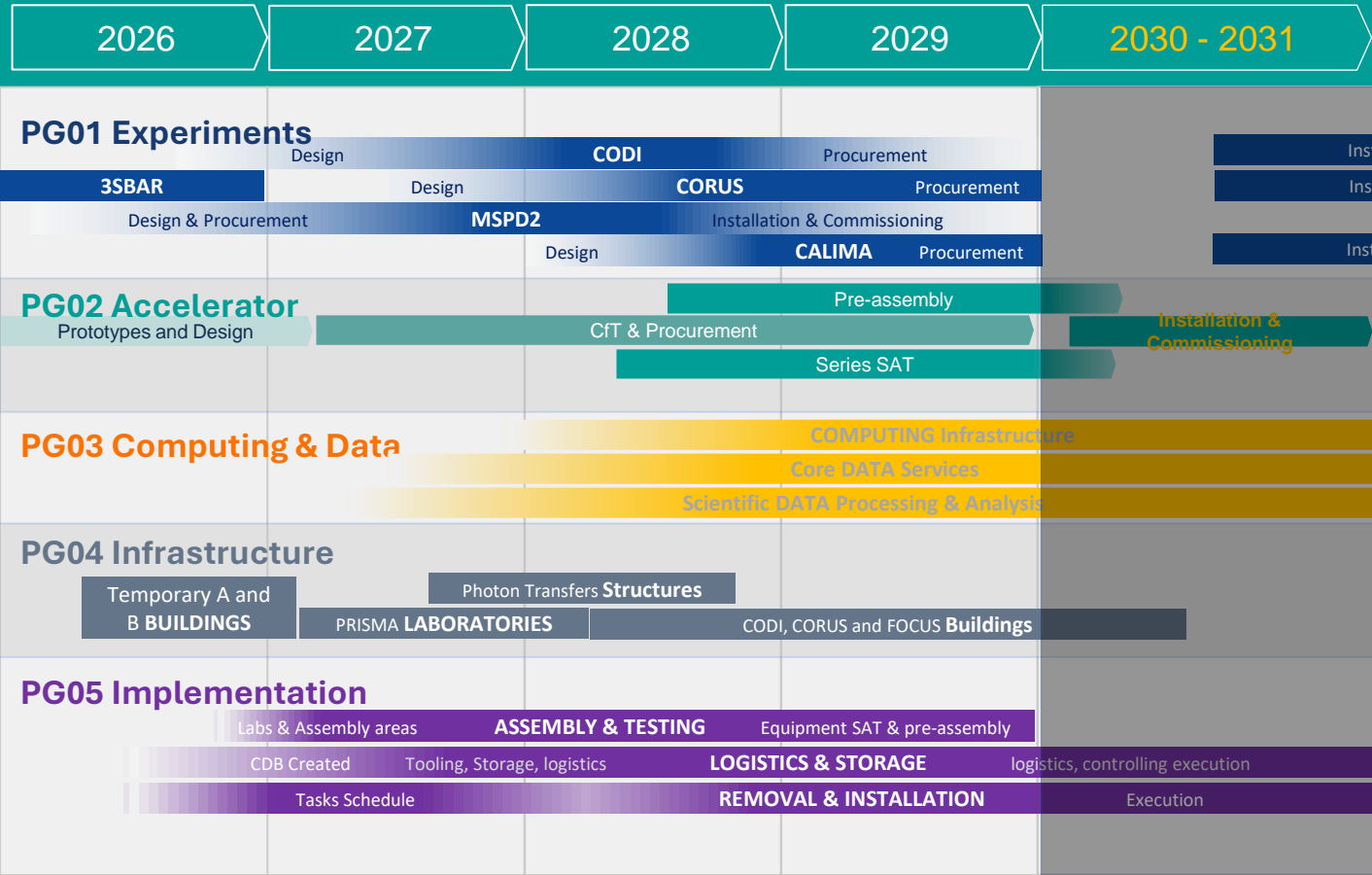
- Boost R+D+I semiconductors ecosystem with **state-of-the-art R&D cleanroom** for development of **innovative technologies and advanced semiconductors** in an industry-relevant environment
- Facilitate **Lab-to-Fab transition** and **industrialization** with flexible collaboration models for universities, research centres, start-ups, SMEs, and large industry.
- Support **education and training** for all professionals in the business, creating **highly qualified talent at all levels**.



