DNR: STYR 2020/725-3

Status of beamlines at MAX IV

January 2021

Status of MAX IV

The MAX IV accelerator facility is performing well and delivering X-ray light to fourteen beamlines, ten of which are in general user operation and four in commissioning. The Swedish radiation safety authority granted a permit for MAX IV to operate the accelerator facility with a 10 Hz injection rate. Commissioning and a radiation survey of the linac and two rings was then carried out in this mode. The linac now delivers x-rays at a 10 Hz repetition rate routinely to the short pulse facility, enabling the FemtoMAX beamline to start general user operations in early 2021.

The Covid-19 pandemic continues prevent many users from coming to MAX IV for their scheduled beamtime. However, MAX IV supported a substantial number of user experiments by mail-in services and remote operation. We aim for as few users as possible losing their awarded beamtime and have adjusted the schedule accordingly. Exactly how many experiments will be affected by the Covid-19 situation is difficult to judge at this time because the situation is still changing rapidly. In order to compensate users for lost beamtime the autumn 2020 proposal call only includes new capabilities and beamlines delivered since the spring 2020 call. The rest of the autumn call is merged with the spring 2021 call. MAX IV's policy regarding beamtime affected by Covid-19 was communicated to all users.

MAX IV's policy regarding on-site visits by users during the pandemic closely follows Lund University's and the Swedish authorities' regulations and guidelines. Users are encouraged to utilise remote or mail-in access when possible and are limited to five people per user group per visit. Until the pandemic situation improves, MAX IV does not allow study visits, collaboration visits, training activities or other external meetings or workshops on its premises.

The MAX IV Central Project Office continues to work closely with resource teams to monitor potential project delays, including pandemic-related delays. No significant installation activities are currently stopped due to the pandemic.

Minor accelerator and beamline installation and maintenance activities were performed during the regular 2020-2021 winter shutdown, which lasted 2 weeks. In addition to infrastructure maintenance, preparatory work for the installation of the ForMAX and MicroMAX beamlines was carried out.

Appendix 1 lists the current status of individual beamlines with techniques currently available to users on beamlines in operation and estimated dates to deliver baseline capabilities for beamlines in commissioning or under construction. This list is based on updated status information from each beamline, the anticipated availability of resources for installation and commissioning of the beamlines, and prioritisation by MAX IV Management based on the above and expected user need.

Science impact and outlook

MAX IV aims to deliver capabilities that will enable impactful science from Day 1. MAX IV has adopted a strategy of early engagement with the community and initially serving many users in parallel with baseline capabilities, anticipating this approach will be more likely to deliver impactful science than completing the full scope on only a few beamlines.

This strategy is now showing results. Appendix 2 lists 2020 publications from MAX IV and MAX-lab beamlines that have been registered to date in our Digital User Office system. Although the list is incomplete as not all publications have been registered yet, the number of publications in 2020 from MAX IV is much larger than that from MAX-lab. This growth is healthy and in line with the

status of the facility. More importantly, the number of high impact papers produced by MAX IV (highlighted in Appendix 2) is also increasing. For example, papers produced by BioMAX this year were published in journals such as *ACS Catalysis* and *Nature Communications* and ones produced by NanoMAX appeared in *Advanced Science*, *Nano Research* and *Physical Review Letters*. The fast access call MAX IV opened to encourage research related to the SARS-CoV-2 virus as well as other urgent medical research delivered its first publication, appearing in the *International Journal of Molecular Sciences.* Registered MAX IV and MAX-lab publications are available at https://www.maxiv.lu.se/science/publications/.

Appendix 1
Current status of individual beamlines

Status of beamlines at MAX IV

January 2021

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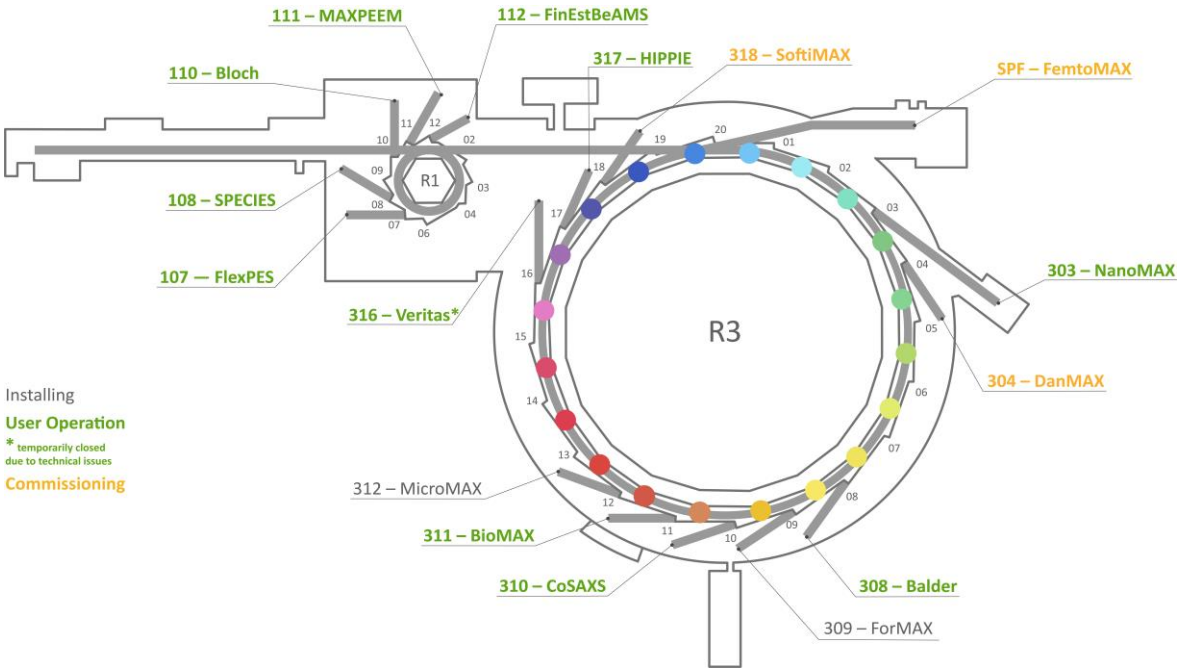
Current status of individual beamlines



Balder

Balder is in general user operation.

