

SXP in a nutshell

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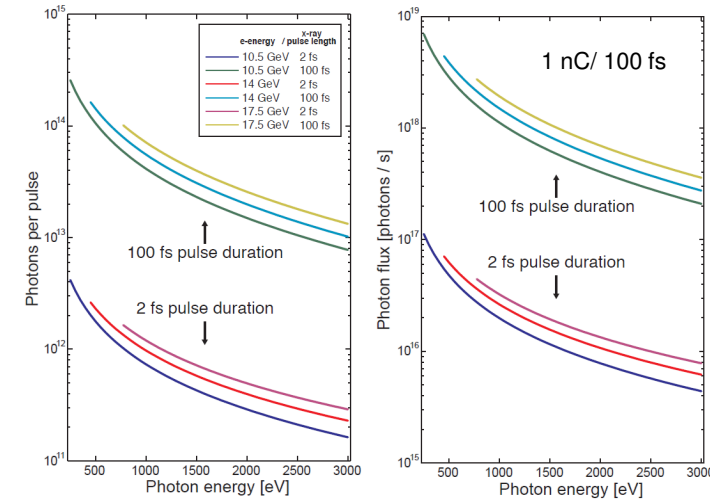
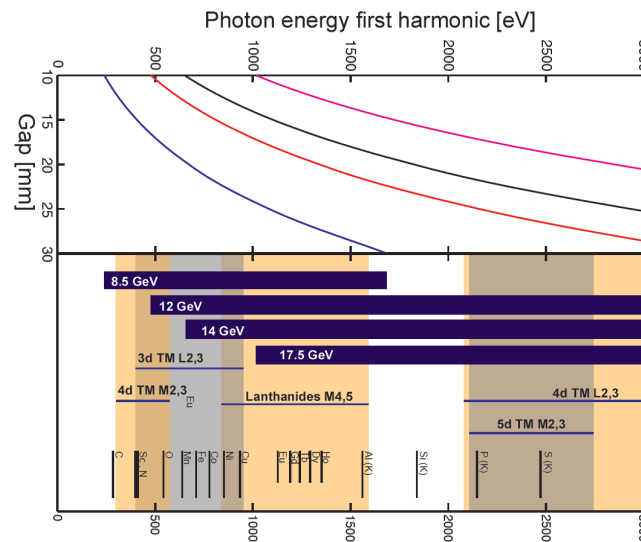
24 January 2022



SXP in a nutshell

X-rays

- SASE 3 source (0.25 – 3 KeV)
- Monochromatization
 - 50 l/mm RP 3000
 - 150 l/mm RP 10000
- Variable polarization
 - Apple X undulators



Adapted from the SCS Conceptual design report

Laser

- Extended pump wavelength (200 nm – THz)
- European XFEL

The SXP scientific community

TR-XPES

Denmark		6 Groups
France		9 Groups
Germany		13 Groups
Italy		5 Groups
Poland		9 Groups
Russia		25 Groups
Spain		15 Groups
Sweden		7 Groups
Switzerland		4 Groups
UK		3 Groups
USA		1 Group

