

DNR: STYR 2021/1690

**Status of beamlines
at MAX IV**

August 2021



Status of MAX IV

The MAX IV accelerators are fully operational, 14 beamlines are able to take X-ray light, and 12 are able to serve users.

All 12 beamlines able to accept general users were reopened in spring 2021 in a restricted access mode (remote access and/or mail-in operations only, with no users or visitors allowed on-site), following a gradual restart of activities after the warm shutdown. The Bloch ARPES beamline is now capable of fully remote experiments. This was made possible by a new software control interface developed by the beamline staff that enables remote users to perform beamline tasks easily and safely.

According to the MAX IV reopening plan, users will be permitted back on-site in small groups (maximum two per experiment) starting September 13th. Unrestricted user access is planned for November 1st onward provided pandemic conditions continue to improve.

Activities towards project and scope completion of the different beamlines resumed after risk assessments were performed, to minimize staff congestion on on-site. At DanMAX expert commissioning experiments were performed so that the beamline will be ready to accept general users for powder diffraction experiments in autumn 2021.

The summer shutdown activities were completed according to plan, including the site acceptance tests for the ForMAX and MicroMAX insertion devices.

Appendix 1 lists the status of individual beamlines with techniques currently available to users on beamlines in operation, and estimated dates to deliver planned capabilities for beamlines in commissioning or under construction.

Science impact and outlook

The scientific output of MAX IV continues to grow, with 80 papers registered in 2021 so far. Of note are high impact papers published in *Science* on results from NanoMAX, *Advanced Energy Materials* from Balder, *Light* jointly from Balder and NanoMAX, *Acta Crystallographica D* and *IUCrJ* from BioMAX, *Nano Letters* from MAXPEEM, and more. The growth in publications, especially from BioMAX and HIPPIE (respectively 26 and 10 papers to date), shows that these beamlines are maturing.

Appendix 2 lists 2021 publications to date. Registered MAX IV and MAX-lab publications are available at <https://www.maxiv.lu.se/science/publications/>.

Appendix 1
Current status of individual beamlines

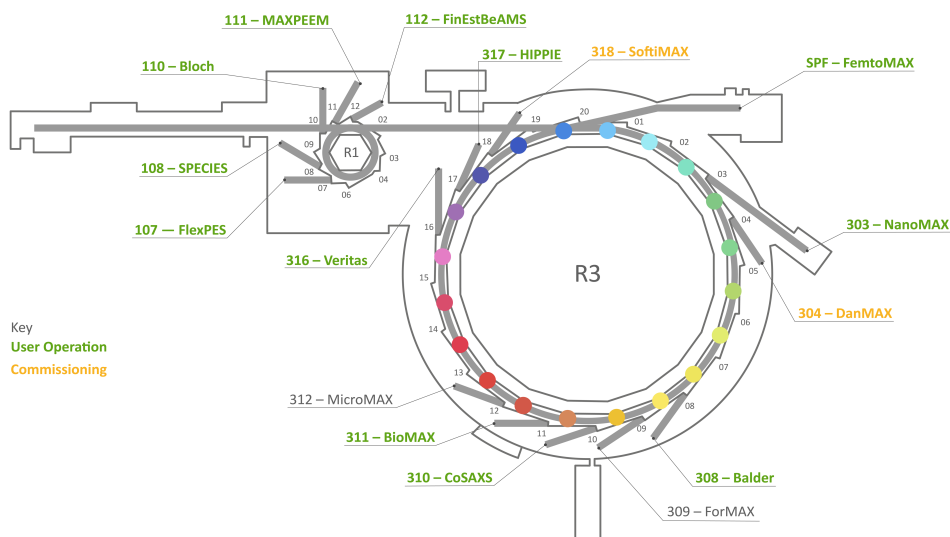
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Current status of individual beamlines



Balder

Techniques available to general users

X-ray absorption spectroscopy (XANES and EXAFS) in transmission, continuous scanning down to 30 s/EXAFS

X-ray absorption spectroscopy (XANES and EXAFS) in fluorescence with 7 element SDD, continuous scanning down to 300 s/EXAFS

Techniques available to commissioning experts

X-ray emission spectroscopy (XES), expert mode with limited angular range

Techniques planned for general users

XRD: Q3 2022

XES spectrometer: Q3 2022

BioMAX

Techniques available to general users

Data collection at fixed energy between 6 and 19.5 keV, detector distance between 126 and 900 mm, beam focus of 20x5 microns or 50x50 μm and defining aperture of 5, 10, 20 or 50 μm
Automated sample mounting and dismounting from UniPucks, 29 puck positions in dewar
Sample temperature 100 K; room temperature with or without humidity control available for manual mounting only
SAD and MAD experiments
Automated data integration, scaling and merging. Offline remote access for manual data processing
SX experiments using HVE-injector (high viscosity extrusion injector), fixed target scan using the MD3
Element identification by X-ray fluorescence
Remote data collection
Fragment-based drug screening

Bloch

Techniques available to general users

High-resolution angle resolved photoelectron spectroscopy (ARPES), using deflection based analyzer or 6-axis manipulator
Linear vertical or horizontal polarised light from EPU, with energy range 10-1000 eV (peak flux and resolution 15-200 eV)
Online scanning tunneling microscopy, 50K - 300K

Techniques planned for general users

Spin-ARPES: Q3 2022

CoSAXS

Techniques available to general users

Solution/soft matter conventional SAXS and bio SAXS
Sample environment: Baseline configuration, heating stages, user implementation

Techniques available to commissioning experts

Time resolved experiments
WAXS
XPCS
Advanced sample environments: rheometer, heating stages, microfluidics, stopped flow, magnets

DanMAX

The powder X-ray diffraction (PXR) station is being commissioned.