Techniques available to general users
X-ray Absorption Near Edge Structure (XANES) and Extended X-ray Absorption Fine Structure (EXAFS) in transmission, continuous scanning down to 30 sec/EXAFS
XANES and EXAFS in fluorescence with 7 element SDD, continuous scanning down to 30 sec/EXAFS

Techniques available to commissioning experts
X-ray Emission Spectroscopy (XES), expert mode with limited angular range (~Cu K α).

BioMAX

BioMAX is in general user operation.

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 microns and defining aperture of 5, 10, 20 or 50 microns
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
Single Anamolous Diffraction (SAD) and Multiple Anamolous Diffraction (MAD) experiments
Automated data integration, scaling and merging. Offline remote access for manual data processsing.
Serial crystallography experiments using a high viscosity extrusion (HVE) injector, fixed target scan using the MD3 diffractometer

Element identification by X-ray Fluorescence.
Remote data collection.
Fragment-based drug screening.

Bloch

Bloch is in general user operation.

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 10-1000eV (peak flux and resolution 15-200eV)
Online Scanning tunneling microscopy (STM), 50K - 300K

CoSAXS

CoSAXS is general user operation

Techniques available to general users
Solution/soft matter conventional Small Angle X-ray Scattering (SAXS) and Bio SAXS Sample environment: Base line configuration, heating stages, user implementation

Techniques available to commissioning experts
Time resolved experiments
Wide Angle X-ray Scattering (WAXS)
X-ray Photon Correlation Spectroscopy (XPCS)
Magenetics systems

DanMAX

Commissioning of the powder X-ray diffraction(PXRD) station is ongoing.

The dates below apply for the PXRD station unfortunately we have a 6 month delay towards First general users. Main reasons for the delay are technical issues with the multilayer mirror (Indium Gallium spillage during installation caused by the manufacturer , water leakage and Covid-19 travel restrictions cancelled the installation and support work.) The Imaging station will follow approximately six months behind.

- First expert users: Week 5
- First general users: Q3 2021

Techniques available to commissioning experts
X-ray powder diffraction
Time resolve studies
Low temperature studies
In situ battery set up

FemtoMAX

Commissioning activities and feasibility tests with expert users at 10 Hz repetition rate has started.

- Commissioning at 10 Hz: on-going
- First general users: Q1 2021.

FinEstBeAMS

FinEstBeAMS is in general user operation.

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 1.4um-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-Photoion Coincidence (PEPICO) spectroscopy of gaseous samples. (GPES) X-ray photoelectron spectroscopy of surfaces and interfaces in the UHV. (SSES) Angle-resolved photoelectron spectroscopy of 2D materials and condensed matter physics. (SSES)

FlexPES

FlexPES is in general user operation.

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 um to 150x40 um 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 the following 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 experiments on cold beams of atomic and molecular gases - Gas cell for PES experiments on atomic and molecular gases

ForMAX

Commissioning of ForMAX have been delayed from Q2 2021 to Q3 2021 due to a delay in the delivery of insertion device. There is risk of delay due to travel restrictions (Covid-19) which may delay the SAT in Q2, large delays on SAT will delay the ID installation and the time of arrival of first users.

- Start of commissioning: Q3 2021

- First expert users: Q3 2021
- First general users: Q4 2022

HIPPIE

HIPPIE is in general user operation.

Techniques available to general users
Catalysis Cell Allows Ambient Pressure X-ray Photoemission Spectroscopy (APXPS) of a solid-gas interface up to 10 mbar. Used for catalysis and surface science experiments
Polarization modulation-infrared reflection-adsorption spectroscopy (PM-IRRAS) Allows APXPS and Fourier Transform Infrared Spectroscopy (FTIR) on the same spot up to 1 mbar. Used for catalysis and surface science experiments
Liquid/Electrochemistry Cell Allows APXPS of a solid-liquid (dip-and-pull setup) and gas-liquid (liquid jet setup) interfaces up to 30 mbar for electrochemistry, energy, environmental, and atmospheric science experiments.

MAXPEEM

MAXPEEM is in general user operation.

Techniques available to general users
Spectroscopic PhotoElectron and Low Energy Electron Microscope (SPELEEM) in the soft X-ray range

MicroMAX

The MicroMAX project timeline has shifted because of a delay in the procurement of essential optical components.. The delay has however increased the risk for delaying the first general user date. The Novo Nordisk Foundation is informed about the situation.

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

NanoMAX

The NanoMAX KB-station is in general user operation.

Techniques available to general users
Scanning X-ray diffraction and coherent imaging in the Bragg geometry
Forward ptychography and Coherent Diffraction Imaging (CDI)
X-Ray Fluorescence mapping in 2D
Forward ptycho-tomography (under development, not all samples are suitable, beamline team must be contacted to discuss feasibility before proposal submission)

The development work of the NanoMAX Fresnel Zone Plate (FZP)-end station is on-going, with tests of a prototype sample scanner and finalization of the design for coarse and fine scan stages planned for summer.

- Start of commissioning: Q3 2021
- First expert users: Q3 2021

- First general users: Q4 2022

SoftiMAX

Commissioning of the first branch line of SoftiMAX is ongoing and first successful experiments have been made. There is a delay due to point corrosion on mirror water inlet. Work towards the conceptual design review (CDR) started for the second branch.

- First expert users: Q1/Q2 2021
- First general users: Q3 2021

Techniques available to commissioning experts
Scanning Transmission X-ray Microscopy (STXM)
Forward ptychography (Basic)
X-ray Magnetic Circular Dichroism (XMCD) Microscopy (Basic)
X-ray Fluorescence (XRF) Mapping

SPECIES

SPECIES is in general user operation.

Techniques available to general users
APXPS using the standard cell Available for APXPS experiments up to 20 mbar. Used for catalysis, oxidation studies, and surface science experiments.
APXPS using the ALD cell Available for in-situ ALD experiments for pressures up to 20 mbar.
Resonant Inelastic X-ray Scattering (RIXS) using the “GRACE” spectrometer (emission energy range 50-650 eV, only linear polarization horizontally and vertically). Solid samples only. Liquid nitrogensample cooling available, 4-axis manipulator.

VERITAS

Commissioning of the Veritas A line branch and general user operation of the Veritas B branch line (open port branch) are paused due to corrosion in the cooling water connections to both internally cooled mirrors. The cause of the corrosion is being investigated intensively. Until a solution is found, it is not yet clear when commissioning of the A branch and user operations on the B-branch can be resumed. General user access for the A branch is currently delayed until Q3 2021.

