Improving Access and Throughput of The MX Beamlines At Diamond Light Source, UK

Marco Mazzorana[1], David Aragao[1], Neil Paterson[1], Elliot Nelson[1], Felicity Bertram[1], Dave Hall[1]

[1]Diamond Light Source

marco.mazzorana@diamond.ac.uk

The MX group at Diamond Light Source offers a suite of seven macromolecular crystallography (MX) beamlines covering a variety of setups and techniques to meet the demands of the user community. This selection of instruments allows access to a wide range of focusing, energy, throughput capabilities as well as numerous approaches including *in-situ*, serial crystallography, and fragment-based drug discovery.

Over the years Diamond has invested its efforts towards improving the user experience, making beamtime more efficient, readily available, and better tailored to the requirements of a dynamic community.

A variety of tools provide responsiveness, trackability and automation of experiments, and increase the throughput and the quality of experiments. Crucial to this are meticulous sample tracking and logistics, fully integrated with the data collection management database ISPyB and the large-scale computing for automated data analysis, available through the Synchweb portal.

More recently, the introduction of Unattended Data Collection (UDC), allows versatile and efficient use of beamtime. Not only does UDC provide efficient screening and data collection for a variety of cases, but its design makes it versatile in the choice of beamlines and reliable by factoring characteristics such as beamline features and estimated dose for each dataset. Furthermore, its design makes it completely interleaved with interactive sessions, decreasing the beamline idle time.

To better respond to the needs of the community, responsive scheduling was also introduced, offering quick access to match readiness of samples and custom-made session timing and lengths to accommodate the specific requirement for interactive data collection sessions.

These changes to the access model and diversification of data collection strategies, in conjunction with the latest innovations in hardware and software, make Diamond a unique place to collect excellent MX data.