

Poster Presentation

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X-ray Crystallography at Beamline P11 at PETRA III

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The bio-imaging and diffraction beamline P11 at PETRA III is dedicated to structure determination of periodic (crystalline) and aperiodic biological samples. The beamline features two experimental endstations: an X-ray microscope and a crystallography experiment. Basis of design was to provide an extremely stable and flexible setup ideally suited for micro and nano beam applications. The X-ray optics consist of a HHL double crystal monochromator, followed by two horizontal deflecting and one vertical deflecting X-ray mirrors. All mirrors are dynamically bendable and used to generate an intermediate focus at 65.5 m from the source with a size of $37 \times 221 \mu\text{m}^2$ FWHM ($v \times h$). All experiments are installed on an 8 m long granite support which provides a very stable setup for micro beam experiments. The crystallography endstation is located at the end of the granite at 72.9 m from the source. The experiment is equipped with a high precision single axis goniostat with a combined sphere of confusion of less than 100 nm. X-ray energies are tunable between 5.5 and 30 keV. A second focusing bendable KB mirror system can be used for further demagnification of the secondary source. In this way the beam size can be freely adjusted between $4 \times 9 \mu\text{m}^2$ and $300 \times 300 \mu\text{m}^2$ FWHM ($v \times h$) with 10^{13} ph/s at 12 keV. Smaller beam sizes down to $1 \times 1 \mu\text{m}^2$ with more than 2×10^{11} ph/s in the focus can be realized by slitting down the secondary source at the cost of flux. The crystallography endstation is equipped with a Pilatus 6M-F detector which allows fast data collection with up to 25 Hz. Due to the very small beam divergence of the X-ray beam P11 is ideally suited to measure large unit cell systems, such as viruses or large molecular complexes. In addition, the beamline is capable of high-throughput crystallography and fast crystal screening. Crystals can be mounted in less than 10 s using an automatic sample changer. The large sample dewar provides space for 368 crystals.



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