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## EMBL beamlines for macromolecular crystallography at PETRA III

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EMBL-Hamburg operates two beamlines for macromolecular crystallography, P13 and P14, at PETRA III (DESY, Hamburg).

P13 delivers high photon fluxes at energies down to 4 keV. Combining X-rays in the 4-6 keV energy range with beam sizes down to 15  $\mu\text{m}$  diameter while maintaining high photon flux and using standard mounting systems (SPINE pins) and robotics allows to solve the crystallographic phase problem via S-SAD phasing; recently the feasibility of MAD-phasing at the Ca K-edge (4.05 keV, 3.1  $\text{\AA}$ ) has been demonstrated

P14 can be run in two modes, one providing a collimated homogeneous beam that can be shaped to any size between 10 and 200  $\mu\text{m}$ , the second mode producing micro-focus conditions with a beam size on the 5  $\mu\text{m}$  scale. Under micro-focus conditions, serial data collections - both under cryogenic and in situ conditions - employing 'serial helical scans'-strategies can be executed conveniently from the MXCuBE user interface.

While several pump-probe and time-resolved experiments have been successfully performed on P14, we are presently constructing a second endstation on P14 to provide flexible beam and sample conditions for pump-probe experiments (in collaboration with the University of Hamburg).

The beamlines are embedded in the Integrated Facility for Structural Biology that offers access to up-stream service such as characterization of samples prior to crystallization, high throughput crystallization, and automatic crystal harvesting with a CrystalDirect<sup>TM</sup> Harvester.

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