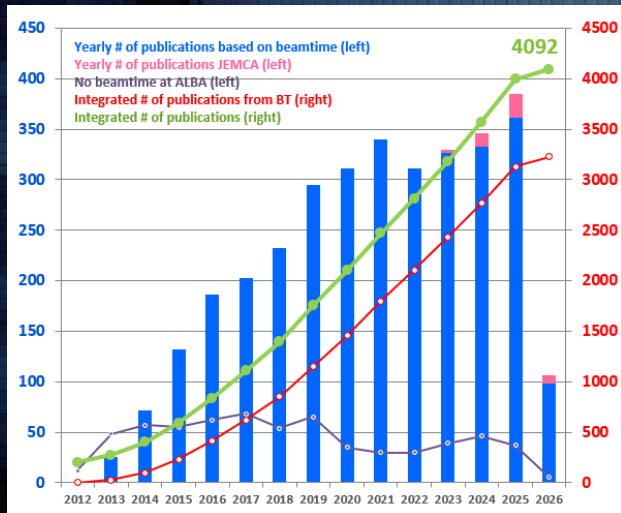
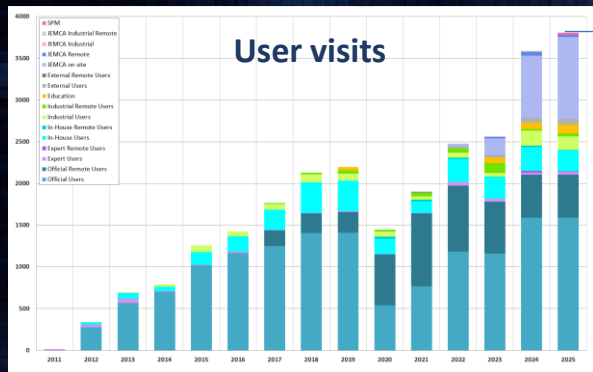
ALBA II

