Status of MXCuBE Beamline Control at BESSY II

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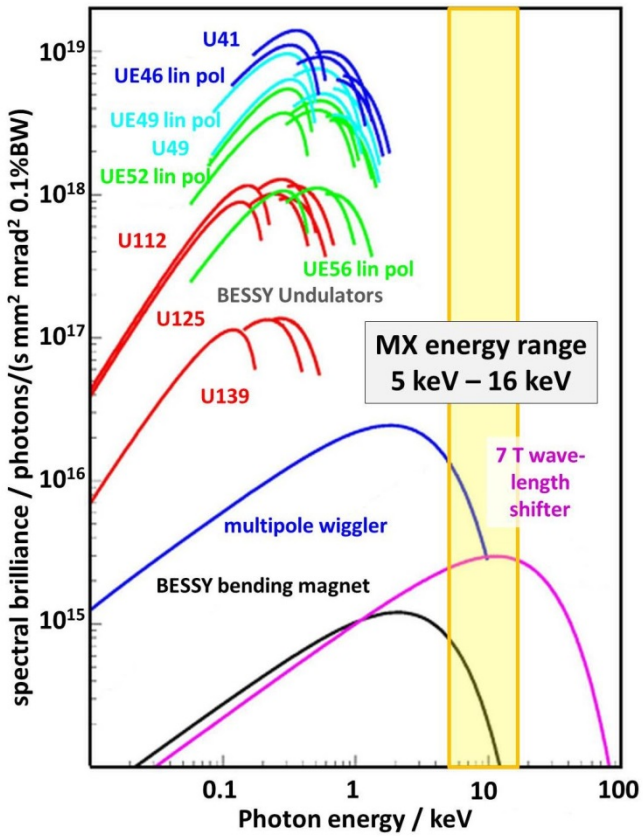
on behalf of the HZB-MX group

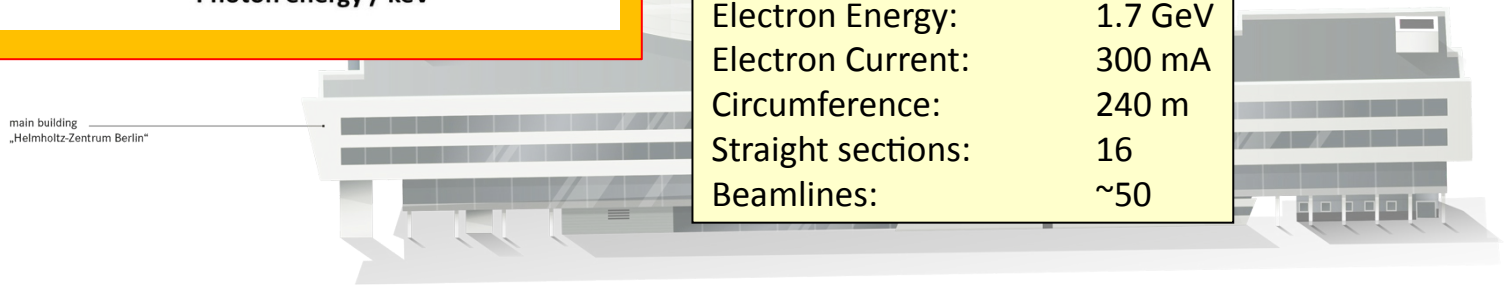
MXCuBE/ISPyB Joint Meeting, 12.03.-14.03.2019,
MAX IV Laboratory, Lund

Photon source BESSY II

Synchrotron sources at BESSY II



7 Tesla wavelength shifter and MX Beamlines



BESSY II ring parameters:

Electron Energy:	1.7 GeV
Electron Current:	300 mA
Circumference:	240 m
Straight sections:	16
Beamlines:	~50