Techniques available to general users
General user operations are temporarily paused on the B branch

- First general users (A branch): Q3 2021

Appendix 2
2020 publications

Status of beamlines at MAX IV

January 2021

BEAMLINE(S)	AUTHORLIST	TITLE	JOURNAL	DOI
Balder	Persson Ingmar, Lundberg Daniel, Bajnoczi Eva G., Klementiev Konstantin, Just Justus, Clauss Kajsa G. V. Sigfridsson	EXAFS Study on the Coordination Chemistry of the Solvated Copper(II) Ion in a Series of Oxygen Donor Solvents	INORGANIC CHEMISTRY	10.1021/acs.inorgchem.0c00403
Balder	Simonarson Gunnar, Calcagno Giulio, Lotsari Antiope, Palmqvist Anders E. C.	Electrochemical and structural characterization of lithiation in spray deposited ordered mesoporous titania as an anode for Li ion batteries	RSC ADVANCES	10.1039/d0ra02687e
Balder	Rissler J, Klementiev K, Dahl J, Steenari BM, Edo M	Identification and Quantification of Chemical Forms of Cu and Zn in MSWI Ashes Using XANES	ENERGY & FUELS	10.1021/acs.energyfuels.0c02226
Balder	Magnuson M, Näslund L-Å	Local chemical bonding and structural properties in Ti3AlC2 MAX phase and Ti3C2Tx MXene probed by Ti 1s x-ray absorption spectroscopy	PHYSICAL REVIEW RESEARCH	10.1103/PhysRevResearch.2.033516
Balder, FinEstBeAMS	Kozlova Anna P., Kasimova Valentina M., Buzanov Oleg A., Chernenko Kirill, Klementiev Konstantin, Pankratov Vladimir	Luminescence and vacuum ultraviolet excitation spectroscopy of cerium doped Gd3Ga3Al2O12 single crystalline scintillators under synchrotron radiation excitations	RESULTS IN PHYSICS	10.1016/j.rinp.2020.103002
* BioMAX	Ernst HA, Mosbech C, Langkilde AE, Westh P, Meyer AS, Agger JW, Larsen S	The structural basis of fungal glucuronoyl esterase activity on natural substrates	NATURE COMMUNICATIONS	10.1038/s41467-020-14833-9
* BioMAX	Labourel Aurore, Frandsen Kristian E. H., Zhang Feng, Brouilly Nicolas, Grisel Sacha, Haon Mireille, Ciano Luisa, Ropartz David, Fanuel Mathieu, Martin Francis, Navarro David, Rosso Marie-Noelle, Tandrup Tobias, Bissaro Bastien, Johansen Katja S., Zerva Anastasia, Walton Paul H., Henrissat Bernard, Lo Leggio Leila, Berrin Jean-Guy	A fungal family of lytic polysaccharide monooxygenase-like copper proteins	NATURE CHEMICAL BIOLOGY	10.1038/s41589-019-0438-8
* BioMAX	Lima GMA, Talibov VO, Jagudin E, Sele C, Nyblom M, Knecht W, Logan DT, Sjögren T, Mueller U	FragMAX: the fragment-screening platform at the MAX IV Laboratory	ACTA CRYSTALLOGRAPHICA SECTION D	10.1107/S205979832000889X
* BioMAX	Teze D, Shuoker , Chaberski K E, Kunstmann S, Fredslund F, Nielsen S T, Stender G P E, Peters H J G, Karlsson Nordberg E, Welner D H, Hachem Abou M	The Catalytic Acid-Base in GH109 Resides in a Conserved GGHGG Loop and Allows for Comparable alpha-Retaining and beta-Inverting Activity in an N-Acetylgalactosaminidase from Akkermansia muciniphila	ACS CATALYSIS	10.1021/acscatal.9b04474
* BioMAX	Vilstrup Joachim, Simonsen Amanda, Birkefeldt Thea, Strandbygard Dorthe, Lyngso Jeppe, Pedersen Jan Skov, Thirup Soren	Crystal and solution structures of fragments of the human leucocyte common antigen-related protein	ACTA CRYSTALLOGRAPHICA SECTION D	10.1107/S2059798320003885

*** Publications in journals with impact factor > 5 reported at time of publication**

BEAMLINE(S)	AUTHORLIST	TITLE	JOURNAL	DOI
BioMAX	Ursby T, Åhnberg K, Appio R, Aurelius O, Barczyk A, Bartalesi A, Bjelčić M, Bolmsten F, Cerenius Y, B Doak R, Eguiraun M, Eriksson T, J Friel R, Gorgisyan I, Gross A, Haghighat V, Hennies F, Jagudin E, Norsk Jensen B, Jeppsson T, Kloos M, Lidon-Simon J, M A de Lima G, Lizatovic R, Lundin M, Milan-Otero A, Milas M, Nan J, Nardella A, Rosborg A, Shilova A, L Shoeman R, Siewert F, Sondhauss P, O Talibov V, Tarawneh H, Thånell J, Thunnissen M, Unge J, Ward C, Gonzalez A, Mueller U	BioMAX – the first macromolecular crystallography beamline at MAX IV Laboratory	J. SYNCHROTRON RADIATION	10.1107/S1600577520008723
BioMAX	Shilova A, Lebrette H, Aurelius O, Nan J, Welin M, Kovacic R, Ghosh S, Safari C, Friel RJ, Milas M, Matej Z, Hogbom M, Branden G, Kloos M, Shoeman RL, Doak B, Ursby T, Hakansson M, Logan DT, Mueller U	Current status and future opportunities for serial crystallography at MAX IV Laboratory	J. SYNCHROTRON RADIATION	10.1107/S1600577520008735
* BioMAX	Lima GMA, Talibov VO, Jagudin E, Sele C, Nyblom M, Knecht W, Logan DT, Sjögren T, Mueller U	FragMAX: the fragment-screening platform at the MAX IV Laboratory	ACTA CRYSTALLOGRAPHICA SECTION D	10.1107/S205979832000889X
BioMAX	Wollenhaupt Jan, Metz Alexander, Barthel Tatjana, Lima Gustavo M. A., Heine Andreas, Mueller Uwe, Klebe Gerhard, Weiss Manfred S.	F2X-Universal and F2X-Entry: Structurally Diverse Compound Libraries for Crystallographic Fragment Screening	STRUCTURE	10.1016/j.str.2020.04.019
BioMAX	Rogstam Annika, Nyblom Maria, Christensen Signe, Sele Celeste, Talibov Vladimir O., Lindvall Therese, Rasmussen Anna Andersson, Andre Ingemar, Fisher Zoe, Knecht Wolfgang, Kozielski Frank	Crystal Structure of Non-Structural Protein 10 from Severe Acute Respiratory Syndrome Coronavirus-2	INTERNATIONAL JOURNAL OF MOLECULAR SCIENCES	10.3390/ijms21197375
* BioMAX	Starkholm Allan, Kloo Lars, Svensson Per H.	Implicit Tandem Organic-Inorganic Hybrid Perovskite Solar Cells Based on Internal Dye Sensitization: Robotized Screening, Synthesis, Device Implementation, and Theoretical Insights	JOURNAL OF THE AMERICAN CHEMICAL SOCIETY	10.1021/jacs.0c06698
* Bloch	Shah J, Wang W, Sohail H, Uhrberg R	Experimental evidence of monolayer arsenene: an exotic 2D semiconducting material	2D MATERIALS	10.1088/2053-1583/ab64fb
Bloch	Yang X, Cochran TA, Chapai R, Tristant D, Yin JX, Belopolski I, Cheng Z, Multer D, Zhang SS, Shumiya N, Litskevich M, Jiang Y, Chang G, Zhang Q, Vekhter I, Shelton WA, Jin R, Xu SY, Hasan MZ	Observation of sixfold degenerate fermions in PdSb2	PHYSICAL REVIEW B	10.1103/PhysRevB.101.201105