Techniques available to commissioning experts
X-ray powder diffraction
Time resolved studies
Low temperature studies
In situ battery set up
2D PXR mapping
Total scattering

First general users
Q4 2021

FemtoMAX

Techniques available to general users
Scattering set-up (SAXS, WAXS) in-vacuo sample environment
Crystallography and grazing incidence X-ray diffraction
Excitation 400 nm – THz radiation
Time-resolved X-ray induced fluorescence measurements
Time resolution is 500 fs for scanning measurements (work ongoing to improve), <200 fs for single-shot

FinEstBeAMS

Techniques available to general users
High-resolution photoelectron and Auger electron spectroscopy of gaseous samples (GPES)
Ion time-of-flight mass spectrometry of gaseous samples (GPES)
X-ray absorption of gaseous samples, measured in the total ion yield mode (GPES)
Photoluminescence spectroscopy of solid samples in the wavelength range 1.4 μm-200 nm (PLES)
Measurement of photoluminescence excitation functions at fixed emission wavelengths as well as reflection spectra from polished surfaces of solid samples (PLES)
Temperature dependencies of luminescence properties of solid materials in the temperature range from 10 K up to 350 K (PLES)
Photoelectron-photon coincidence (PEPICO) spectroscopy of gaseous samples (GPES)
X-ray photoelectron spectroscopy of surfaces and interfaces in UHV (SSES)
Angle-resolved photoelectron spectroscopy of 2D materials and condensed matter physics (SSES)

Techniques planned for general users

Solid state end-station: Q3 2021

FlexPES

Techniques available to general users

Beamline: Linear horizontally polarized light from LPU, with energy range 40-1500 eV, spot on sample both defocused (0.5-1.5 mm) and focused (from 50x15 μm to 150x40 μm in different end stations)

Surface- and material science (SMS) branch: High-resolution photoelectron spectroscopy (PES) on solid samples using SES-2002 analyzer and 4-axis manipulator; X-ray absorption spectroscopy (XAS or NEXAFS) using total and partial electron yield

Low density matter (LDM) branch: High-resolution PES on LDM samples using R4000 analyzer with these sample delivery systems (samples must be approved by chemical safety group):

- Liquid jet setup for e.g. aqueous solutions
- Molecular jet source (continuous beam) for cold beams of atomic and molecular gases
- Gas cell for PES on atomic and molecular gases

ForMAX

ForMAX is under construction.

- Start of commissioning: Q1 2022
- First expert users: Q1 2022
- First general users: Q4 2022

HIPPIE

Techniques available to general users

Catalysis cell: APXPS of solid-gas interfaces up to 10 mbar, for catalysis and surface science

PM-IRRAS: APXPS and FTIR on the same spot up to 1 mbar for catalysis and surface science

Liquid/electrochemistry cell: APXPS of solid-liquid (dip-and-pull setup) and gas-liquid (liquid jet setup) interfaces up to 30 mbar for electrochemistry, energy, environmental, and atmospheric science

The HIPPIE B branch is under development.

- Start of commissioning: Q1 2023
- First expert users: Q4 2023
- First general users: Q1 2024

MAXPEEM

Techniques available to general users

Soft X-ray SPELEEM (micro-LEED, PED, micro-ARPES, XMCD microscopy)

MicroMAX

MicroMAX is under construction.

- Start of commissioning: Q2 2022
- First expert users: Q4 2022
- First general users: Q2 2023

NanoMAX

Techniques available to general users (KB end station)

Scanning X-ray diffraction and coherent imaging in Bragg geometry

Forward ptychography and CDI

X-Ray fluorescence mapping in 2D

Forward ptycho-tomography (under development, not all samples are suitable, contact beamline team to discuss feasibility before proposal submission)

The FZP end station is under construction.

- Start of commissioning: Q3 2021
- First expert users: Q3 2021
- First general users: Q4 2022

SoftiMAX

SoftiMAX is being commissioned. First general users were delayed to Q1 2022 due to extensive realignment and commissioning required after repair of the optics cooling leak.

Techniques available to commissioning experts

STXM

Forward ptychography (basic)

XMCD microscopy (basic)

XRF mapping

First general users

Q1 2022

SPECIES

Techniques available to general users

Standard cell: APXPS up to 20 mbar for catalysis, oxidation studies, and surface science

ALD cell: APXPS for in-situ ALD experiments up to 20 mbar

RIXS using the GRACE spectrometer (emission energy range 50-650 eV, only linear polarization horizontally and vertically). Solid samples only. LN2-sample cooling available, 4-axis manipulator

VERITAS

Techniques available to general users (open port B branch)

User roll-up at the open port branch. Only approved equipment (contact beamline)