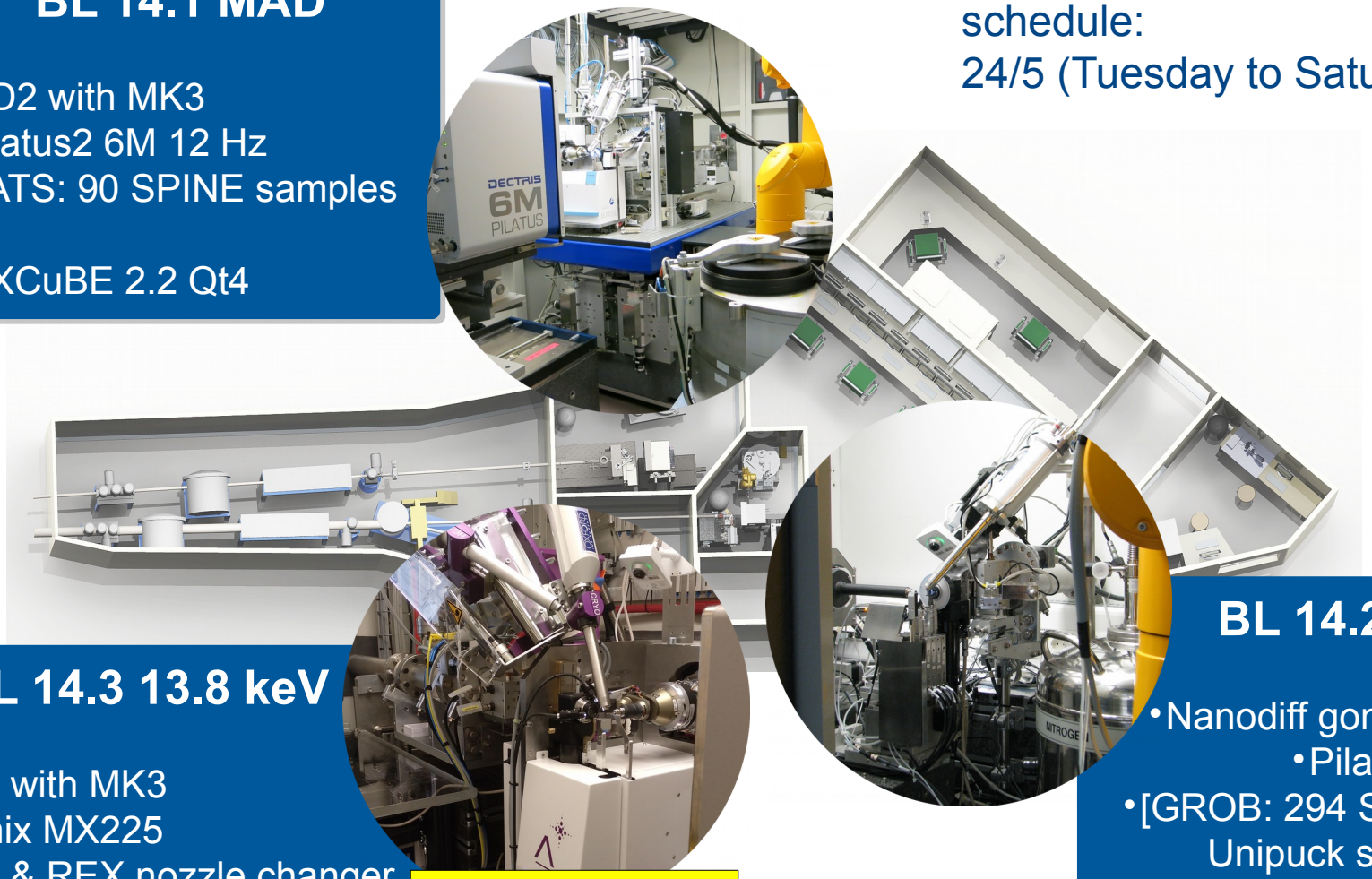
MX experimental floor at BESSY II

BL 14.1 MAD

- MD2 with MK3
- Pilatus2 6M 12 Hz
- CATS: 90 SPINE samples

- MXCuBE 2.2 Qt4

- standard user operation schedule:
  24/5 (Tuesday to Saturday)