The Plan

2032 – ALBA II Operation



2011-2025



Our USERS



Academic

Competitive and free access
 Public results
 Overbooking factor: 2

Joint academic and industrial

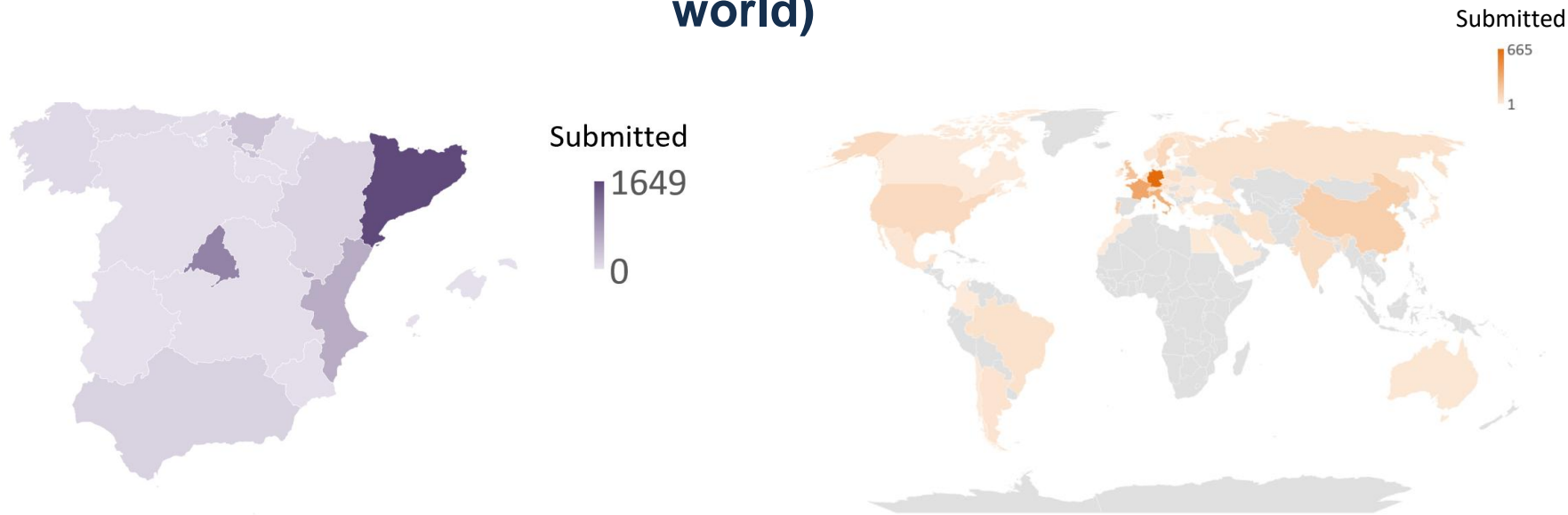
Private

Direct access covering operational costs
 Results can be confidential

+110 companies using our instruments

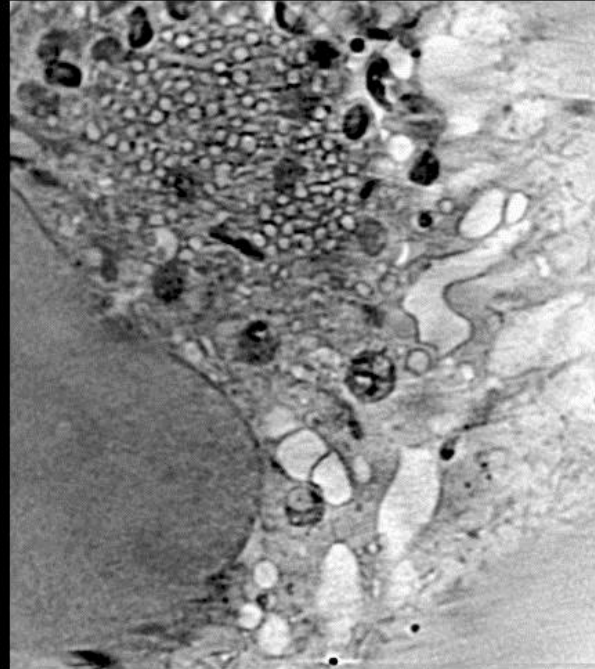
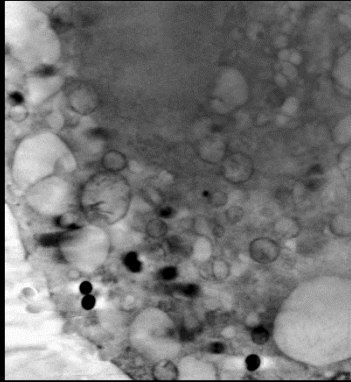
Origin of academic users

(Granted beamtime: 64% Spain, 32% Europe, 4% rest of the world)



Spain:	4105 submitted – 2344 granted (57%)
International:	2863 submitted – 1333 granted (47%)
Total:	6968 submitted – 3677 granted (53%)