*** Publications in journals with impact factor > 5 reported at time of publication**

BEAMLINE(S)	AUTHORLIST	TITLE	JOURNAL	DOI
* Bloch	Igor Marković, Matthew D. Watson, Oliver J. Clark, Federico Mazzola, Edgar Abarca Morales, Chris A. Hooley, Helge Rosner, Craig M. Polley, Thiagarajan Balasubramanian, Saumya Mukherjee, Naoki Kikugawa, Dmitry A. Sokolov, Andrew P. Mackenzie, and Phil D. C. King	Electronically driven spin-reorientation transition of the correlated polar metal Ca3Ru2O7	PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES	10.1073/pnas.2003671117
Bloch	D. A. Chareev, P. Evstigneeva, D. Phuyal, G.J. Man, H. Rensmo, A.N. Vasiliev, M. Abdel-Hafiez	Growth of Transition Metal Dichalcogenides by Solvent Evaporation Technique	CRYSTAL GROWTH & DESIGN	10.1021/acs.cgd.0c00980
Bloch	Tian, S., Gao, S., Nie, S., Qian, Y., Gong, C., Fu, Y., Li, H., Fan, W., Zhang, P., Kondo, T., Shin, S., Adell, J., Fedderwitz, H., Ding, H., Wang, Z., Qian, T. & Lei, H.	Magnetic topological insulator MnBi6Te10 with a zero-field ferromagnetic state and gapped Dirac surface states	PHYSICAL REVIEW B	10.1103/PhysRevB.102.035144
Bloch	Chareev Dmitriy A., Evstigneeva Polina, Phuyal Dibya, Man Gabriel J., Rensmo Hakan, Vasiliev Alexander N., Abdel-Hafiez Mahmoud	Growth of Transition-Metal Dichalcogenides by Solvent Evaporation Technique	CRYSTAL GROWTH & DESIGN	10.1021/acs.cgd.0c00980
* Bloch, MAXPEEM	Karakachian Hrag, Nguyen T. T. Nhung, Aprojanz Johannes, Zakharov Alexei A., Yakimova Rositsa, Rosenzweig Philipp, Polley Craig M., Balasubramanian Thiagarajan, Tegenkamp Christoph, Power Stephen R., Starke Ulrich	One-dimensional confinement and width-dependent bandgap formation in epitaxial graphene nanoribbons	NATURE COMMUNICATIONS	10.1038/s41467-020-19051-x
Bloch, FinEstBeAMS, HIPPIE, SPECIES, SoftiMAX, Veritas	Sjöblom P, Todorescu G, Urpelainen S	Understanding the mechanical limitations of the performance of soft X-ray monochromators at MAX IV laboratory	J SYNCHROTRON RADIATION	10.1107/S1600577520000843
BLOCH I311-PEEM MAXPEEM STM-Laboratory	Shi Yuchen, Zakharov Alexei A., Ivanov Ivan G., Vinogradov Nikolay A., Yazdi G. Reza, Syvajarvi Mikael, Yakimova Rositsa, Sun Jianwu	A patterning-free approach for growth of free-standing graphene nanoribbons using step-bunched facets of off-oriented 4H-SiC(0001) epilayers	JOURNAL OF PHYSICS D-APPLIED PHYSICS	10.1088/1361-6463/ab6149
* FemtoMAX	Wang Xiaocui, Ekstrom J. C., Bengtsson A. U. J., Jarnac A., Jurgilaitis A., Van-Thai Pham, Kroon D., Enquist H., Larsson J.	Role of Thermal Equilibrium Dynamics in Atomic Motion during Nonthermal Laser-Induced Melting	PHYSICAL REVIEW LETTERS	10.1103/PhysRevLett.124.105701
FemtoMAX	Saaring Juhan, Feldbach Eduard, Nagirnyi Vitali, Omelkov Sergey, Vanetsev Alexander, Kirm Marco	Ultrafast Radiative Relaxation Processes in Multication Cross-Luminescence Materials	IEEE TRANSACTIONS ON NUCLEAR SCIENCE	10.1109/TNS.2020.2974071