Techniques planned for general users

A branch: Q4 2021

Appendix 2

2021 publications

Status of beamlines at MAX IV

August 2021

BEAMLINE(S)	AUTHORLIST	TITLE	JOURNAL	DOI
*Balder	Shu Rui, Lundin Daniel, Xin Binbin, Sortica Mauricio A., Primetzhofer Daniel, Magnuson Martin, le Febvrier Arnaud, Eklund Per	Influence of Metal Substitution and Ion Energy on Microstructure Evolution of High-Entropy Nitride (TiZrTaMe)N _{1-x} (Me = Hf, Nb, Mo, or Cr) Films	ACS APPLIED ELECTRONIC MATERIALS	10.1021/acsaem.1c00311
*Balder	Li Jinzhao, Dagar Janardan, Shargaieva Oleksandra, Flatken Marion A., Kobler Hans, Fenske Markus, Schultz Christof, Stegemann Bert, Just Justus, Tobbens Daniel M., Abate Antonio, Munir Rahim, Unger Eva	20.8% Slot-Die Coated MAPbI ₃ Perovskite Solar Cells by Optimal DMSO-Content and Age of 2-ME Based Precursor Inks	ADVANCED ENERGY MATERIALS	10.1002/aenm.202003460
*Balder	Lu Changyong, Klementiev Konstantin, Hassenkam Tue, Qian Wenjie, Ai Jing, Hansen Hans Chr. Bruun	High affinity lanthanum doped iron oxide nanosheets for phosphate removal	CHEMICAL ENGINEERING JOURNAL	10.1016/j.cej.2021.130009
Balder	Dalgaard Kirstine Junker, Kevy Simone Munkholm, Wollesen Laura, Ma Qing, Wiedmann Steffen, Clauss Kajsa G. V. Sigfridsson, Bremholm Martin	Local structure of Nb in superconducting Nb-doped Bi ₂ Se ₃	PHYSICAL REVIEW B	10.1103/PhysRevB.103.184103
*BioMAX	Marcos-Torres FJ, Maurer D, Juniar L, Griesse JJ	The bacterial iron sensor IdeR recognizes its DNA targets by indirect readout	NUCLEIC ACIDS RESEARCH	10.1093/nar/gkab711
*BioMAX	Asthana P, Singh D, Pedersen JS, Hynönen MJ, Sulu R, Murthy AV, Laitaoja M, Jänis J, Riley LW, Venkatesana R	Structural insights into the substrate-binding proteins Mce1A and Mce4A from Mycobacterium tuberculosis	IUCRJ	10.1107/S2052252521006199
*BioMAX	Cellini Andrea, Wahlgren Weixiao Yuan, Henry Leocadie, Pandey Suraj, Ghosh Swagatha, Castillon Leticia, Claesson Elin, Takala Heikki, Kubel Joachim, Nimmrich Amke, Kuznetsova Valentyna, Nango Eriko, Iwata So, Owada Shigeki, Stojkovic Emina A., Schmidt Marius, Ihalaainen Janne A., Westenhoff Sebastian	The three-dimensional structure of Drosophila melanogaster (6-4) photolyase at room temperature	ACTA CRYSTALLOGRAPHICA SECTION D-STRUCTURAL BIOLOGY	10.1107/S2059798321005830
*BioMAX	Kelpas Vinardas, Caldararu Octav, Blakeley Matthew P., Coquelle Nicolas, Wierenga Rikkert K., Ryde Ulf, von Wachenfeldt Claes, Oksanen Esko	Neutron structures of Leishmania mexicana triosephosphate isomerase in complex with reaction-intermediate mimics shed light on the proton-shuttling steps	IUCRJ	10.1107/S2052252521004619
*BioMAX	Mazurkewich Scott, Seveso Andrea, Huttner Silvia, Branden Gisela, Larsbrink Johan	Structure of a C1/C4-oxidizing AA9 lytic polysaccharide monooxygenase from the thermophilic fungus Malbranchea cinnamomea	ACTA CRYSTALLOGRAPHICA SECTION D-STRUCTURAL BIOLOGY	10.1107/S2059798321006628