BL 14.3 13.8 keV

- MD2S with MK3
- Rayonix MX225
- HClab & REX nozzle changer

- MXCuBE 2.2 Qt4

Final commissioning

BL 14.2 MAD

- Nanodiff goniometer
- Pilatus3 2M
- [GROB: 294 SPINE & Unipuck samples]

- MXCuBE 2.2 Qt4

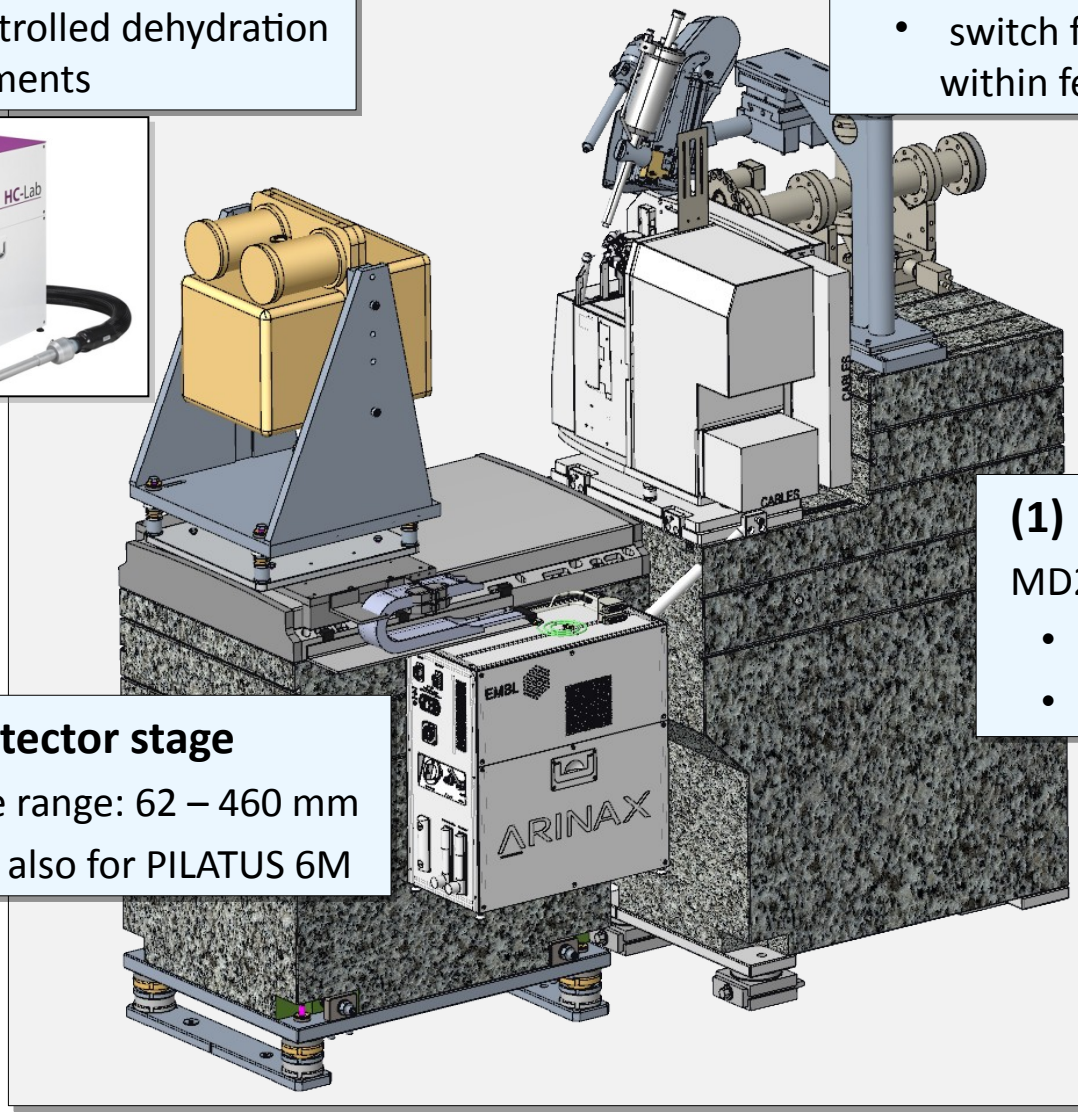
MX beamline 14.3: Update in Progress