*** Publications in journals with impact factor > 5 reported at time of publication**

BEAMLINE(S)	AUTHORLIST	TITLE	JOURNAL	DOI
FemtoMAX	Bengtsson A. U. J., Ekstroem J. C., Wang Xiaocui, Jurgilaitis A., Pham Van-Thai, Kroon D., Larsson J.	Repetitive non-thermal melting as a timing monitor for femtosecond pump/probe X-ray experiments	STRUCTURAL DYNAMICS-US	10.1063/4.0000020
FemtoMAX, FinEstBeAMS	Kamenskikh I, Tishchenko E, Kirm M, Omelkov S, Belsky A, Vasil'ev A	Decay Kinetics of CeF3 under VUV and X-ray Synchrotron Radiation	SYMMETRY	10.3390/sym12060914
FinEstBeAMS	Dendebera M., Chornodolskyy Ya, Gamernyk R., Antonyak O., Pashuk I., Myagkota S., Gnilitskyi I., Pankratov V., Vistovskyy V., Mykhaylyk V., Grinberg M., Voloshinovskii A.	Time resolved luminescence spectroscopy of CsPbBr 3 single crystal	JOURNAL OF LUMINESCENCE	10.1016/j.jlumin.2020.117346
FinEstBeAMS	Pankratov Vladimir, Kotlov Aleksei	Luminescence spectroscopy under synchrotron radiation: From SUPERLUMI to FINESTLUMI	NUCLEAR INSTRUMENTS & METHODS IN PHYSICS RESEARCH SECTION B-BEAM INTERACTIONS WITH MATERIALS AND ATOMS	10.1016/j.nimb.2020.04.015
FinEstBeAMS	Kaminska Agata, Koronski Kamil, Strak Pawel, Wierzbicka Aleksandra, Sobanska Marta, Klosek Kamil, Nechaev Dmitrii V., Pankratov Vladimir, Chernenko Kirill, Krukowski Stanislaw, Zytkiewicz Zbigniew R.	Defect-related photoluminescence and photoluminescence excitation as a method to study the excitonic bandgap of AlN epitaxial layers: Experimental and ab initio analysis	APPLIED PHYSICS LETTERS	10.1063/5.0027743
FinEstBeAMS	Abid Abdul Rahman, Pelimanni Eetu, Reinhardt Maximilian, Boudjemia Nacer, Kivimaki Antti, Huttula Marko, Bjorneholm Olle, Patanen Minna	Electron-ion coincidence spectroscopy of a large organic molecule: photofragmentation of avobenzone after valence and core ionisation	JOURNAL OF PHYSICS B-ATOMIC MOLECULAR AND OPTICAL PHYSICS	10.1088/1361-6455/abc228
FinEstBeAMS	Kooser K, Kivimäki A, Turunen P, Pärna R, Reisberg L, Kirm M, Valden M, Huttula M, Kukk E	Gas-phase endstation of electron, ion and coincidence spectroscopies for diluted samples at the FinEstBeAMS beamline of the MAX IV 1.5 GeV storage ring	JOURNAL OF SYNCHROTRON RADIATION	10.1107/S1600577520007146
FinEstBeAMS	Shalaev A, Shendrik R, Rusakov A, Bogdanov A, Pankratovs V, Chernenko K, Myasnikova A	Luminescence of divalent lanthanide doped BaBrI single crystal under synchrotron radiation excitations	NUCLEAR INSTRUMENTS & METHODS IN PHYSICS RESEARCH SECTION B-BEAM INTERACTIONS WITH MATERIALS AND ATOMS	10.1016/j.nimb.2020.01.023

*** Publications in journals with impact factor > 5 reported at time of publication**

BEAMLINE(S)	AUTHORLIST	TITLE	JOURNAL	DOI
FinEstBeAMS	Spasskiy D, Kozlova N, Zabelina E, Kasimova V, Krutyak N, Ukhanova A, A Morozov V, V Morozov A, Buzanov O, Chernenko K, Omelkov S, Nagirnyi V	Influence of Sc cation substituent on structural properties and energy transfer processes in GAGG:Ce crystals	CRYSTENGCOMM	10.1039/D0CE00122H
FinEstBeAMS	Spasskiy D, Voznyak-Levushkina V, Arapova A, Zadneprovski B, Chernenko K, Nagirnyi V	Enhancement of light output in ScxY1-xPO4:Eu3+ solid solutions	SYMMETRY	10.3390/sym12060946
FlexPES	Marcel J. S. Abb, Tim Weber, Daniel Langsdorf, Volkmar Koller, Sabrina M. Gericke, Sebastian Pfaff, Michael Busch, Johan Zetterberg, Alexei Preobrajenski, Henrik Grönbeck, Edvin Lundgren, and Herbert Over	Thermal Stability of Single-Crystalline IrO2(110) Layers: Spectroscopic and Adsorption Studies	J. PHYS. CHEM. C	10.1021/acs.jpcc.0c04373
HIPPIE	Hohner Chantal, Kettner Miroslav, Stumm Corinna, Blaumeiser Dominik, Wittkaemper Haiko, Grabau Mathias, Schwarz Matthias, Schuschke Christian, Lykhach Yaroslava, Papp Christian, Steinrueck Hans-Peter, Libuda Jorg	Pt-Ga Model SCALMS on Modified HOPG: Thermal Behavior and Stability in UHV and under Near-Ambient Conditions	JOURNAL OF PHYSICAL CHEMISTRY C	10.1021/acs.jpcc.9b10944
* HIPPIE	Weststrate CJ, Sharma D, Garcia Rodriguez D, Gleeson MA, Fredriksson HOA, Niemantsverdriet JW	Mechanistic insight into Carbon-Carbon bond formation on Cobalt under simulated Fischer-Tropsch Synthesis conditions	NATURE COMMUNICATIONS	10.1038/s41467-020-14613-5
HIPPIE	C. J. Weststrate, Devyani Sharma, Daniel Garcia Rodriguez, Michael A. Gleeson, Hans O. A. Fredriksson & J. W. Niemantsverdrie	Reactivity of C3Hx Adsorbates in Presence of Co-adsorbed CO and Hydrogen: Testing Fischer–Tropsch Chain Growth Mechanisms	TOPICS IN CATALYSIS	10.1007/s11244-020-01306-y
HIPPIE	Joachim Schnadt, Jan Knudsen, and Niclas Johansson	Present and new frontiers in materials research by ambient pressure x-ray photoelectron spectroscopy	JOURNAL OF PHYSICS	10.1088/1361-648X/ab9565
MAXPEEM	Kim Kyung Ho, He Hans, Rodner Marius, Yakimova Rositsa, Larsson Karin, Piantek Marten, Serrate David, Zakharov Alexei, Kubatkin Sergey, Eriksson Jens, Lara-Avila Samuel	Chemical Sensing with Atomically Thin Platinum Templated by a 2D Insulator	ADVANCED MATERIALS INTERFACES	10.1002/admi.201902104
* MAXPEEM	Li Hao, Shi Yuchen, Shang Huan, Wang Weimin, Lu Jun, Zakharov Alexei A., Hultman Lars, Uhrberg Roger I. G., Syvaejaervi Mikael, Yakimova Rositsa, Zhang Lizhi, Sun Jianwu	Atomic-Scale Tuning of Graphene/Cubic SiC Schottky Junction for Stable Low-Bias Photoelectrochemical Solar-to-Fuel Conversion	ACS NANO	10.1021/acsnano.0c00986
MAXPEEM	Shi Yuchen, Zakharov Alexei A., Ivanov Ivan G., Vinogradov Nikolay A., Yazdi G. Reza, Syvajarvi Mikael, Yakimova Rositsa, Sun Jianwu	A patterning-free approach for growth of free-standing graphene nanoribbons using step-bunched facets of off-oriented 4H-SiC(0001) epilayers	JOURNAL OF PHYSICS D-APPLIED PHYSICS	10.1088/1361-6463/ab6149
MAXPEEM	Shi Yuchen, Zakharov Alexei A., Ivanov Ivan Gueorguiev, Yazdi Gholamreza, Syvajarvi Mikael, Yakimova Rositsa, Sun Jianwu	Epitaxial Graphene Growth on the Step-Structured Surface of Off-Axis C-Face 3C-SiC(1 over bar 1 over bar 1 over bar)	PHYSICA STATUS SOLIDI B-BASIC SOLID STATE PHYSICS	10.1002/pssb.201900718