BEAMLINE(S)	AUTHORLIST	TITLE	JOURNAL	DOI
*BioMAX	Cassidy Andrew, Jorgensen Mads R. V, Glavic Artur, Lauter Valeria, Plekan Oksana, Field David	A mechanism for ageing in a deeply supercooled molecular glass	CHEMICAL COMMUNICATIONS	10.1039/d1cc01639c
*BioMAX	Zhang SM, Rehling D, Jemth A-S, Throup A, Landazuri N, Almlof I, Goettmann M, Valerie NCK, Borhade SR, Wakchaure P, Page BDG, Desroses M, Homan EJ, Scobie M, Rudd SG, Warpman Berglund U, Soderberg-Naucler C, Stenmark P, Helleday T	NUDT15-mediated hydrolysis limits the efficacy of anti-HCMV drug ganciclovir	CELL CHEMICAL BIOLOGY	doi: 10.1016/j.chembiol.2021.06.001
BioMAX	Koruz K, Murray AB, Mahon, BP, Hopkins JB, Knecht W, McKenna R, Fisher SZ	Biophysical Characterization of Cancer-Related Carbonic Anhydrase IX	INTERNATIONAL JOURNAL OF MOLECULAR SCIENCES	10.3390/ijms21155277
BioMAX	Krska D, Mazurkewich S, Brown HA, Theibich Y, Poulsen JN, Morris AL, Koropatkin NM, Lo Leggio L, Larsbrink J	Structural and Functional Analysis of a Multimodular Hyperthermostable Xylanase-Glucuronoyl Esterase from Caldicellulosiruptor kristjanssonii .	BIOCHEMISTRY	doi: 10.1021/acs.biochem.1c00305
*BioMAX	Lima GMA, Jagudin E, Talibov VO, Benz LS, Marullo C, Barthel T, Wollenhaupt J, Weiss MS, Mueller U	FragMAXapp: crystallographic fragment-screening data-analysis and project-management system	ACTA CRYSTALLOGRAPHICA SECTION D	10.1107/S2059798321003818
BioMAX	Fitzgerald EA, Butko MT, Boronat P, Cederfelt D, Abramsson M, Ludviksdottir H, van Muijlwijk-Koezen J, de Esch IJP, Dobritzsch D, Young T, Danielson UH	Discovery of fragments inducing conformational effects in dynamic proteins using a second-harmonic generation biosensor	RSC ADVANCES	
*BioMAX	Ramos J, Lau V, Haertlein M, Erba EB, McAuley KE, Forsyth VT, Mossou E, Larsen S, Langkilde AE	Structural insights into protein folding, stability and activity using in vivo perdeuteration of hen egg-white lysozyme	IUCRI	10.1107/S2052252521001299
*BioMAX	Haddad Momeni M, Fredslund F, Bissaro B, Raji O, Vuong TV, Meier S, Nielsen TS, Lombard V, Guigliarelli B, Biaso F, Haon M, Grisel S, Henrissat B, Welner DH, Master ER, Berrin JG, Abou Hachem M	Discovery of fungal oligosaccharide-oxidising flavo-enzymes with previously unknown substrates, redox-activity profiles and interplay with LPMOs.	NATURE COMMUNICATIONS	10.1038/s41467-021-22372-0
BioMAX	Sprenger J, Carey J, Schulz A, Drouard F, L Lawson C, von Wachenfeldt C, Linse S, Lo Leggio L	Guest-protein incorporation into solvent channels of a protein host crystal (hostal)	ACTA CRYSTALLOGRAPHICA SECTION D	10.1107/S2059798321001078
*BioMAX	Schriever K, Saenz-Mendez P, Rudraraja RS, Hendrikse NM, Hudson EP, Biundo A, Schnell R, Syren PO	Engineering of Ancestors as a Tool to Elucidate Structure, Mechanism, and Specificity of Extant Terpene Cyclase.	JOURNAL OF THE AMERICAN CHEMICAL SOCIETY	10.1021/jacs.0c10214

BEAMLINE(S)	AUTHORLIST	TITLE	JOURNAL	DOI
*BioMAX	Martelli G, Pessatti TB, Steiner EM, Cirillo M, Caso C, Bisognin F, Landreh M, Monte PD, Giacomini D, Schnell R	N-Thio-beta-lactams targeting L,D-transpeptidase-2, with activity against drug-resistant strains of Mycobacterium tuberculosis.	CELL CHEMICAL BIOLOGY	10.1016/j.chembiol.2021.03.008
*BioMAX	Pallesen JS, Narayanan D, Tran KT, Solbak SM, Marseglia G, Sørensen LME, Høj LJ, Munafò F, Carmona RMC, Garcia AD, Desu HL, Brambilla R, Johansen TN, Popowicz GM, Sattler M, Gajhede M, Bach A	Deconstructing Noncovalent Kelch-like ECH-Associated Protein 1 (Keap1) Inhibitors into Fragments to Reconstruct New Potent Compounds.	JOURNAL OF MEDICINAL CHEMISTRY	10.1021/acs.jmedchem.0c02094
BioMAX	Rehling D, Zhang SM, Jemth AS, Koolmeister T, Throup A, Wallner O, Scaletti E, Moriyama T, Nishii R, Davies J, Desroses M, Rudd SG, Scobie M, Homan E, Berglund UW, Yang JJ, Helleday T, Stenmark P	Crystal structures of NUDT15 variants enabled by a potent inhibitor reveal the structural basis for thiopurine sensitivity.	JOURNAL OF BIOLOGICAL CHEMISTRY	10.1016/j.jbc.2021.100568
BioMAX	Fragment-Based Discovery of Novel Allosteric MEK1 Binders	Fragment-Based Discovery of Novel Allosteric MEK1 Binders	ACS MEDICINAL CHEMISTRY LETTERS	10.1021/acsmedchemlett.0c00563
BioMAX	Kmezic C, Mazurkewich S, Meents T, McKee L, Idstrom A, Armeni M, Savolainen O, Branden G, Larsbrink J	polysaccharide utilization locus from the gut bacterium Dysgonomonas mossii encodes functionally distinct carbohydrate esterases.	JOURNAL OF BIOLOGICAL CHEMISTRY	10.1016/j.jbc.2021.100500
BioMAX	Heidler Thomas V., Ernits Karin, Ziolkowska Agnieszka, Claesson Rolf, Persson Karina	Porphyromonas gingivalis fimbrial protein Mfa5 contains a von Willebrand factor domain and an intramolecular isopeptide	COMMUNICATIONS BIOLOGY	10.1038/s42003-020-01621-w
BioMAX	Kalyani DC, Reichenbach T, Aspeborg H, Divne C	A homodimeric bacterial exo-beta-1,3-glucanase derived from moose rumen microbiome shows a structural framework similar to yeast exo-beta-1,3-glucanases.	ENZYME AND MICROBIAL TECHNOLOGY	10.1016/j.enzmictec.2020.109723
BioMAX	Talibov VO, Fabini E, Fitzgerald E, Tedesco D, Eriksson D, Talu MJ, Rachman MM, Mihalic F, Manoni E, Naldi M, Sanese P, Forte G, Signorile ML, Barril X, Simone C, Bartolini M, Dobritzsch D, Rio AD, Danielson UH	Discovery of an allosteric ligand binding site in SMYD3 lysine methyltransferase	CHEMBIOCHEM	10.1002/cbic.202000736
*BioMAX	Hasan M, Khakzad H, Happonen L, Sundin A, Unge J, Mueller U, Malmström J, Westergren-Thorsson G, Malmström L, Ellervik U, Malmström A, Tykesson E	The structure of human dermatan sulfate epimerase 1 emphasizes the importance of C5-epimerization of glucuronic acid in higher organisms	CHEMICAL SCIENCE	10.1039/D0SC05971D
BioMAX	Vella Peter, Rudraraju Reshma Srilakshmi, Lundback Thomas, Axelsson Hanna, Almqvist Helena, Vallin Michaela, Schneider Gunter, Schnell Robert	A FabG inhibitor targeting an allosteric binding site inhibits several orthologs from Gram-negative ESKAPE pathogens	BIOORGANIC & MEDICINAL CHEMISTRY	10.1016/j.bmc.2020.115898

