Standardization in MX as a collaborative tool for the success of the structural biology user communities

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During the last decades, structural biology had a major impact in illustrating the structure-functional aspects of some of the most important biomolecules. This success has been also contributed by the evolution of macromolecular crystallography beamlines worldwide and the continued development of synchrotron sources that allowed it to reach a very high standard of automation, reliability and user friendliness. ESRF, the European Synchrotron, has been a major player of this revolution for about the last twenty years. Initially European funded projects provided the means to introduce standardisation in the sample supports, introduce new robotics and design software interfaces and pipelines to facilitate complex experiments. Eventually, the advent of photon counting detectors raised the bar in terms of throughput that an MX beamline could achieve and changed the paradigm from collecting the best data from one (or few) crystal to selecting the best data from all collected ones, and introduce new data collection methods that could be implemented to perform unattended data collection in a completely automated manner. These novel strategies could be implemented and disseminated through the user community also thanks to the collaborative projects of MXCuBE, the control interface for MX experiments, and ISPyB, the LIMS database for MX experiments, which are part of large collaborations that included different European partners and now expanded to include associate worldwide. The definition of new standards for serial crystallography sample delivery and data collection methods at synchrotron source will represent an important asset to promote the new techniques for time resolved room temperature data collection among the large and variegate user community.

In this talk we will present how the standardisation of hardware and software has facilitated the evolution of MX experiments at third (now fourth) generation synchrotrons and discuss how a similar strategy will be a key for the success of the new serial crystallography beamlines that are under construction.