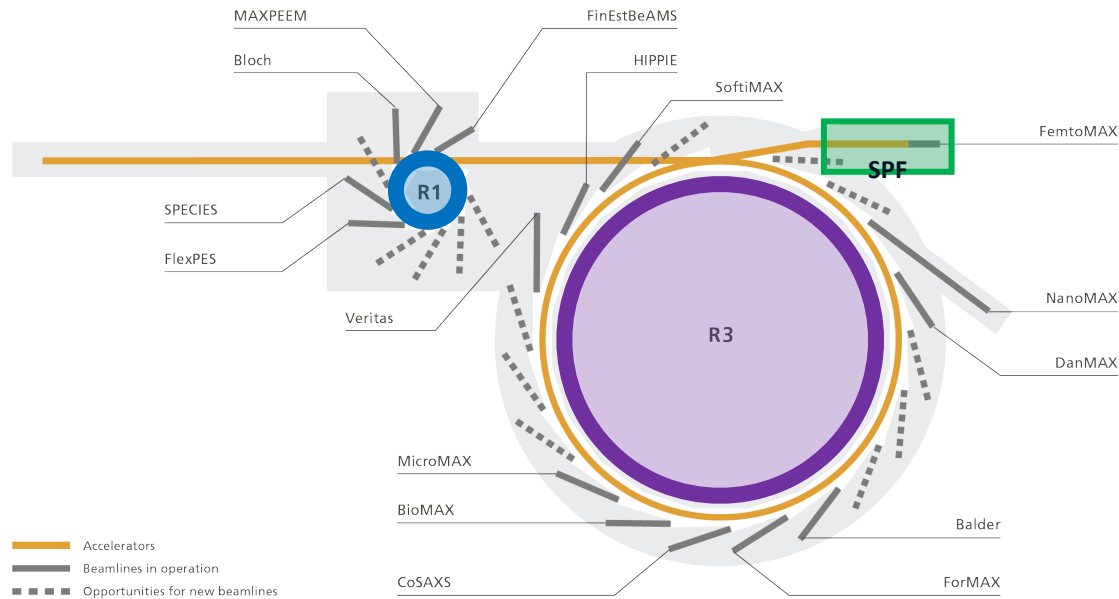# MAX IV Laboratory's
# Control System Evolution and
# Future Strategies

Mini-oral, ICALEPCS 2023

Vincent Hardion, 7/10/2023

# MAX IV is almost complete



**FEL DEVELOPMENT**

APPLE X undulator with a round aperture for the generation of Soft X-ray FEL. A cost-effective solution compared to the existing APPLE II and provides full polarization control with constant effective K-value as a function of phase, i.e. polarization state.