BEAMLINE(S)	AUTHORLIST	TITLE	JOURNAL	DOI
Bloch	Yi HEMIAN, Huang ZENGLE, Shi WUJUN, Min LUJIN, Wu RUI, POLLEY C, Zhang RUOXI, Zhao YI-FAN, Zhou LING-JIE, Adell J, Gui XIN, Xie WEIWEI, Chan MOSES H W, Mao ZHIQIANG, Wang ZHIJUN, Wu WEIDA, Chang CUI-ZU	Surface charge induced Dirac band splitting in a charge density wave material (TaSe4)2I	PHYSICAL REVIEW RESEARCH	
Bloch	Schulz S, Vyazovskaya A Yu, Poelchen G, Generalov A, Güttler M, Mende M, Danzenbächer S, Otrokov MM, Balasubramanian T, Polley C, Chulkov EV, Laubschat C, Peters M, Kliemt K, Krellner C, Usachov D Yu, Vyalikh DV	Classical and cubic Rashba effect in the presence of in-plane 4f magnetism at the iridium silicide surface of the antiferromagnet GdIr2Si2	PHYSICAL REVIEW B	10.1103/PhysRevB.103.035123
FemtoMAX BioMAX	Jensen M, Ahlberg Gagner V, Cabello Sanchez J, Bengtsson A U J, Ekstrom J C, Bjorg Ulfarsdottir T, Garcia-Bonete M J, Jurgilaitis A, Kroon D, Pham V T, Checcia S, Coudert-Alteirac H, Schewa S, Rossle M, Rodilla H, Stake J, Zhaunerchyk V, Larsson J, Katona G	High-resolution macromolecular crystallography at the FemtoMAX beamline with time-over-threshold photon detection	J. SYNCHROTRON RADIATION	10.1107/S1600577520014599
FinEstBeAMS Balder	Khanin Vasilii, Venevtsev Ivan, Chernenko Kirill, Pankratov Vladimir, Klementiev Konstantin, van Swieten Thomas, van Bunningen Arnoldus J., Vruble Ivan, Shendrik Roman, Ronda Cees, Rodnyi Piotr, Meijerink Andries	Exciton interaction with Ce3+ and Ce4+ ions in (LuGd)(3)(Ga, Al)(5)O-12 ceramics	JOURNAL OF LUMINESCENCE	10.1016/j.jlumin.2021.118150
FinEstBeAMS	Chernenko K, Kivimäki A, Pärna R, Wang W, Sankari R, Leandersson M, Tarawneh H, Pankratov V, Kook M, Kuk E, Reisberg L, Urpelainen S, Käämbre T, Siewert F, Gwalt G, Sokolov A, Lemke S, Alimov S, Knedel J, Kutz O, Seliger T, Valden M, Hirsimäki M, Kirm M, Huttula M	Performance and characterization of the FinEstBeAMS beamline at the MAX IV Laboratory	JOURNAL OF SYNCHROTRON RADIATION	10.1107/S1600577521006032
FinEstBeAMS	Gundacker S., Pots R. H., Nepomnyashchikh A., Radzhabov E., Shendrik R., Omelkov S., Kirm M., Acerbi F., Capasso M., Paternoster G., Mazzi A., Gola A., Chen J., Auffray E.	Vacuum ultraviolet silicon photomultipliers applied to BaF2 cross-luminescence detection for high-rate ultrafast timing applications	PHYSICS IN MEDICINE AND BIOLOGY	10.1088/1361-6560/abf476
FinEstBeAMS	Pelimanni E, Hautala L, Hans A, Kivimäki A, Kook M, Küstner-Wetekam C, Marder L, Patanen M, Huttula M	Core and Valence Level Photoelectron Spectroscopy of Nanosolvated KCl	JOURNAL OF PHYSICAL CHEMISTRY A	10.1021/acs.jpca.1c01539
FlexPES	Temperton R, Hart J, Verykokkos N, Gibson E, OShea J	A soft x-ray probe of a titania photoelectrode sensitized with a triphenylamine dye	JOURNAL OF CHEMICAL PHYSICS	10.1063/5.0050531