We observe the details of cells
with resolution up to 30 nm



ALBA: 1 tomogram per hour – resolution 30 nm

ALBA II: 1 tomogram per minute – resolution 10 nm

Life Science

From ALBA to ALBA II - Tango Meeting - 8 June 2026

We solve protein structures up to
atomic resolution



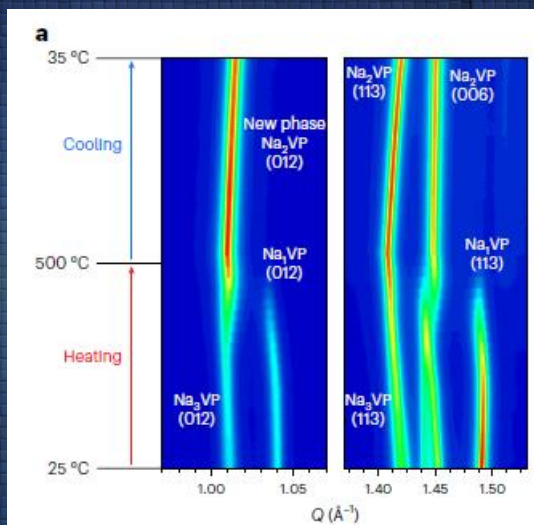
complex with inhibitor KYT-36

To understand diseases, the
origin of life, to design and
develop new drugs and
vaccines

We develop new materials for generation, storage, conversion and transport of **energy**

A promising step forward towards the development of Na batteries

Energy materials



(courtesy:)

Innovative approach for the study of battery materials

21/03/2024

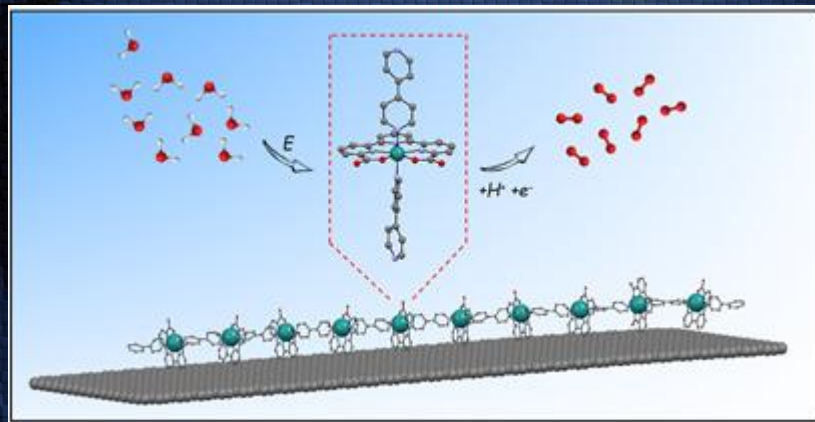


<https://doi.org/10.1038/s41563-024-02023-7>

<https://www.cells.es/en/public/news/innovative-approach-for-the-study-of-battery-materials>

We take care of ambient developing new catalysts for green fuels and green energy

Water photolysis through photocatalysis is being investigated to produce hydrogen, a clean fuel. This process has the simplicity of using a catalyst and sunlight to produce hydrogen from water



Water oxidation electrocatalysis using ruthenium coordination oligomers adsorbed on multiwalled carbon nanotubes Hoque, A et al A. *Nat. Chem.* 2020 (DOI: 10.1038/s41557-020-0548-7).

Identifying the active catalytic phases and explaining the improved performance toward low-cost green energy

