MS01-P07 | Optimized design for new scientific opportunities in macromolecular crystallography at the future microfocus XAIRA beamline

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The BL06-XAIRA microfocus macromolecular crystallography (MX) beamline at the ALBA synchrotron light facility is foreseen to enter into user operation in 2021 and complies with a long-standing request from the scientific community. Three main MX scientific cases will be covered by XAIRA. Primarily XAIRA will tackle projects in which the macromolecular crystals only grow in micrometric sizes, possess a reduced diffracting power or require complex data collection strategies. To push these experiments the new beamline aims at providing a stable X-ray beam at 1 Å wavelength with a micrometric size (3×1 μm^2 FWHM), focused with plane-elliptical mirrors bent through Alba in-house Nanobenders and equipped with dynamical figure error correctors. The beam might be further reduced down to 1×1 μm^2 by limiting the horizontal primary source produced by a prefocusing horizontal mirror.

The BL06-XAIRA beamline is also intended to cope with native phasing methods, which exploit the anomalous scattering of light metals naturally occurring in proteins. To this aim, the beamline will deliver 3 Å wavelength (4 keV) photons and the end station will include a helium atmosphere surrounding the sample up to the detector to reduce the background at the detector.

The new beamline will finally cater fixed-target serial crystallography experiments by providing a flexible sample environment, which will be operational also in air. To cover the need of high flux to perform these experiments, the photon wavelength will be selected using a double multilayer pseudo-channel cut monochromator, installed in addition to the channel-cut Si(111) monochromator.