BEAMLINE(S)	AUTHORLIST	TITLE	JOURNAL	DOI
FlexPES	Sterling Cody M., Kamal Chinnathambi, Man Gabriel J., Nayak Pabitra K., Simonov Konstantin A., Svanstrom Sebastian, Garcia-Fernandez Alberto, Huthwelker Thomas, Cappel Ute B., Butorin Sergei M., Rensmo Hakan, Odelius Michael	Sensitivity of Nitrogen K-Edge X-ray Absorption to Halide Substitution and Thermal Fluctuations in Methylammonium Lead-Halide Perovskites	JOURNAL OF PHYSICAL CHEMISTRY C	10.1021/acs.jpcc.1c02017
*FlexPES	Athle R, Persson AEO, Irish A, Menon H, Timm R, Borg M	Effects of TiN Top Electrode Texturing on Ferroelectricity in Hf1-xZrxO2	ACS APPLIED MATERIALS & INTERFACES	10.1021/acsami.1c01734
FlexPES	Abid AR, Reinhardt M, Boudjemia N, Pelimanni E, Milosavljevic AR, Saak CM, Huttula M, Björneholm O, Patanen M	The effect of relative humidity on CaCl2 nanoparticles studied by soft X-ray absorption spectroscopy	RSC ADVANCES	10.1039/d0ra08943e
*HIPPIE	Kallquist Ida, Lindgren Fredrik, Lee Ming-Tao, Shavorskiy Andrey, Edstrom Kristina, Rensmo Hakan, Nyholm Leif, Maibach Julia, Hahlin Maria	<i>Probing Electrochemical Potential Differences over the Solid/Liquid Interface in Li-Ion Battery Model Systems</i>	ACS APPLIED MATERIALS & INTERFACES	10.1002/aenm.202003460
*HIPPIE	Ivashenko O, Johansson N, Pettersen C, Jensen M, Zheng J, Schnadt J, Sjöstad AO	How Surface Species Drive Product Distribution during Ammonia Oxidation: An STM and Operando APXPS Study	ACS CATALYSIS	10.1021/acscatal.1c00956
*HIPPIE	Wang C, Tissot H, Soldemo M, Lu J, Weissenrieder J	Inverse single-site Fe1(OH)X/Pt(111) model catalyst for preferential oxidation of CO in H2	NANO RESEARCH	10.1007/s12274-021-3551-4
*HIPPIE	Stromsheim MD, Svenum IH, Mahmoodinia M, Boix V, Knudsen J, Vervik HJ	Segregation dynamics of a Pd-Ag surface during CO oxidation investigated by NAP-XPS	CATALYSIS TODAY	10.1016/j.cattod.2021.02.007
HIPPIE	Zhu Suyun, Scardamaglia Mattia, Kundsén Jan, Sankari Rami, Tarawneh Hamed, Temperton Robert, Pickworth Louisa, Cavalca Filippo, Wang Chunlei, Tissot Heloise, Weissenrieder Jonas, Hagman Benjamin, Gustafson Johan, Kaya Sarp, Lindgren Fredrik, Kallquist Ida, Maibach Julia, Hahlin Maria, Boix Virginia, Gallo Tamiere, Rehman Foqia, D'Acunto Giulio, Schnadt Joachim, Shavorskiy Andrey	HIPPIE: a new platform for ambient-pressure X-ray photoelectron spectroscopy at the MAX IV Laboratory	JOURNAL OF SYNCHROTRON RADIATION	10.1107/S160057752100103X
*HIPPIE	Persson N, Ram MS, D'acunto G, Liu Y, Benter S, Pan J, Li Z, Borg M, Mikkelsen A, Wernersson LE, Timm R	Tuning oxygen vacancies and resistive switching properties in ultra-thin HfO2 RRAM via TiN bottom electrode and interface engineering	APPLIED SURFACE SCIENCE	10.1016/j.apsusc.2021.149386