Research brings us a step closer to low-cost green energy

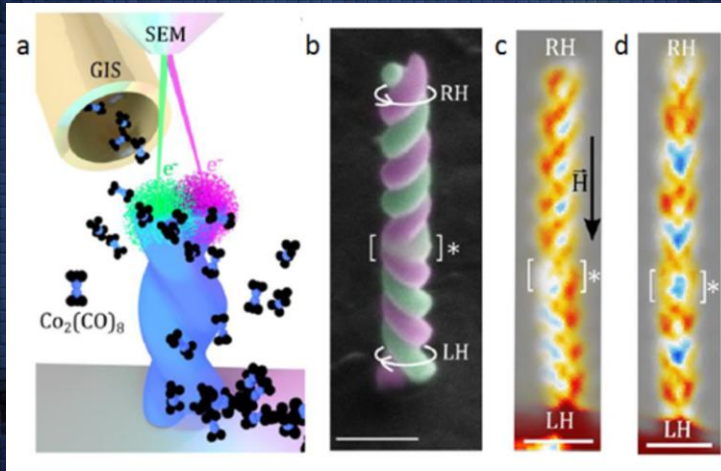
06/09/2024



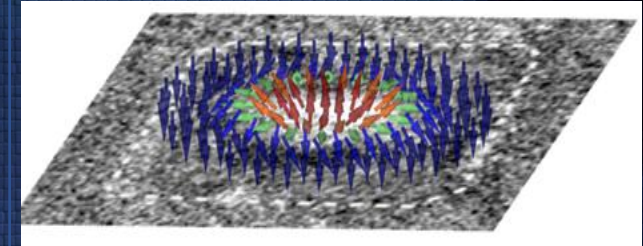
<https://www.nature.com/articles/s41467-024-49015-4>

We advance in the understanding and development of complex materials, quantum techniques, spintronic, xips

Exploitation of materials composed of compounds with catalytic active phases that include earth-abundant elements (Ti, B, rare earths) and control over the size (to optimize it) of the relevant parameters of these nanofunctional materials, which are fundamental for the improvement of low-cost green energy technologies



Skyrmion schematic

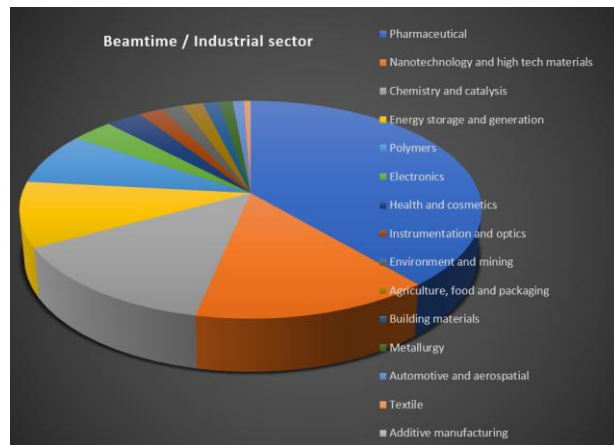


Nature Nanotechnology (2016) O. BulleL. Aballe, M. Foester, ...G. Gaudin , ALBA

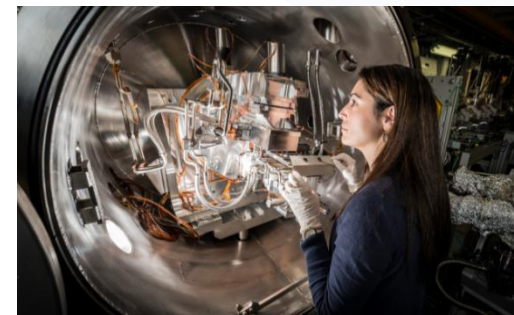
S. Ruiz-Gomez et al. Helical Surface magnetization in nanowires: the role of chirality. *Nanoscale*, 2020. DOI: [10.1039/D0NR05424K](https://doi.org/10.1039/D0NR05424K).

Industry and ALBA

The industrial program allows industry to fully benefit from the services and developments of the synchrotron, promoting innovation and competitiveness for the benefit of society



Industry as user of instruments and laboratories



Tech Transfer

Industry as supplier

ALIBAVA SYSTEMS
Very Low Absorption
Position & Intensity Monitors
The photons you lose at least counts

Alibava Systems offers Silicon Transmission Photodiodes with very low absorption < 15% (8 keV) and very high efficiency.

Single and 4 quadrants designs to perform intensity and position measurements.

Different configurations:
Vacuum (30 mm compact chamber, KF 40 terminals); Standard (opaque housing), both with individual coaxial lens connectors and flanged, for custom integration.

Vacuum configuration

Standard configuration

info@alibasystems.com
T. +34 932 868 812
www.alibasystems.com

Workshop on semiconductor technologies

11 June 2026



ALBA
SYNCHROTRON

Workshop on ADVANCED CHARACTERISATION AND TECHNOLOGY SERVICES FOR SEMICONDUCTOR INDUSTRIES AND QUANTUM TECHNOLOGIES

There will be a pitch session open
to participating companies!