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BEAMLINE(S)	AUTHORLIST	TITLE	JOURNAL	DOI
* MAXPEEM	Aprojanz J., Rosenzweig Ph, Nguyen T. T. Nhung, Karakachian H., Kuester K., Starke U., Lukosius M., Lippert G., Sinterhauf A., Wenderoth M., Zakharov A. A., Tegenkamp C.	High-Mobility Epitaxial Graphene on Ge/Si(100) Substrates	ACS APPLIED MATERIALS & INTERFACES	10.1021/acsami.0c10725
* MAXPEEM	Pakdehi Davood Momeni, Schaedlich Philip, Thi Thuy Nhung Nguyen, Zakharov Alexei A., Wundrack Stefan, Najafidehaghani Emad, Speck Florian, Pierz Klaus, Seyller Thomas, Tegenkamp Christoph, Schumacher Hans Werner	Silicon Carbide Stacking-Order-Induced Doping Variation in Epitaxial Graphene	ADVANCED FUNCTIONAL MATERIALS	10.1002/adfm.202004695
* MAXPEEM I3 I311-PEEM I4	Forti S, Link S, Stöhr A, Niu Y, Zakharov AA, Coletti C, Starke U	Semiconductor to metal transition in two dimensional gold and its van der Waals heterostack with graphene	NATURE COMMUNICATIONS	10.1038/s41467-020-15683-1
MAXPEEM I311-XPS	Kim Kyung Ho, He Hans, Struzzi Claudia, Zakharov Alexei, Giusca Cristina E., Tzalenchuk Alexander, Park Yung Woo, Yakimova Rositsa, Kubatkin Sergey, Lara-Avila Samuel	Ambipolar charge transport in quasi-free-standing monolayer graphene on SiC obtained by gold intercalation	PHYSICAL REVIEW B	10.1103/PhysRevB.102.165403
NanoMAX	Akan Rabia, Frisk Thomas, Lundberg Fabian, Ohlin Hanna, Johansson Ulf, Li Kenan, Sakdinawat Anne, Vogt Ulrich	Metal-Assisted Chemical Etching and Electroless Deposition for Fabrication of Hard X-ray Pd/Si Zone Plates	MICROMACHINES	10.3390/mi11030301
NanoMAX	Björling A, Kalbfleisch S, Kahnt M, Sala S, Parfeniukas K, Vogt U, Carbone D, Johansson U	Ptychographic characterization of a coherent nanofocused X-ray beam	OPTICS EXPRESS	10.1364/OE.386068
* NanoMAX	Hammarberg S, Dagytė V, Chayanun L, Hill MO, Wyke A, Bjorling A, Johansson U, Kalbfleisch S, Heurlin M, Lauhon LJ, Borgström MT, Wallentin J	High resolution strain mapping of a single axially heterostructured nanowire using scanning X-ray diffraction	NANO RESEARCH	10.1007/s12274-020-2878-6
NanoMAX	Ji Cheng, Li Bing, Liu Wenjun, Smith Jesse S., Bjorling Alexander, Majumdar Arnab, Luo Wei, Ahuja Rajeev, Shu Jinfu, Wang Junyue, Sinogeikin Stanislav, Meng Yue, Prakapenka Vitali B., Greenberg Eran, Xu Ruqing, Huang Xianrong, Ding Yang, Soldatov Alexander, Yang Wenge, Shen Guoyin, Mao Wendy L., Mao Ho-Kwang	Crystallography of low Z material at ultrahigh pressure: Case study on solid hydrogen	MATTER AND RADIATION AT EXTREMES	10.1063/5.0003288
* NanoMAX	Björling A, Marcal L, Solla-Gullon J, Wallentin J, Carbone G, Maia F	Three-Dimensional Coherent Bragg Imaging of Rotating Nanoparticles	PHYSICAL REVIEW LETTERS	10.1103/PhysRevLett.125.246101
NanoMAX	Kahnt Maik, Sala Simone, Johansson Ulf, Bjorling Alexander, Jiang Zhimin, Kalbfleisch Sebastian, Lenrick Filip, Pikul James H., Thanell Karina	First ptychographic X-ray computed tomography experiment on the NanoMAX beamline.	JOURNAL OF APPLIED CRYSTALLOGRAPHY	10.1107/S160057672001211X