(2) New HC-Lab

- for controlled dehydration experiments

(3) REX nozzle exchanger

- switch for HC-Lab to cryojet within few 100 ms



(1) New diffractometer

MD2-S Microdiffractometer

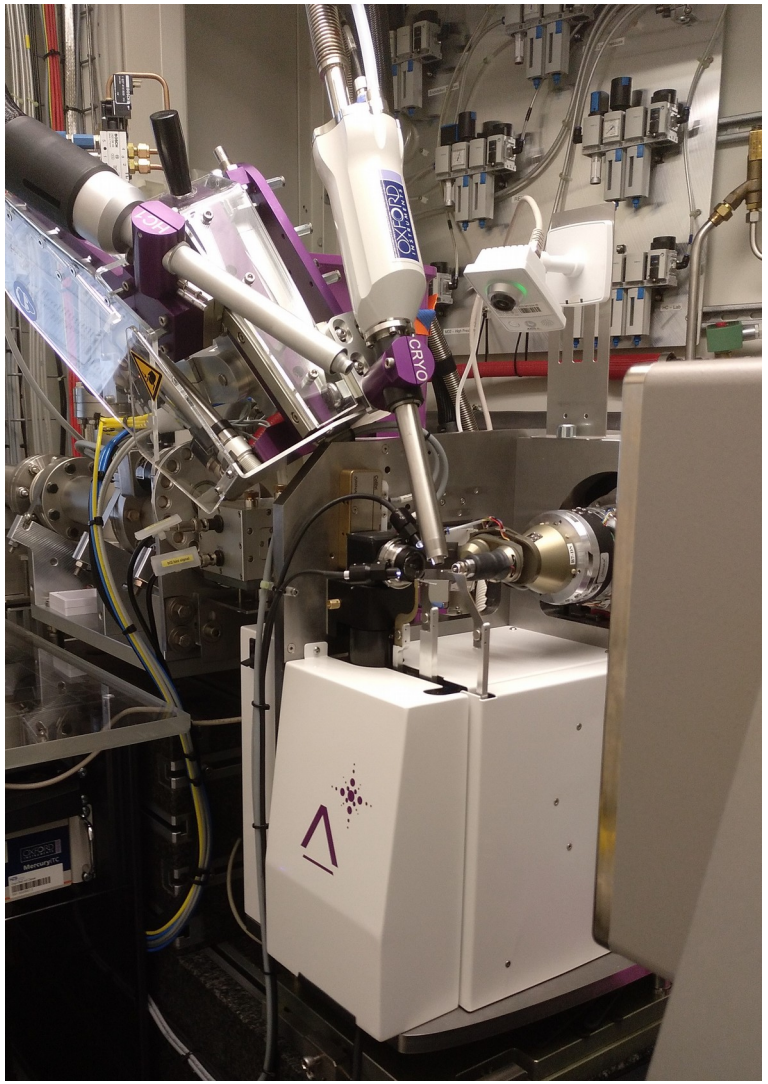
- MK3 mini-kappa
- 96-well plate manipulator

