

MS01-P02 | TREXX: A NEW ENDSTATION FOR SERIAL TIME-RESOLVED CRYSTALLOGRAPHY AT PETRA-III

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The EMBL operates two beamlines (P13 and P14) for macromolecular crystallography at the PETRA-III synchrotron in Hamburg. In addition, a new endstation (P14-2, TREX) for serial time-resolved crystallography has been in operation in a second hutch at the far end of P14 since October 2018. For this endstation, the P14 X-ray beam is refocussed with a compound refractive lens (CRL) transfocator to provide a $15 \times 10 \mu\text{m}$ beam with a flux of about 2×10^{12} photons/s at 12.7 keV. In order to be able to accommodate different microcrystal sample delivery systems suitable for serial crystallography, P14-2 is not equipped with a goniometer, but instead with a basic beam conditioning unit (BCU) that provides an on-axis viewer, beam shaping apertures, a fully motorized beamstop, and a scintillator for visualisation of the X-ray beam. For time-resolved pump/probe experiments, a laser system (355 and 532 nm) for initiating reactions is built into the setup, such that the laser and X-ray beams are almost parallel at the sample position, which facilitates alignment of the beams using the on-axis viewer. First experiments have yielded promising results using patterned chips as well as microfluidic flow cells. To be able to reach sub-millisecond timescales in time-resolved experiments, the Hadamard technique [1] will be employed in the future, either by gating the detector or alternatively by modulating the X-ray beam.

[1] Song BH et al., *J Mater Chem A*, 2015