



CoDI

Coherence Diffraction Imaging

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Name of the beamline: **CoDI**

- CoDI will be the **long-based coherence diffraction** endstation at **ALBA II**
- Nano and mesoscale characterization of matter
- This instrument will be intended to investigate materials in strategic sectors for the UN (SDGs), **European Union and ALBA strategic lines**:
 - Design/ characterization of **drugs** and drug-related **biological** processes
 - Cancer, Alzheimer, and Parkinson (nano and mesoscale)
 - **Materials for energy-related applications**
 - Batteries, fuel cells
 - **Catalysis and environmental sciences**
 - Clean industrial production
 - **Composites**
 - Transport

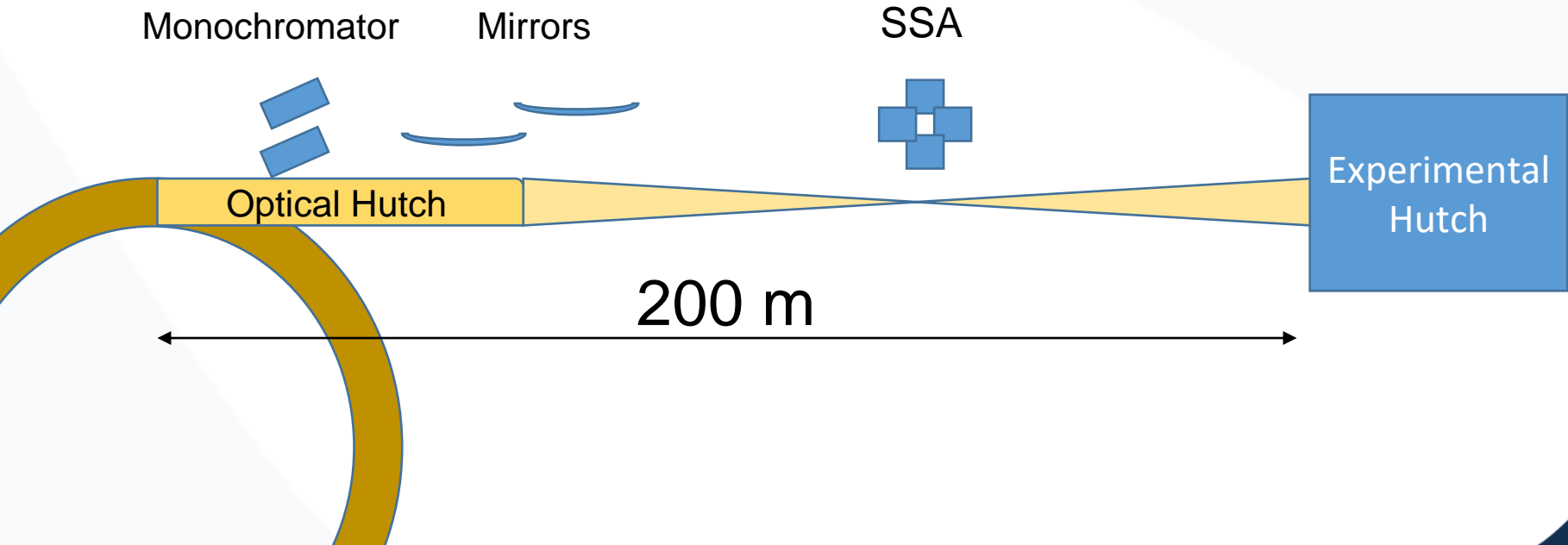
Beamline technique(s):

- **3D Scanning Microscopy**, e.g., **XRF** and **XRD**.
- Fullfield: **Holotomography** and **XCDI**.
- **Ptychographic techniques**: Ptychographic-tomography, near-field Ptychography, Tele-Ptychography.

