

# **Tomography at ALBA FaXToR**

## **Upcoming challenges with PB-sized data at tomography beamlines**

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**Temporal resolution** 100 ms - 1000 s (full CT)

**Spatial resolution** 0.7 – 15 µm (image pixel size)

**Detection optics table** 

**Two detection** 

optics in series

New detector technology capable of streaming continuously at 10GB/s

	Resolution (pixels)	Pixel Size (mm)	Frame rate (fps)	Dynamic range A/D (bit)
Pco.Edge 5.5	2560×2160	6.5	100	16
Pco.Edge DiMax	2000×2000	11	2277	12



## **Examples of applications**

- Samples bigger than the FoV at high spatial resolution
- In-operando high-speed acquisition

### FaXToR: <u>Fa</u>st <u>X</u>-ray <u>To</u>mography & <u>R</u>adiography Beamline

## ALBA

## **Examples of applications**

Patera A, Zippo AG, Bonnin A, Stampanoni M, Biella GEM Brain micro-vasculature imaging: an unsupervised deep learning algorithm for segmenting mouse brain volume probed by highresolution phase-contrast X-ray tomography. International Journal of Imaging Systems and Technology. 2021; 31(3): 1211-1220.

Samples bigger than the FoV at high spatial resolution

## Summary

- Whole the mouse brain vasculature system at 1 µm resolution
- Human Brain Project: investigate the vascular structure and topology for better understanding the pathophysiological cerebral processes.



Brain sample perfused with 50% indian ink and embedded in glue to ensure stability

- 1 cm<sup>3</sup> brain sample
- 800 local CT scans
- 7TB of acquired data

### FaXToR: <u>Fa</u>st <u>X</u>-ray <u>Tomography & Radiography</u> Beamline

## **Examples of applications**

García-Moreno F, Kamm PH, Neu TR, Bülk F, Noack MA, Wegener M, et al.Tomoscopy: time-resolved tomography for dynamic processes in materials. Advanced Materials. 2021; 33(45): 2104659 (13 pp.).

In-operando high-speed acquisition





### Summary: why data reduction/compression is fundamental

- Long terms storage
- Data transfer (to users)
- 3D data preview
- Keep useful data
- . . .

insights are welcome!



## Thank you for the attention!

**FaXToR Team:** A. Patera, L. Ribó, A. Mittone

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