11th of June 2026
9:30-17:30 h CEST

ALBA Synchrotron, Carrer de la Llum 2-26,
08290 Cerdanyola del Vallès, Barcelona, Spain



Program

<p>9:30-10:00 Registration</p> <p>10:00-10:10 Welcome and Introduction. Caterina Biscari, ALBA Synchrotron, Director (Spain)</p> <p>10:10-10:30 Use of synchrotrons in semiconductor R&D. Paul van der Heide, IMEC, Director of the Materials and Component Analysis Department (Belgium)</p> <p>10:30-10:50 Towards Intelligent Quantum Computers. Román Orús, DIPC and Multiverse Computing, Ikerbasque Research Professor and co-founder and CSO of Multiverse Computing (Spain)</p> <p>10:50-11:10 Opportunities for EUV Optics and Materials with Synchrotron Analytics. Eric Pellegrin, Carl Zeiss GmbH, Research Associate at ZEISS Semiconductor Manufacturing Technology Segment (Germany)</p> <p>11:10-11:30 Break and networking</p> <p>11:30-11:50 ASML, Lithography and Metrology challenges. Olivier Balmes, ASML, Group Lead of Light Sources Research (Netherlands)</p>	<p>11:50-12:10 To be announced José Garrido, InnoFab and ICN2, ICREA Research Professor of the ICN2 Advanced Electronic Materials and Devices Group and CSO of INBRAIN Neuroelectronics (Spain)</p> <p>12:10-12:30 From lab to state-of-the-art technology, the role of research infrastructures in innovation. Bárbara Calisto, ALBA Synchrotron, Industrial Liaison Officer (Spain)</p> <p>12:30-13:15 3-min pitches by the participant companies.</p> <p>13:15-14:15 Lunch and networking</p> <p>14:15-14:25 Move to exhibition area</p> <p>14:25-15:45 Exhibition. Booths from the organiser and co-organisers</p> <p>15:45-16:45 Guided tour of the ALBA facilities</p> <p>16:45-17:30 Refreshments and networking</p> <p>Moderator: Alejandra Sánchez, ALBA Synchrotron, Head of the Industrial Liaison Office</p>
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WiFi access: albaguest (guest2010)

Note on the language: The official language of the workshop will be English but Q&A in Catalan or Spanish will be possible.

* The number of participants is limited to 80. Participation is free of charge but moderated.

Registrations



Organiser  Co-organisers   

Contact: industrialoffice@cells.es



+500 students trained

High-qualified
job offers

Positive Economic
return of investments

ALBA & society

Involvement in
educational programs
from schools to
universities

+7500
outreach
visits per
year

280 staff

Academic and
Industrial PhDs



Outreach projects
for children





LEAPS

League of European
Accelerator-based
Photon Sources

+ 35000 users
from all EU &
beyond
+ 25000
publications
In last 5 years

+300 operating
End Stations
offering +
1Mh/year

Funded by **national** governments

Offering free access to **ALL** public researchers, based on
competitive excellence

Offering advanced and cost effective instruments to **ALL**
industrial world

ALBA in Europa

17 facilities - 15 institutions - 10 countries



Associate: SESAME, INFN
Partners: ESUO, LENS, CLS

ALBA in the world

Synchrotron Radiation Facilities



Collaborations with Japan, China, USA, Canada, Brasil, and with the Project of a future African Light Source

prime

DAY ONE

400k€ Relevant
Media Impact

Bringing Synchrotron Science to Wider Audiences

ALBA featuring in **Day One** (Episode 5), a technology-focused TV series filmed at the facility in 2025

Distributed through **Amazon Prime Video** in over 240 countries, as well as **Catalan public television (3Cat)**, providing international visibility for ALBA



N.º 4 en series de suspense

Barcelona, 2026. En plena semana del Mobile World Congress, Ulises Albet, antiguo prodigio tecnológico y ahora activista anti tech, se convierte en el principal sospechoso de un asesinato. En su huida por la ciudad, descubre que está a punto de lanzarse un...