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* NanoMAX	Chayanun Lert, Hrachowina Lukas, Bjorling Alexander, Borgstrom Magnus T., Wallentin Jesper	Direct Three-Dimensional Imaging of an X-ray Nanofocus Using a Single 60 nm Diameter Nanowire Device	NANO LETTERS	10.1021/acs.nanolett.0c03477
* NanoMAX	Marcal L, Oksenberg E, Dzhigaev D, Hammarberg S, Rothman A, Björling A, Unger E, Mikkelsen A, Joselevich E, Wallentin J	In Situ Imaging of Ferroelastic Domain Dynamics in CsPbBr3 Perovskite Nanowires by Nanofocused Scanning X-ray Diffraction	ACS NANO	10.1021/acsnano.0c07426
* NanoMAX	Silva Barreto Isabella, Le Cann Sophie, Ahmed Saima, Sotiriou Vivien, Turunen Mikael J., Johansson Ulf, Rodriguez-Fernandez Angel, Grunewald Tilman A., Liebi Marianne, Nowlan Niamh C., Isaksson Hanna	Multiscale Characterization of Embryonic Long Bone Mineralization in Mice	ADVANCED SCIENCE	10.1002/advs.202002524
* NanoMAX	Dzhigaev D, Svensson J, Krishnaraja A, Zhu Z, Ren Z, Liu Y, Kalbfleisch S, Björling A, Lenrick F, Balogh ZI, Hammarberg S, Wallentin J, Timm R, Wernersson RLE, Mikkelsen A	Strain mapping inside an individual processed vertical nanowire transistor using scanning X-ray nanodiffraction	NANOSCALE	10.1039/D0NR02260H
Veritas, HIPPIE, SoftiMAX, FinEstBeAMS, MAXPEEM, Bloch and FlexPES	Agaker, M., Mueller, F., Norsk Jensen, B., Ahnberg, K., Sjoblom, P., Deiwiks, J., Henniger, H., Parna, R., Knudsen, J., Thiagarajan, B. & Sathe, C.	A five-axis parallel kinematic mirror unit for soft X-ray beamlines at MAX IV	J SYNCHROTRON RADIATION	10.1107/S160057751901693X
Accelerator	Jonas Björklund Svensson, Tessa K. Charles, Olle Lundh, and Sara Thorin	Third-order double-achromat bunch compressors for broadband beams	PHYS REV ACCEL BEAMS	10.1103/PhysRevAccelBeams.22.104401
Accelerator	F. J. Cullinan, Å. Andersson, and P. F. Tavares	Harmonic-cavity stabilization of longitudinal coupled-bunch instabilities with a nonuniform fill	PHYS REV ACCEL BEAMS	10.1103/PhysRevAccelBeams.23.074402
Accelerator	Olsson DK, Andersson Å, Sjöström M	Nonlinear optics from off-energy closed orbits	PHYSICAL REVIEW ACCELERATORS AND BEAMS	10.1103/PhysRevAccelBeams.23.102803
Accelerator	Aleksandre P, Fekih RBE, Letresor A, Thoraud S, Castro J, Bouvet F, Breunlin J, Andersson Å, Tavares PF	Transparent top-up injection into a fourth-generation storage ring	NUCLEAR INSTRUMENTS & METHODS IN PHYSICS RESEARCH SECTION A-ACCELERATORS SPECTROMETERS DETECTORS AND ASSOCIATED EQUIPMENT	10.1016/j.nima.2020.164739

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BEAMLINE(S)	AUTHORLIST	TITLE	JOURNAL	DOI
Accelerator	Williams Peter H., Perez-Segurana Gustavo, Bailey Ian R., Thorin Sara, Kyle Bill, Svensson Jonas Bjorklund	Arclike variable bunch compressors	PHYSICAL REVIEW ACCELERATORS AND BEAMS	0.1103/PhysRevAccelBeams.23.100701
BL73	Andersen J., Larsen R. Wugt, Ceponkus J., Uvdal P., Nelander B.	Far-Infrared Investigation of the Benzene-Water Complex: The Identification of Large-Amplitude Motion and Tunneling Pathways	JOURNAL OF PHYSICAL CHEMISTRY A	10.1021/acs.jpca.9b01497
I1011	Magnuson Martin, Mattesini Maurizio	Magnetic anisotropy in Cr2GeC investigated by X-ray magnetic circular dichroism and ab initio calculations	JOURNAL OF MAGNETISM AND MAGNETIC MATERIALS	10.1016/j.jmmm.2020.166470
* I311-XPS	Garcia-Martinez Fernando, Garcia-Fernandez Carlos, Simonovis Juan Pablo, Hunt Adrian, Walter Andrew, Waluyo Iradwikanari, Bertram Florian, Merte Lindsay R., Shipilin Mikhail, Pfaff Sebastian, Blomberg Sara, Zetterberg Johan, Gustafson Johan, Lundgren Edvin, Sanchez-Portal Daniel, Schiller Frederik, Enrique Ortega J.	Catalytic Oxidation of CO on a Curved Pt(111) Surface: Simultaneous Ignition at All Facets through a Transient CO-O Complex	ANGEWANDTE CHEMIE-INTERNATIONAL EDITION	10.1002/anie.202007195
I311-XPS	Emanuelsson C., Johansson L. S. O., Zhang H. M.	Photoelectron spectroscopy studies of PTCDI on Sn/Si(111)-2 root 3 x 2 root 3	CHEMICAL PHYSICS	10.1016/j.chemphys.2020.110973
I4	Shah Jalil, Wang Weimin, Sohail Hafiz M., Uhrberg Roger I. G.	Quasi One-Dimensional Structure Formed by an As/Ag(111) Surface Alloy	JOURNAL OF PHYSICAL CHEMISTRY C	doi: 10.1021/acs.jpcc.0c06827
I4	Federico Mazzola, Chin-Yi Chen, Rajib Rahman, Xie-Gang Zhu, Craig M. Polley, Thiagarajan Balasubramanian, Phil D. C. King, Philip Hofmann, Jill A. Miwa & Justin W. Wells	The sub-band structure of atomically sharp dopant profiles in silicon.	QUANTUM MATER	10.1038/s41535-020-0237-1
* I4	J. Shah, H. M. Sohail, R. I. G. Uhrberg, and W. Wang	Two-Dimensional Binary Honeycomb Layer Formed by Ag and Te on Ag(111)	THE JOURNAL OF PHYSICAL CHEMISTRY LETTERS	10.1021/acs.jpclett.0c00123