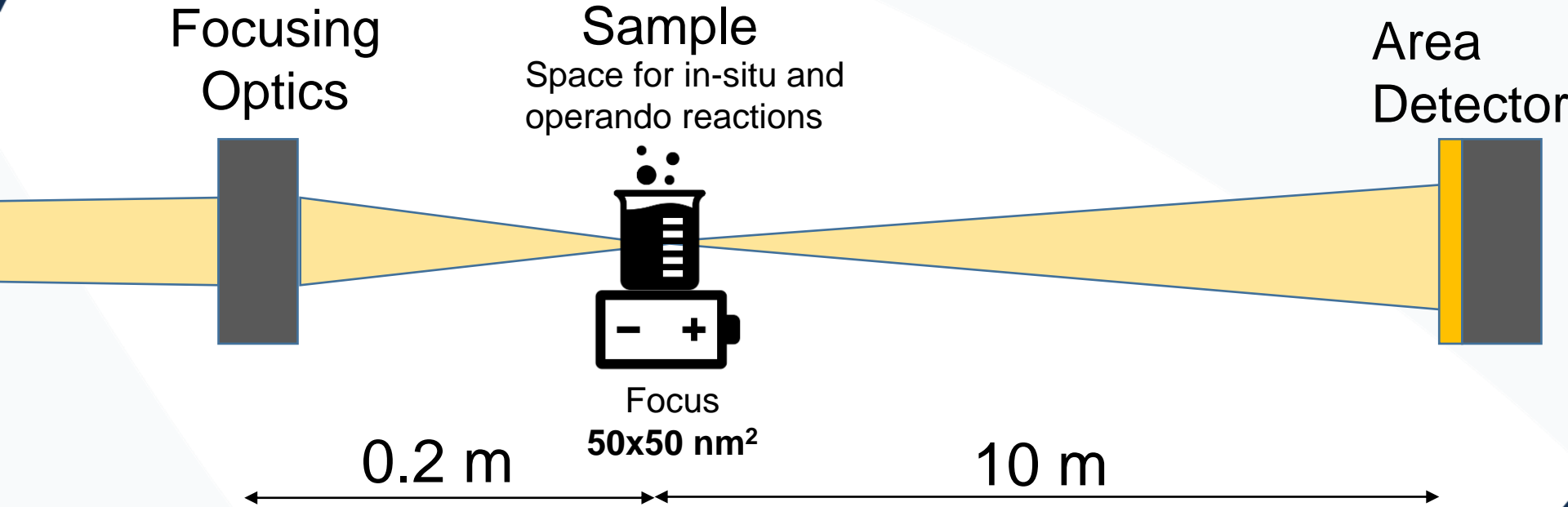
Beamline:

- Long-based Beamline with **ID**.
- Energy range **10 to 30 keV**.
- **Secondary Source Aperture (SSA)**, to increase coherence in high energies.
- **Focus at the sample** $50 \times 50 \text{ nm}^2$.
- **Minimum sample-detector distance** of 10 m
- **Large working distances** around the sample for in-situ experiments.

Beamline Layout:



Experimental Layout:



Expected benefit from ALBA II:

- High **coherence** of the X-ray beam.
- **Brilliance**
- Long-based beamline: **nanofocus** with large sample environments

International competition (at which other sources there are similar instruments):

- Max IV, SLS, ESRF-EBS, APS, Sirius...
- Beamlines as cSAXS(SLS) and selected aspects of NanoMAX (MAX IV), I13 (DLS) and P06 (Petra III).

Which scientific or community need will be addressed:

- Scientific communities that will benefit from imaging thick samples till 500 μm , such as Biology, catalysis, electrocatalysis, energy related materials and general material science.

Potential or existing user community (communities or also institutes):

- In the past years there has been an increase of the articles on coherence diffraction with partners in **Spanish university and institutions** such as (U. Alicante, U. Malaga, U. Barcelona, IMDEA-energia, U. Oviedo, U. La Laguna, ...).
- **Industry** for imaging of components with high resolution.
- If the beamline is retained, a program for building up a broad user community is required.