BEAMLINE(S)	AUTHORLIST	TITLE	JOURNAL	DOI
*HIPPIE	Divins NJ, Kordus D, Timoshenko J, Sinev I, Zegkinoglou I, Bergmann A, Chee SW, Widrinna S, Karslioğlu O, Mistry H, Luna ML, Zhong JQ, Hoffman AS, Boubnov A, Boscoboinik JA, Heggen M, Dunin-Borkowski RE, Bare SR, Cuenya BR	Operando high-pressure investigation of size-controlled CuZn catalysts for the methanol synthesis reaction	NATURE COMMUNICATIONS	10.1038/s41467-021-21604-7
*HIPPIE	Pramhaas Verena, Roiaz Matteo, Bosio Noemi, Corva Manuel, Rameshan Christoph, Vesselli Erik, Gronbeck Henrik, Rupprechter Guenther	Interplay between CO Disproportionation and Oxidation: On the Origin of the CO Reaction Onset on Atomic Layer Deposition-Grown Pt/ZrO ₂ Model Catalysts	ACS CATALYSIS	10.1021/acscatal.0c03974
*HIPPIE	Scardamaglia M, Boix V, D'acunto G, Struzzi C, Reckinger N, Chen X, Sivayogimath A, Booth T, Knudsen J	Comparative study of copper oxidation protection with graphene and hexagonal boron nitride	CARBON	10.1016/j.carbon.2020.09.021
*MAXPEEM STM- Laboratory	Thi Thuy Nhung Nguyen, de Vries Niels, Karakachian Hrag, Gruschwitz Markus, Aprojanz Johannes, Zakharov Alexei A., Polley Craig, Balasubramanian Thiagarajan, Starke Ulrich, Flipse Cornelis F. J., Tegenkamp Christoph	Topological Surface State in Epitaxial Zigzag Graphene Nanoribbons	NANO LETTERS	10.1021/acs.nanolett.0c05013
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*MAXPEEM	Boix Virginia, Struzzi Claudia, Gallo Tamires, Johansson Niclas, D'Acunto Giulio, Yong Zhihua, Zakharov Alexei, Li Zheshen, Schnadt Joachim, Mikkelsen Anders, Knudsen Jan	Area-selective Electron-beam induced deposition of Amorphous-BN _x on graphene	APPLIED SURFACE SCIENCE	10.1016/j.apsusc.2021.149806
MAXPEEM	Singh Harishchandra, Alatarvas Tuomas, Kistanov Andrey A., Aravindh S. Assa, Wang Shubo, Zhu Lin, Sarpi Brice, Niu Yuran, Zakharov Alexei, de Groot F. M. F., Huttula Marko, Cao Wei, Fabritius Timo	Unveiling interactions of non-metallic inclusions within advanced ultra-high-strength steel: A spectro-microscopic determination and first-principles elucidation	SCRIPTA MATERIALIA	10.1016/j.scriptamat.2021.113791
I311-PEEM MAXPEEM	Stanishev Vallery, Armakavicius Nerijus, Bouhafs Chamseddine, Coletti Camilla, Kuhne Philipp, Ivanov Ivan G., Zakharov Alexei A., Yakimova Rositsa, Darakchieva Vanya	Critical View on Buffer Layer Formation and Monolayer Graphene Properties in High-Temperature Sublimation	APPLIED SCIENCES-BASEL	10.3390/app11041891

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I311-PEEM MAXPEEM	Selegard Linnea, Skallberg Andreas, Zakharov Alexei, Abrikossova Natalia, Uvdal Kajsa	Step by step rare-earth catalyzed SiO _x annealing and simultaneous formation of Europium- silicide by low coverage of Eu doped Gd ₂ O ₃ nanoparticles	SURFACE SCIENCE	10.1016/j.susc.2020.121743
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*NanoMAX Balder	Gustavsson Nadja, Paulus Agnes, Martinsson Isak, Engdahl Anders, Medjoubi Kadda, Klementiev Konstantin, Somogyi Andrea, Deierborg Tomas, Borondics Ferenc, Gouras Gunnar K., Klementieva Oxana	Correlative optical photothermal infrared and X-ray fluorescence for chemical imaging of trace elements and relevant molecular structures directly in neurons	LIGHT-SCIENCE & APPLICATIONS	doi:10.1038/s41377-021-00590-x
NanoMAX	Langer Max, Zhang Yuhe, Figueirinhas Diogo, Forien Jean-Baptiste, Mom Kannara, Mouton Claire, Mokso Rajmund, Villanueva-Perez Pablo	PyPhase - a Python package for X-ray phase imaging	JOURNAL OF SYNCHROTRON RADIATION	doi:10.1107/S1600577521004951
NanoMAX	Björling A, Weninger C, Kahnt M, Kalbfleisch S, Johansson U, Sala S, Lenrick F, Thånell K	Contrast – a lightweight Python framework for beamline orchestration and data acquisition	JOURNAL OF SYNCHROTRON RADIATION	10.1088/1367-2630/ac02e0
NanoMAX	Dzhigaev D, Zhang Z, A B Marçal L, Sala S, Björling A, Mikkelsen A, Wallentin J	Three-dimensional coherent x-ray diffraction imaging of ferroelastic domains in single CsPbBr ₃ perovskite nanoparticles	NEW JOURNAL OF PHYSICS	10.1088/1367-2630/ac02e0
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*NanoMAX	Nukala P, Ahmadi M, Wei Y, Graaf SD, Stylianidis E, Chakraborty T, Matzen S, Zandbergen HW, Björling A, Mannix D, Carbone D, Kooi B, Noheda B	Reversible oxygen migration and phase transitions in hafnia-based ferroelectric devices	Science	10.1126/science.abf3789
NanoMAX	Nissila Tuukka, Wei Jiayuan, Geng Shiyu, Teleman Anita, Oksman Kristiina	Ice-Templated Cellulose Nanofiber Filaments as a Reinforcement Material in Epoxy Composites	NANOMATERIALS	10.3390/nano11020490