Suspense • Acción 2026

Reparto: Álex González, Iván



Tango Controls Collaboration

Amendment n°3 to the TANGO Controls Collaboration (CL 0243)

Between

EUROPEAN SYNCHROTRON RADIATION FACILITY, hereafter referred to as the **ESRF**, located, 71 avenue des Martyrs, Grenoble, France, and represented by Dr. Jean Daillant, Director General, and Ms. Claudine Dargent, Director of Administration,

and

SYNCHROTRON SOLEIL, hereafter referred to as **SOLEIL**, located, L'Orme des Merisiers, Saint Aubin, BP 48, 91192 GIF-SUR-YVETTE, Cedex, France, and Represented by Dr. Jean Susini, Director, and Mr. Jean-Michel CASSAGNE, Administrative Director,

and

Elettra - Sincrotrone Trieste S.C.p.A., hereafter referred to as **ELETTRA**, located, S.S. 14, km 163.5 in AREA Science Park, Basovizza, 34149 TRIESTE, Italy, and represented by Prof. Alfonso FRANCIOSI, President and CEO,

and

CONSORTIUM FOR THE CONSTRUCTION, EQUIPPING AND EXPLOITATION OF THE SYNCHROTRON LIGHT SOURCE, hereafter referred to as **CELLS**, located, Carrer de la Llum, 2-26, 08290 Cerdanyola del Vallès, Barcelona, Spain, and represented by Dr. Caterina BISCARI, Director,

and

MAX IV Laboratory, hereafter referred to as **MAX IV**, located, Lund University, P.O Box 118 SE-221 00 Lund, Sweden, and represented by Prof. Dr. Olof KARIS, Director,

and

DEUTSCHES ELEKTRONEN-SYNCHROTRON, hereafter referred to as **DESY**, located, Notkestraße 85, 22607 HAMBURG, Germany, and represented by Prof. Dr. Dr. h. c. Beate HEINEMANN, Director General and Prof. Dr. Britta REDLICH, Director Photon Science,

and

Amendment n°3 to the TANGO Controls Collaboration

WHEREAS

1. The TANGO Controls Collaboration (the “TANGO Collaboration”) concerning the mutualisation of resources in a coordinated manner in order to i) maintain and further develop the TANGO Control System Framework, and ii) further enlarge the TANGO community to the benefit of all TANGO users (hereinafter referred to as “the Agreement”, including its Amendments n°1 and n°2, referred to in point 2 below), took effect as on 01 January 2021 for a duration of five years, i.e. until 31 December 2025.

Amendment n°3 to the TANGO Controls Collaboration

NATIONAL SYNCHROTRON RADIATION CENTRE SOLARIS at Jagiellonian University, hereafter referred to as **SOLARIS**, located, Ciesnones Maki 98 Street, 30-392 Krakow, Poland and represented by Prof Marek STANKIEWICZ, Director of Solaris,

and

ISTITUTO NAZIONALE DI ASTROFISICA, hereafter referred to as **INAF**, Located, Viale del Parco Mellini 84, 00136 ROMA Italy, and represented by Prof. Roberto RAGAZZONI, President of INAF,

and

SKA Observatory, hereafter referred to as the **SKAO**, located, Jodrell Bank Observatory, Lower Withington, Macclesfield, Cheshire, SK11 9DL, UK, and represented by Dr. Phil DIAMOND, Director General.

and

SOUTH AFRICAN RADIO ASTRONOMY OBSERVATORY, hereafter referred to as **SARAO**, Located, Liesbeek House, River Park Liesbeek Parkway, Settlers Way, Mowbray, Cape Town, 7705, South Africa, and represented by Dr. Rob ADAM, Project Director SARAO,

hereinafter referred to individually as the “Party” and collectively as the “Parties”,

HAVE AGREED AS FOLLOWS:

10 institutions recently
agreed in signing a
new amendment to
the collaboration
agreement

Thank you for your attention
Enjoy the meeting