Transverse Deflecting Cavity has been installed to increase the Temporal resolution for diagnostic purpose in the Single Pulse facility, awaiting for FEL.
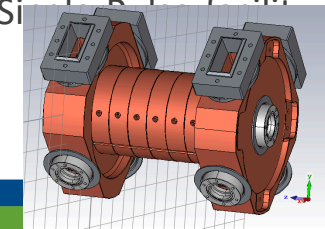
**MICROMAX 2023**
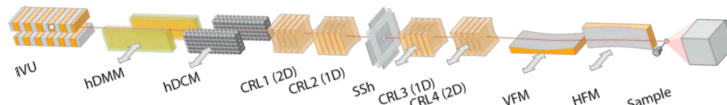
Will open up new possibilities in the area of structural biology making it possible to study proteins in 3D and to follow them in time. MicroMAX will allow studying the molecules that are most interesting but most difficult to study because they only provide microcrystals. The beamline operates at 5-25 keV, with a beam size at the sample of ≈ 1μm – 5 mm and photon flux of 10^15 photons/s depending on mode of operation.
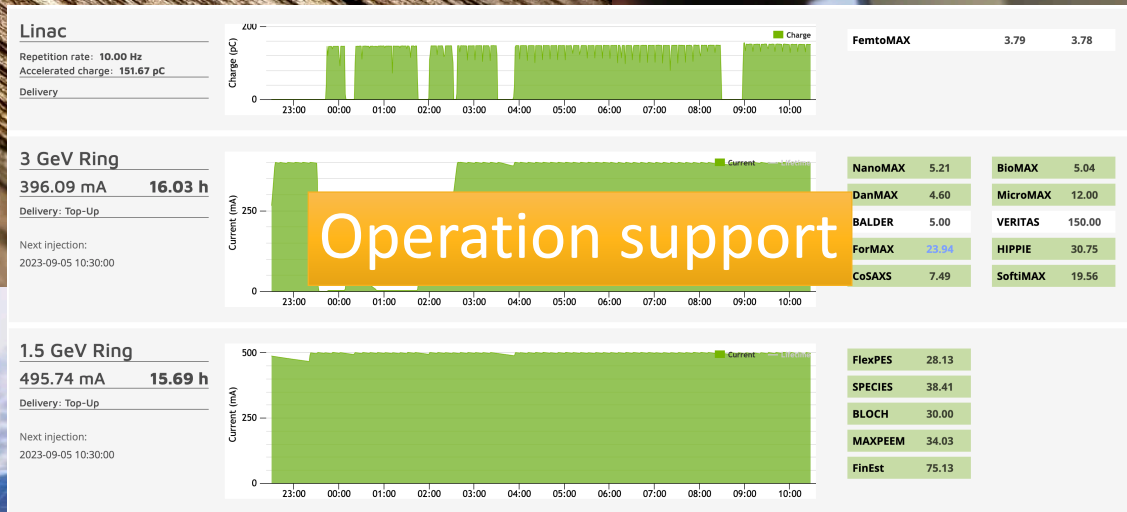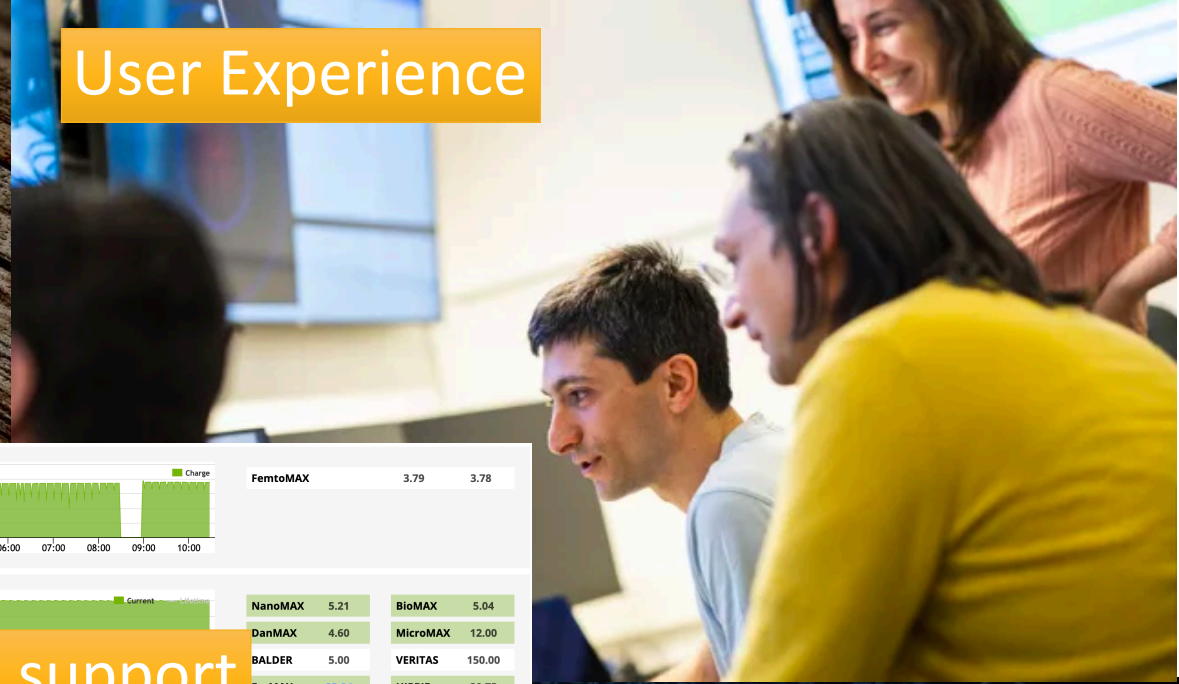
**FORMAX 2022**

Allows in-situ multi-scale structural characterization from nm to mm length scales by combining full-field tomographic imaging, small- and wide-angle x-ray scattering (SWAXS), and scanning SWAXS imaging in a single instrument. The beamline operates at 8-25 keV, with a beam size at the sample of ≈ 1μm – 5 mm depending on mode of operation.

Readiness & Reliability

User Experience

Operation support

| Linac | | | | | FemtoMAX | 3.79 | | 3.78 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |

Repetition rate: 10.00 Hz
Accelerated charge: 151.67 pC
Delivery

**3 GeV Ring**
396.09 mA — **16.03 h**
Delivery: Top-Up
Next injection:
2023-09-05 10:30:00

| NanoMAX | 5.21 | BioMAX | 5.04 |
| --- | --- | --- | --- |
| DanMAX | 4.60 | MicroMAX | 12.00 |
| BALDER | 5.00 | VERITAS | 150.00 |
| ForMAX | 23.94 | HIPPIE | 30.75 |
| CoSAXS | 7.49 | SoftiMAX | 19.56 |

**1.5 GeV Ring**
495.74 mA — **15.69 h**
Delivery: Top-Up
Next injection:
2023-09-05 10:30:00

| FlexPES | 28.13 |
| --- | --- |
| SPECIES | 38.41 |
| BLOCH | 30.00 |
| MAXPEEM | 34.03 |
| FinEst | 75.13 |

Fast Experimental Measurement

Technology Development