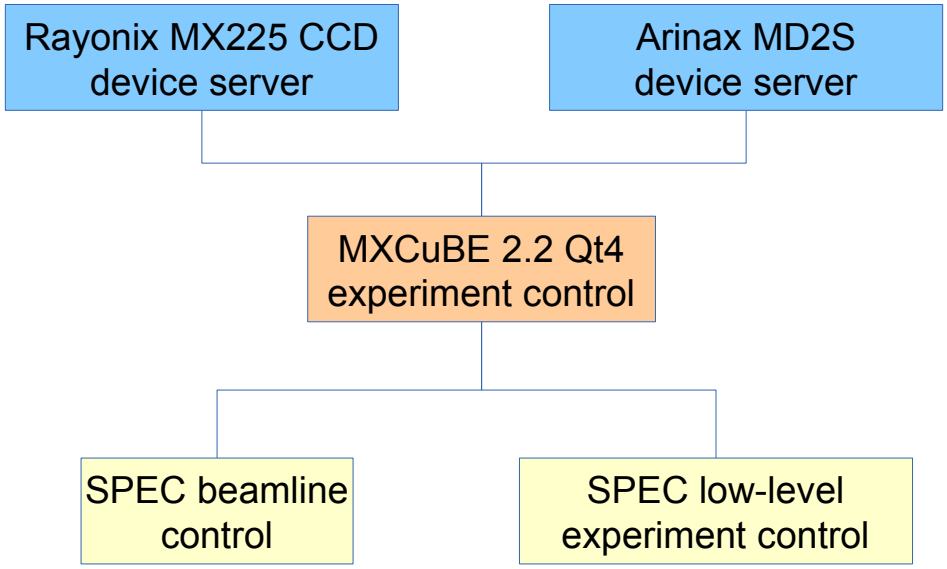
(4) New detector stage

- Distance range: 62 – 460 mm
- Suitable also for PILATUS 6M

MX beamline 14.3: Control-system setup

- Main components:
  - Arinax MD2S with Minikappa and Plate Manipulator
  - Rayonix MX225
  - Arinax HClab
  - Arinax REX nozzle changer
  - Amptek X-123SDD fluorescence detector