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Species	Redekop Evgeniy A., Johansson Niclas, Kokkonen Esko, Urpelainen Samuli, da Silva Felipe Lopes, Kaipio Mikko, Nieminen Heta-Elisa, Rehman Foqia, Miikkulainen Ville, Ritala Mikko, Olsbye Unni	Synchronizing gas injections and time-resolved data acquisition for perturbation-enhanced APXPS experiments	REVIEW OF SCIENTIFIC INSTRUMENTS	10.1063/5.0039957
*Species	Lin Jack J., Raj Kamal R., Wang Stella, Kokkonen Esko, Mikkela Mikko-Heikki, Urpelainen Samuli, Prisle Nonne L.	Pre-deliqescent water uptake in deposited nanoparticles observed with in situ ambient pressure X-ray photoelectron spectroscopy	ATMOSPHERIC CHEMISTRY AND PHYSICS	10.5194/acp-21-4709-2021
Species	Kokkonen Esko, da Silva Felipe Lopes, Mikkela Mikko-Heikki, Johansson Niclas, Huang Shih-Wen, Lee Jenn-Min, Andersson Margit, Bartalesi Antonio, Reinecke Benjamin N., Handrup Karsten, Tarawneh Hamed, Sankari Rami, Knudsen Jan, Schnadt Joachim, Sathe Conny, Urpelainen Samuli	Upgrade of the SPECIES beamline at the MAX IV Laboratory	JOURNAL OF SYNCHROTRON RADIATION	10.1107/S1600577521000564
Veritas Species	Agaker Marcus, Englund Carl-Johan, Sjoblom Peter, Wassdahl Nial, Fredriksson Pierre, Sathe Conny	An ultra-high-stability four-axis ultra-high-vacuum sample manipulator	JOURNAL OF SYNCHROTRON RADIATION	10.1107/S1600577521004859
Accelerator	Qin Weilun, Curbis Francesca, Andersson Joel, Goryashko Vitaliy, Isaksson Lennart, Kyle Billy, Lindau Filip, Mansten Erik, Pop Mihai, Salen Peter, Tarawneh Hamed, Tavares Pedro F., Thorin Sara, Vorozhtsov Alexey, Werin Sverker	<i>The FEL in the SXL project at MAX IV</i>	JOURNAL OF SYNCHROTRON RADIATION	doi:10.1107/S1600577521003465
Accelerator	Afzali-Far B., Andersson A., Zhou K., Malmgren M.	Data analysis, spatial metrology network, and precision realignment of the entire MAX IV linear accelerator	NUCLEAR INSTRUMENTS & METHODS IN PHYSICS RESEARCH SECTION A-ACCELERATORS SPECTROMETERS DETECTORS AND ASSOCIATED EQUIPMENT	10.1016/j.nima.2021.165267
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D1011	Kamal C., Stenberg Nader, Walle Lars Erik, Ragazzon Davide, Borg Anne, Uvdal Per, Skorodumova Natalia V, Odellius Michael, Sandell Anders	Core-Level Binding Energy Reveals Hydrogen Bonding Configurations of Water Adsorbed on TiO ₂ (110) Surface	PHYSICAL REVIEW LETTERS	10.1103/PhysRevLett.126.016102

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I811	Bendz D, Tiberg C, Kleja DB	Mineralogical characterization and speciation of sulfur, zinc and lead in pyrite cinder from Bergvik, Sweden	APPLIED GEOCHEMISTRY	10.1016/j.apgeochem.2021.105010
*I811	Tiberg Charlotta, Sjostedt Carin, Fedje Karin Karlfeldt	Speciation of Cu and Zn in bottom ash from solid waste incineration studied by XAS, XRD, and geochemical modelling	WASTE MANAGEMENT	10.1016/j.wasman.2020.10.023
I911-4	Barciszewski J, Szpotkowski K, Wiśniewski J, Kołodziejczyk R, Rakus D, Dzugaj MJA	Structural studies of human muscle FBPase	ACTA BIOCHIMICA POLONICA	10.18388/abp.2020_5554
I911-4 MX	Kuktaite Ramune, Repo-Carrasco-Valencia Ritva, de Mendoza Cesar C. H., Plivelic Tomas S., Hall Stephen, Johansson Eva	Innovatively processed quinoa (Chenopodium quinoa Willd.) food: chemistry, structure and end-use characteristics	JOURNAL OF THE SCIENCE OF FOOD AND AGRICULTURE	10.1002/jsfa.11214
*I911-4	Helvig SY, Woythe L, Pham S, Bor G, Andersen H, Moghimi SM, Yaghmur A	A Structurally Diverse Library of Glycerol Monooleate/Oleic Acid Non-Lamellar Liquid Crystalline Nanodispersions Stabilized with Nonionic Methoxypoly(ethylene glycol) (mPEG)-Lipids Showing Variable Complement Activation Properties	JOURNAL OF COLLOID AND INTERFACE SCIENCE	10.1016/j.jcis.2020.08.085
MX	Zhao J, Tandrup T, Bissaro B, Barbe S, Poulsen JN, Andre I, Dumon C, Lo Leggio L, O'Donohue MJ, Faure R	Probing the determinants of the transglycosylation/hydrolysis partition in a retaining alpha-L-arabinofuranosidase	NEW BIOTECHNOLOGY	10.1016/j.nbt.2021.01.008
*MX	Beckmann R, Jensen K, Fenn S, Speck J, Krause K, Meier A, Röth M, Fauser S, Kimbung R, Logan DT, Steegmaier M, Kettenberger H	DutaFabs are engineered therapeutic Fab fragments that can bind two targets simultaneously	NATURE COMMUNICATIONS	10.1038/s41467-021-20949-3