**Poster Presentation**

**IT.P11**

## *NSLS-II MX beamlines FMX for micro-crystallography & AMX for highly automated MX*

M. Fuchs[1], R. Sweet[1], L. Berman[1], D. Bhogadi[1], W. Hendrickson[1,2], O. Chubar[1], L. Yang[1], S. McSweeney[1], D. Schneider[1]

*[1]Brookhaven National Laboratory, Photon Sciences, Upton, USA, [2]Columbia University and New York Structural Biology Center, New York, USA*

We present the final design of the x-ray optical systems and experimental stations of the two macromolecular crystallography (MX) beamlines, FMX and AMX, at the National Synchrotron Light Source-II (NSLS-II). Along with its companion x-ray scattering beamline, LIX, this suite of Advanced Beamlines for Biological Investigations with X-rays (ABBIX, [1]) will begin user operation in 2016. The pair of MX beamlines with complementary and overlapping capabilities is located at canted undulators (IVU21) in sector 17-ID. The Frontier Microfocusing Macromolecular Crystallography beamline (FMX) will deliver a photon flux of ~5x10^12 ph/s at a wavelength of 1 Å into a spot of 1 - 50 µm size. It will cover a broad energy range from 5 - 30 keV, corresponding to wavelengths from 0.4 - 2.5 Å. The highly Automated Macromolecular Crystallography beamline (AMX) will be optimized for high throughput applications, with beam sizes from 4 - 100 µm, an energy range of 5 - 18 keV (0.7 - 2.5 Å), and a flux at 1 Å of ~10^13 ph/s. Central components of the in-house-developed experimental stations are a 100 nm sphere of confusion goniometer with a horizontal axis, piezo-slits to provide dynamic beam size changes during diffraction experiments, a dedicated secondary goniometer for crystallization plates, and sample- and plate-changing robots. FMX and AMX will support a broad range of biomedical structure determination methods from serial crystallography on micron-sized crystals, to structure determination of complexes in large unit cells, to rapid sample screening and data collection of crystals in trays, for instance to characterize membrane protein crystals and to conduct ligand-binding studies. Together with the solution scattering program at LIX, the new beamlines will offer unique opportunities for advanced diffraction experiments with micro- and mini-beams, with next generation hybrid pixel array detectors and emerging crystal delivery methods such as acoustic droplet ejection. This work is supported by the US National Institutes of Health.

***[1]*** *D. K. Schneider, L. E. Berman, O. Chubar, et al, J. Phys. Conf. Ser., 2013, 425, 012003*

**Keywords:** Beamline, Experimental Station, Macromolecular Crystallography