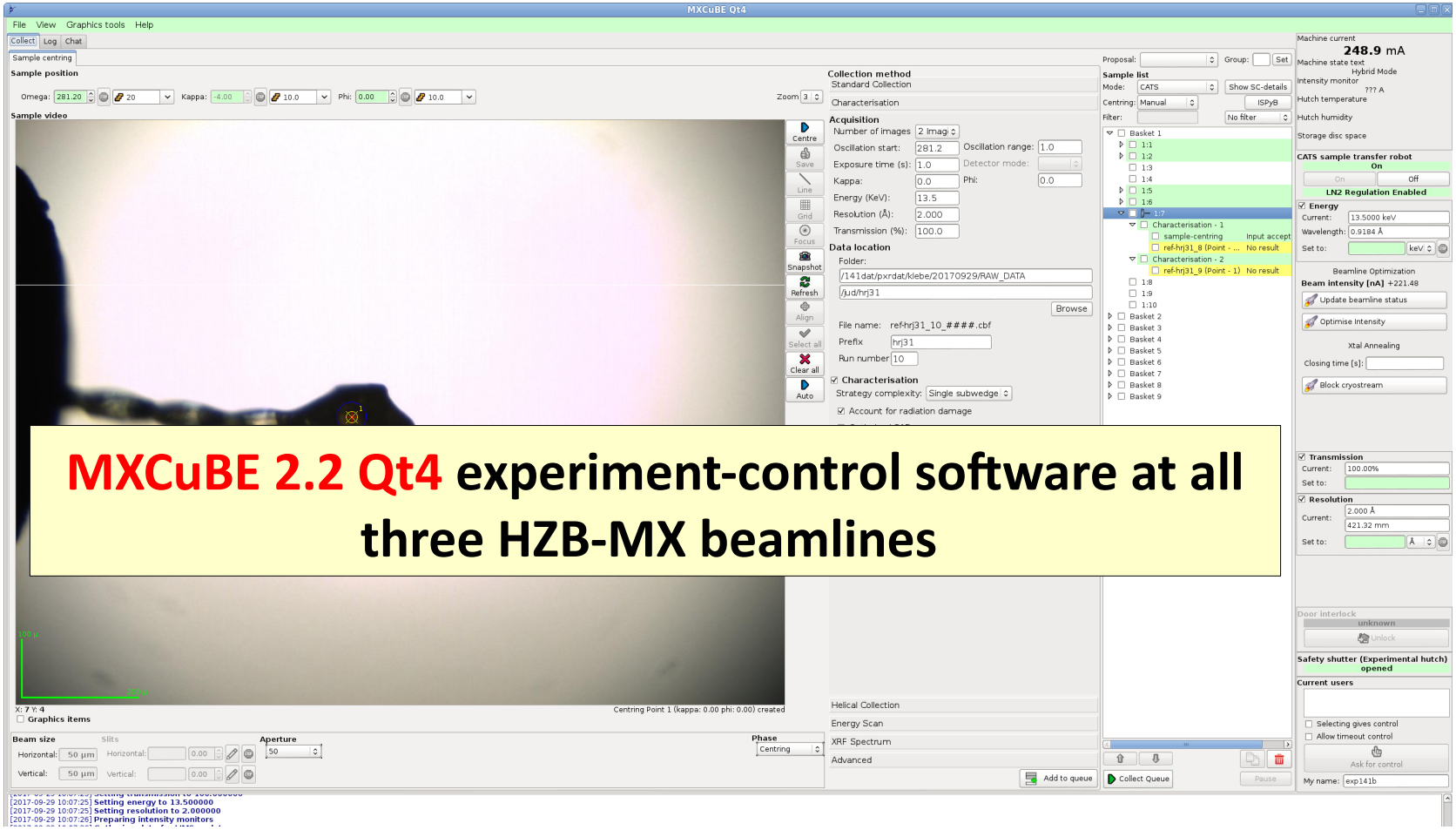




Final commissioning in progress

Start user operation: April 2019

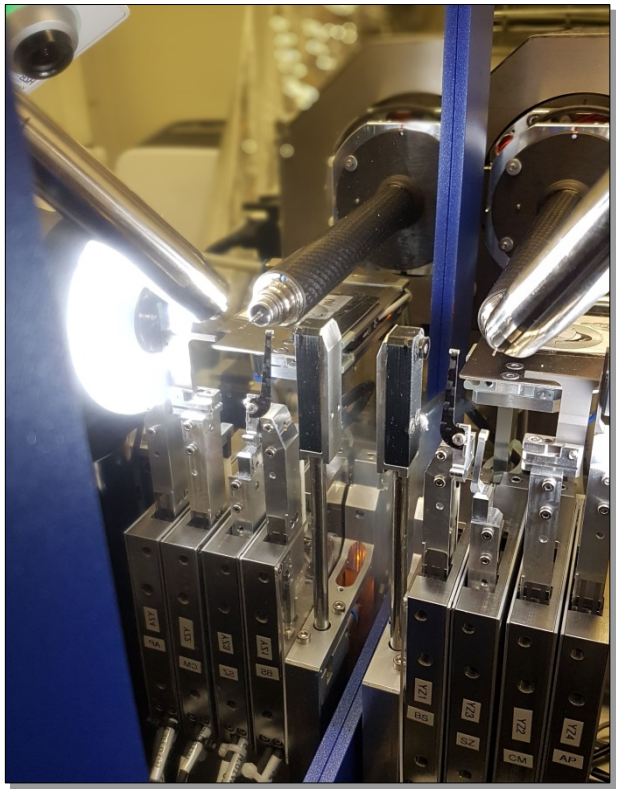
MXCuBE2 Qt4 @HZB-MX



MXCuBE 2.2 Qt4 experiment-control software at all three HZB-MX beamlines

Diffractometers:	Sample-transfer robots:	Detectors:	Auxiliary devices:	Control systems:
Arinax MD2 Arinax MD2S DESY Nanodiff	Irelec CATS NatX-ray GROB	Dectris Pilatus2 6M Dectris Pilatus3 2M Rayonix MX225	Wago I/O controller Amptek X-123SDD	EPICS, Tango, Exporter, SPEC

