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XALOC: The MX beamline at the synchrotron ALBA

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BL13-XALOC is the only operating macromolecular crystallography beamline at the 3 GeV ALBA Synchrotron near Barcelona (Spain) and started user operation on July 2012. It receives light from an in-vacuum undulator and it is fully tunable from 5 to 22 keV which allows anomalous diffraction-dependent experiments. The optical design consists of a Si(111) channel-cut crystal monochromator and a pair of focusing KB mirrors. The beam at the sample position is typically focused with a size of 52 µm x 5.5 µm FWHM (H x V) and it can be defocused to match the dimensions of the crystal up to a maximum of sizes 300 µm x 200 µm FWHM (H x V) which is very uniform due to the small slope errors of the mirrors (55 nrad and 83 nrad RMS for the vertical and horizontal focusing mirrors, respectively). Both mirrors can also be removed from the beam path to use an unfocused beam. Thorough commissioning with X-ray beam and user operation the beamline has demonstrated an excellent energy and spatial stability of the beamline. The end-station includes a high-accuracy single-axis diffractometer, a removable mini-kappa stage, an automated sample-mounting robot (CATS) that performs reliably with SPINE/MD vials/caps and a photon-counting detector (Pilatus 6M) that allows shutterless operation. This equipment, together with the operation flexibility of the beamline, allows a large variety of types of crystals to be tackled, from medium-sized crystals with large unit-cell parameters to microcrystals. Recent software updates include a new user GUI, raster scan to determine the best area to expose the sample, automatic data collection strategy (EDNA), inverse beam data collection method and an automated pipeline to perform data reduction and integration (AutoProc) that runs after each data collection. The control system is based on Sardana-Tango architecture and MXCuBE is being integrated. As per May 2015, 51 structures have been deposited to the PDB with data collected at XALOC and more than 17.000 crystals have been tested.

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