

# PROXIMA-1 PROXIMA-2A

MX Beamlines

and **POLARIS**

cryoEM

ORGANISMS



TISSUES



CELLS



ORGANELLES



COMPLEXES



PROTEINS



ATOMS



# POLARIS

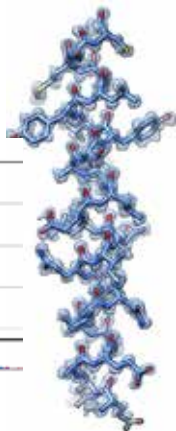
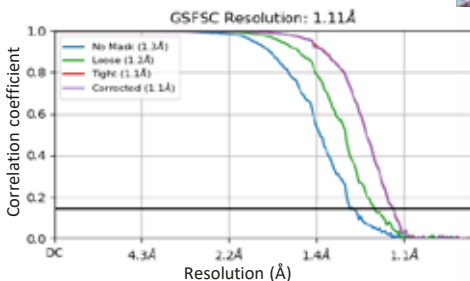
## Titan KRIOS G4

- 300 keV, cold FEG
- SELECTRX-X energy filter
- Falcon 4i camera
- Fringe free illumination
- Autoloader (12 grids)
- To be used for **SPA and cryoET**
- Control via EPU and Serial-EM
- For cryoET, single rotation sample stage (+/- 70°)



## Measured performances

Fourier Shell Correlation and docking on apoferritin



# PROXIMA-1 & PROXIMA-2A

## CHARACTERISTICS

- X-ray wavelength tunability for MAD and SAD phasing or metal identification - Energy range 6-18 keV
- Beamline control via MXCuBE software - including automatic loop centering and tools for X-ray centering, helical scans, grid scans, X-ray dose estimation, ...
- Multi-axis goniometry
- Fast beamline alignments
- Under cryogenic conditions, a full data set can be acquired within five minutes.



### Experiments

➤ On site

➤ Remote

➤ Mail-In

## DATA PROCESSING

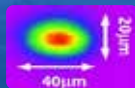
- Manual and automatic data processing is available on both beamlines
- Support from beamline scientists for experiments and data processing as well as phasing & modeling with SAD, MAD & AlphaFold
- Data visualization via ISPyB/EXI2
- Data retrieval via external hard drives or GLOBUS (remote data access service)
- Online and on-site tutorials available

# SPECIFICITY

## PROXIMA-1



Parallel beam



- ④ Collimated  $40 \times 20 \mu\text{m}^2$
- ④ Robotic sample changer with cryogenic Dewar capacities of three unipucks (upgraded to a larger capacity soon) using SPINE compliant pins
- ④ SMARGON Multi-axis goniometer
- ④ Eiger X 16M X-ray area detector (data collection frame rates of 120 Hz)

## PROXIMA-2A



$\mu$  focus beam

- ④ Microfocus  $10 \times 5 \mu\text{m}^2$
- ④ Robotic sample changer with cryogenic Dewar capacities of nine unipucks using SPINE compliant pins
- ④ MD3 Multi-axis goniometer (to be commissioned in 2025)
- ④ Eiger X 9M X-ray area detector (data collection frame rates of 238 Hz)
- ④ Humidity controller (REX-HC1) for crystal dehydration experiments
- ④ **Global Phasing Ltd (GPhL) workflows** for improved X-ray data collection strategies and electron density map quality



- ④ **The CRIBLEUR plate screener** for room temperature X-ray data collection from crystals in SBS-format plates, micro-fluidic chips, capillaries, ... and also from plate sandwiches for screening membrane protein crystals in lipid cubic phases.

# REFERENCES

- Chavas LMG, et al. PROXIMA-1 beamline for macromolecular crystallography measurements at Synchrotron SOLEIL. J Synchrotron Radiat. (2021)
- Duran D. et al. PROXIMA-2A – A New Fully Tunable Microfocus Beamline for Macromolecular Crystallography. J Phys. Conf. Ser. (2013)
- Jeangerard D. et al. From Plate Screening to Artificial Intelligence : Innovative developments on PROXIMA-2A at Synchrotron SOLEIL. Proceedings of the 10<sup>th</sup> MEDSI, WEPH36 (2018)

**More information on PROXIMA-1 & PROXIMA-2A publications web pages**

PROXIMA-1



PROXIMA-2A



# COMPLEMENTARY BEAMLINES

## SWING-BioSAXS:

- Determine or confirm the conformation of the macromolecule **in solution**
- Probe **the oligomerization state** under various conditions
- Probe **large conformational changes** induced by environmental conditions (pH, temperature, salts, cofactors, ...)

## DISCO-SRCD:

- Measure the **thermostability** of the protein (prior crystallization screens)
- Characterise the **Secondary structure content**
- Probe **for cofactor/ligand/lipid bilayer induced conformational changes**

# CONTACT

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## Health & Well-Being at SOLEIL



Link to the web page

SOLEIL's Health and Well-being Scientific Section is composed of 30 scientific experts from different fields. Through collaborative and science-driven approaches, the Section offers the community a coherent portfolio of state-of-the-art techniques to serve scientific and societal health-related challenges.



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