High resolution data acquisition @BL14.2



„Guillotine“ Style Cover:
Schutzschieber

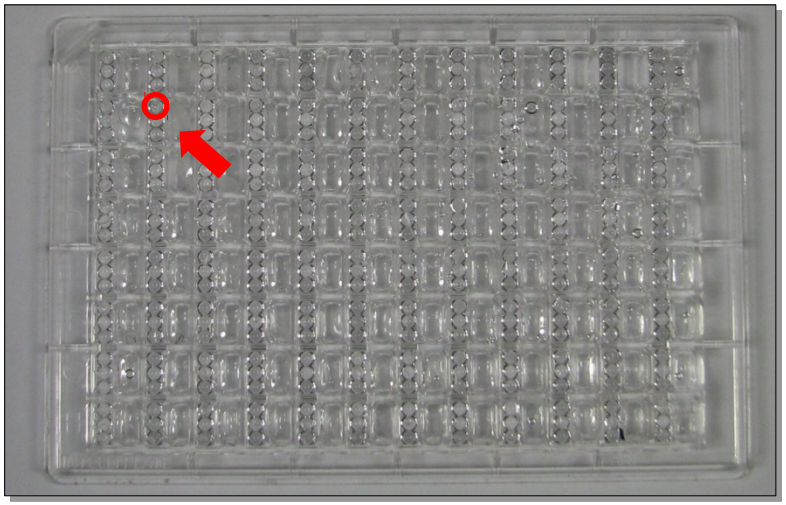
Min. detector distance: 55 mm

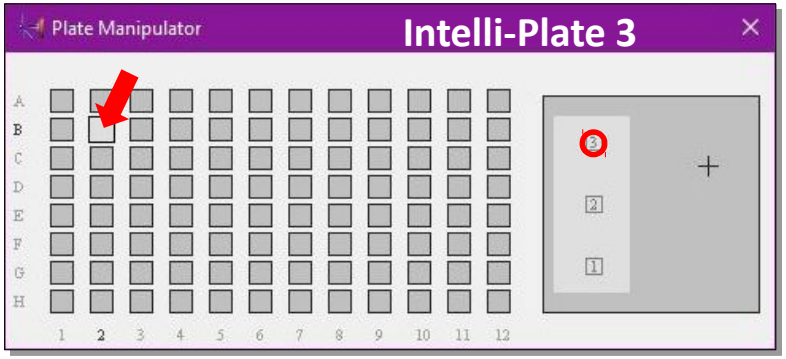
Max. resolution: 0.72 A @15 keV

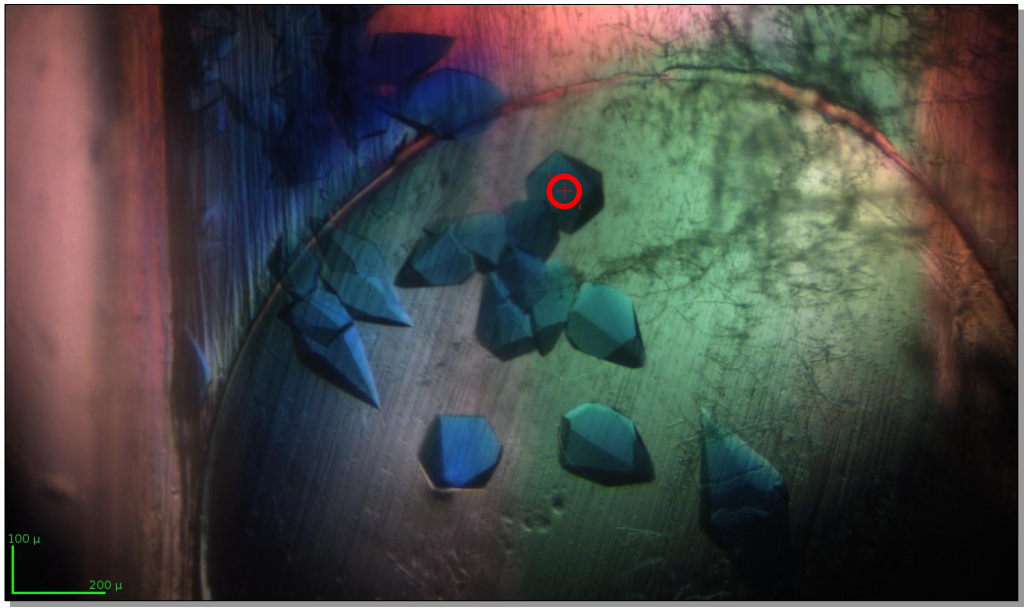
In Situ MX crystallography @BL14.1 and BL14.3

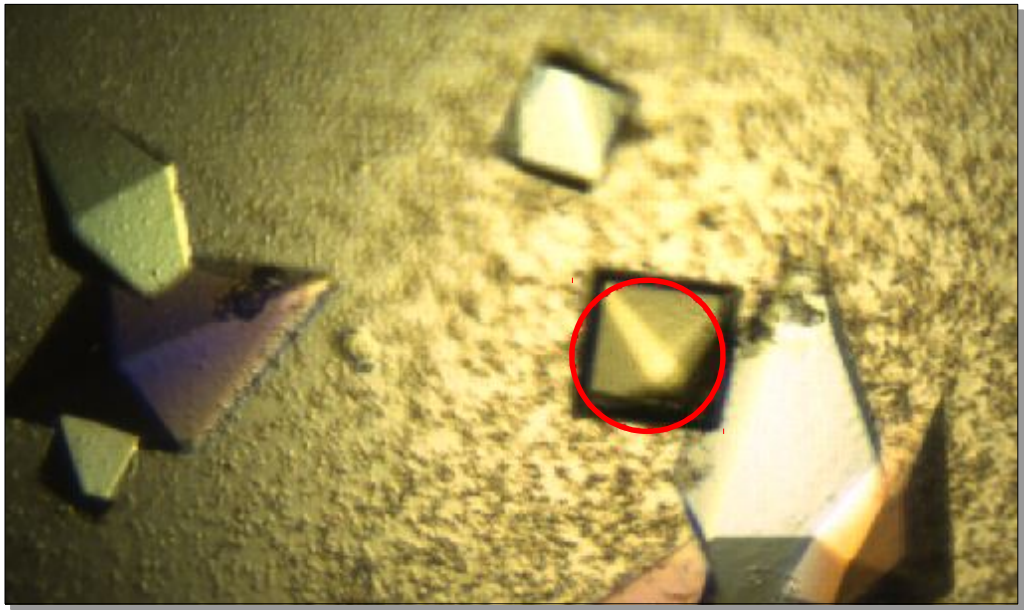
Four supported plate types:

- CrystalDirect
- Intelli-Plate 3
- Crystal QuickX
- Mitegen InSitu-1









MXCuBE: status and future plans

- current status:
  - MXCuBE 2.2 Qt4 running on all three HZB-MX beamlines
- short- and mid-term plans:
  - upgrade MXCuBE in production environment:
    - MXCuBE2 → GitHub master branch
    - HardwareRepository → branch 2.3.0
  - integration of PlateManipulator as pseudo sample changer
  - integration of HClab into MXCuBE software setup
  - automated sample centring for fragment screening

Acknowledgements

BESSY-MX team

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The MXCuBE collaboration

Industrial partners:

Thank you for your attention.

Questions?