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BEAMLINE(S)	AUTHORLIST	TITLE	JOURNAL	DOI
I511-3	Magnuson M, Olovsson W, Ghafoor N, Odén M, Hultman L	Interface bonding of Zr1−xAlxN nanocomposites investigated by x-ray spectroscopies and first principles calculations	PHYSICAL REVIEW RESEARCH	10.1103/PhysRevResearch.2.013328
* I811	Tiberg C, Sjöstedt C, Eriksson AK, Klysubun W, Gustafsson JP	Phosphate competition with arsenate on poorly crystalline iron and aluminum (hydr)oxide mixtures	CHEMOSPHERE	10.1016/j.chemosphere.2020.126937
* I811	Yu C, Drake H, Dideriksen K, Tillberg M, Song Z, Mørup S, Astrom M	A Combined X-ray Absorption and Mössbauer Spectroscopy Study on Fe Valence and Secondary Mineralogy in Granitoid Fracture Networks: Implications for Geological Disposal of Spent Nuclear Fuels	ENVIRONMENTAL SCIENCE & TECHNOLOGY	10.1021/acs.est.9b07064
* I811	Tiberg Charlotta, Sjostedt Carin, Eriksson Ann Kristin, Klysubun Wantana, Gustafsson Jon Petter	Phosphate competition with arsenate on poorly crystalline iron and aluminum (hydr)oxide mixtures	CHEMOSPHERE	10.1016/j.chemosphere.2020.126937
I811	Astrom Mats E., Yu Changxun, Virtasalo Joonas J., Osterholm Peter, Peltola Pasi, Burton Edward D., Hogmalm K. Johan, Ojala Antti E. K.	Extensive accumulation of rare earth elements in estuarine sediments affected by leaching of acid sulfate soils	BOREAL ENVIRONMENT RESEARCH	
I911-4	Johansson Eva, Nielsen Anders D., Demuth Helle, Wiberg Charlotte, Schjodt Christine B., Huang Tao, Chen Jianhe, Jensen Sanne, Petersen Jorgen, Thygesen Peter	Identification of Binding Sites on Human Serum Albumin for Somapacitan, a Long-Acting Growth Hormone Derivative	BIOCHEMISTRY	10.1021/acs.biochem.0c00019
I911-4	Ryberg Line A., Sonderby Pernille, Bukrinski Jens T., Harris Pernille, Peters Gunther H. J.	Investigations of Albumin-Insulin Detemir Complexes Using Molecular Dynamics Simulations and Free Energy Calculations	MOLECULAR PHARMACEUTICS	10.1021/acs.molpharmaceut.9b00839
I911-4	Sønderby P, Söderberg C, Frankær CG, Peters GHJ, Bukrinski JT, Labrador A, Plivelic T, Harris P	Concentrated protein solutions investigated using acoustic levitation and small-angle X-ray scattering	JOURNAL OF SYNCHROTRON RADIATION	10.1107/S1600577519016977
I911-4	Ceresino Elaine Berger, Johansson Eva, Sato Helia Harumi, Plivelic Tomas S., Hall Stephen A., Kuktaite Ramune	Morphological and structural heterogeneity of solid gliadin food foams modified with transglutaminase and food grade dispersants	FOOD HYDROCOLLOIDS	doi: 10.1016/j.foodhyd.2020.105995

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BEAMLINE(S)	AUTHORLIST	TITLE	JOURNAL	DOI
* I911-4	Helvig SY, Andersen H, Antopolsky M, Airaksinen AJ, Urtti A, Yaghmur A, Moghimi SM	Engineering hexosomes for single-photon emission computed tomography/computed tomography dynamic imaging of regional lymph nodes	ACTA MATERIALIA	doi: 10.1016/j.mtla.2020.100705
I911-4	Johansson Eva, Nielsen Anders D., Demuth Helle, Wiberg Charlotte, Schjodt Christine B., Huang Tao, Chen Jianhe, Jensen Sanne, Petersen Jorgen, Thygesen Peter	Identification of Binding Sites on Human Serum Albumin for Somapacitan, a Long-Acting Growth Hormone Derivative	BIOCHEMISTRY	10.1021/acs.biochem.0c00019
D1011	Temperton R, Skowron S, Gibson A, Handrup K, OShea J	Ultra-fast charge transfer between fullerenes and a gold surface, as prepared by electrospray deposition	CHEMICAL PHYSICS LETTERS	10.1016/j.cplett.2020.137309
* D1011	Beyer Paul, Meister Eduard, Florian Timo, Generalov Alexander, Bruetting Wolfgang, Koch Norbert, Opitz Andreas	Fermi level pinned molecular donor/acceptor junctions: reduction of induced carrier density by interfacial charge transfer complexes	JOURNAL OF MATERIALS CHEMISTRY	10.1039/d0tc02774j
* MX	Bozsoki Z, Gysel K, Hansen SB, Lironi D, Kroenauer C, Feng F, de Jong N, Vinther M, Kamble M, Thygesen M, Engholm E, Kofoed C, Fort S, Sullivan JT, Ronson CW, Jensen K, Blaise M, Oldroyd G, Stougaard J, Andersen KR, Radutoiu S	Ligand-recognizing motifs in plant LysM receptors are major determinants of specificity	SCIENCE	10.1126/science.abb3377
MX	Sorensen Anders B., Tuneew Inga, Svensson L. Anders, Persson Egon, Ostergaard Henrik, Overgaard Michael Toft, Olsen Ole H., Gandhi Prafull S.	Beating tissue factor at its own game: Design and properties of a soluble tissue factor?independent coagulation factor VIIa	JOURNAL OF BIOLOGICAL CHEMISTRY	10.1074/jbc.RA119.009183
* MX	Zaksauskas Audrius, Capkauskaite Edita, Jezecikas Linas, Linkuviene Vaida, Paketuryte Vaida, Smirnov Alexey, Leitans Janis, Kazaks Andris, Dvinskis Elviss, Manakova Elena, Grazulis Saulius, Tars Kaspars, Matulis Daumantas	Halogenated and di-substituted benzenesulfonamides as selective inhibitors of carbonic anhydrase isoforms	EUROPEAN JOURNAL OF MEDICINAL CHEMISTRY	10.1016/j.ejmech.2019.111825
MX	Frydenvang Karla, Pickering Darryl S., Kshirsagar Giridhar U., Chemi Giulia, Gemma Sandra, Sprogoe Desiree, Kaern Anne Mette, Brogi Simone, Campiani Giuseppe, Butini Stefania, Kastrup Jette Sandholm	Ionotropic Glutamate Receptor GluA2 in Complex with Bicyclic Pyrimidinedione-Based Compounds: When Small Compound Modifications Have Distinct Effects on Binding Interactions	ACS CHEMICAL NEUROSCIENCE	10.1021/acschemneuro.0c00195

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