

# FAXTOR: the 14th beamline at ALBA for BIG DATA

The FAXTOR beamline at the third generation ALBA synchrotron will be dedicated to fast micro-tomography in the hard X-ray regime range. It will start its operation at the beginning of 2024, serving different user communities, including material science, biomedical, palaeontology, earth science, cultural heritage etc. At the start of operations, the spatial resolution (in terms of image pixel size) will range between 1  $\mu\text{m}$  and 10  $\mu\text{m}$ , thanks to the presence of different detection systems. The design of the endstation allows the possibility of acquiring imaging simultaneously at two different spatial resolutions if required. The possibility of performing dynamical studies with a temporal resolution  $< 1$  s (per tomography) is foreseen. Both phase-contrast imaging (propagation-based) and absorption-based imaging techniques in radiography and tomography modes will be accessible during the experiments. The beamline is expected to present a high data throughput and making use of state-of-the art CMOS fast detectors, therefore a particular care is required in order to cope with the computing requirements.

FAXTOR's data workflow will be presented and discussed, with particular focus on data compression. Different known datasets will be made available for testing the compression algorithm performance as this procedure will become a routine at FAXTOR. Data compression will be essential for the processing and storage purpose of TB-sized datasets, typical dimension of data acquired during experiments aimed at capturing the sample dynamics or for rendering large samples at very high spatial resolution. The quality of the datasets, in terms of contrast to noise ratio, will play a major role on the compression ratio. Such a ratio will mostly depend on the experimental setting configuration used to acquire the data and on the reconstruction algorithm. A generalized algorithm capable to tune such a ratio depending on the data will be the desired solution.

## Accelerator or Beamline

FAXTOR beamline at ALBA synchrotron (in design)

## Team Contacts

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## Team Name

FAXTOR team

## Workflow Goals

Tomography raw data to be lossy compressed (parameters adjusted to a variety of different use cases)

## Programming Languages

Python, Nextflow DSL

## Publications

## Data Volume

1 dataset reaches ranges from 1 to 100TB (extreme cases)

## Team Speaker

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