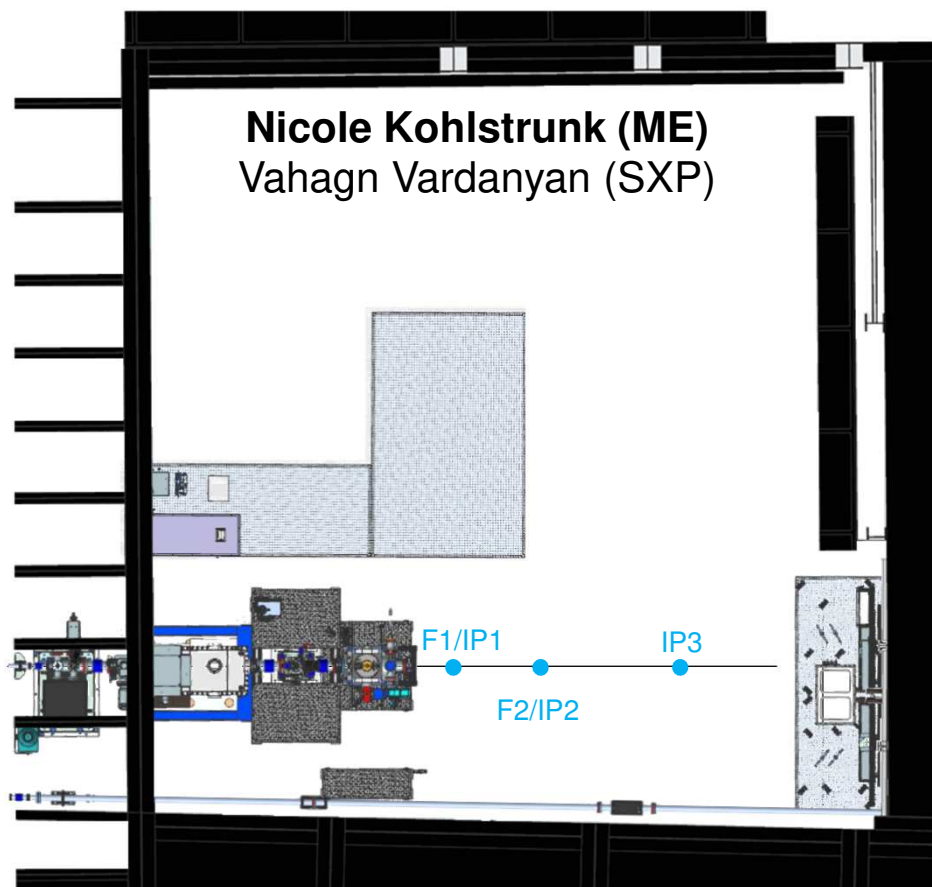


Sweden		4 Groups
Germany		1 Group
USA		2 Groups
Germany		7 Groups
USA		4 Groups
Spain		1 Group
France		1 Group
Netherlands		1 Group
Israel		1 Group

CBA

HCI

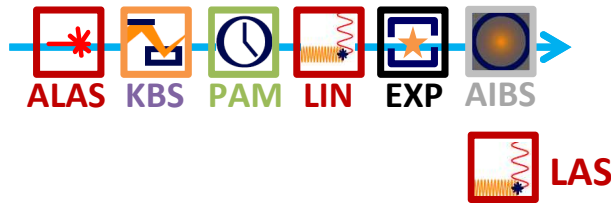
The SXP instrument



- Compact beamline design
 - All permanent beamline components upstream
- KB focusing system with bendable mirrors
 - First implementation → fixed foci mirrors

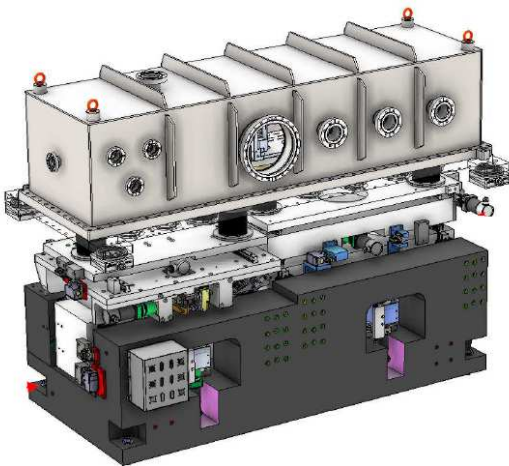
Distance VF (m)	HF @ 0.3 KeV	VF @ 0.3 KeV
2.2	2.08	1.39
3	2.64	2.78
5.5	4.37	5.09

SXP First implementation



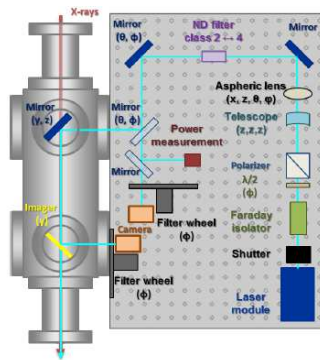
Patrik Grychtol
Laser specialist

KBS

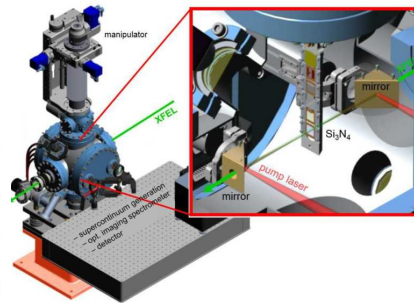


Talk by Maurizio Vannoni
European XFEL

ALAS

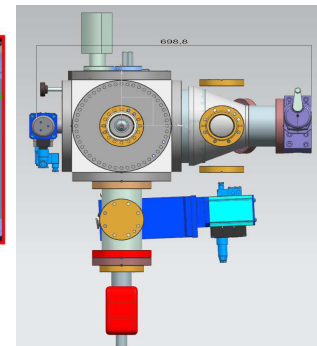


PAM+

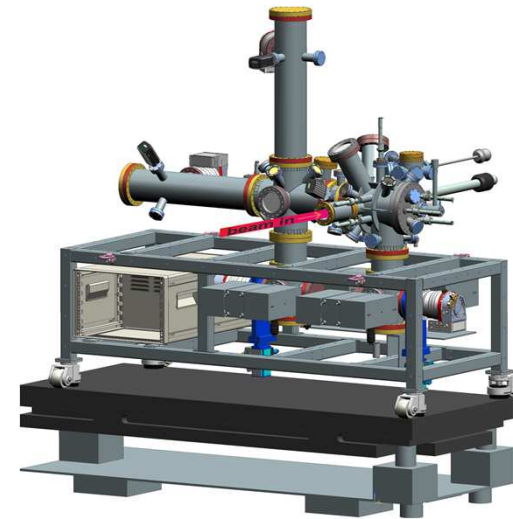


Talk by Patrik

LIN



TR-XPES

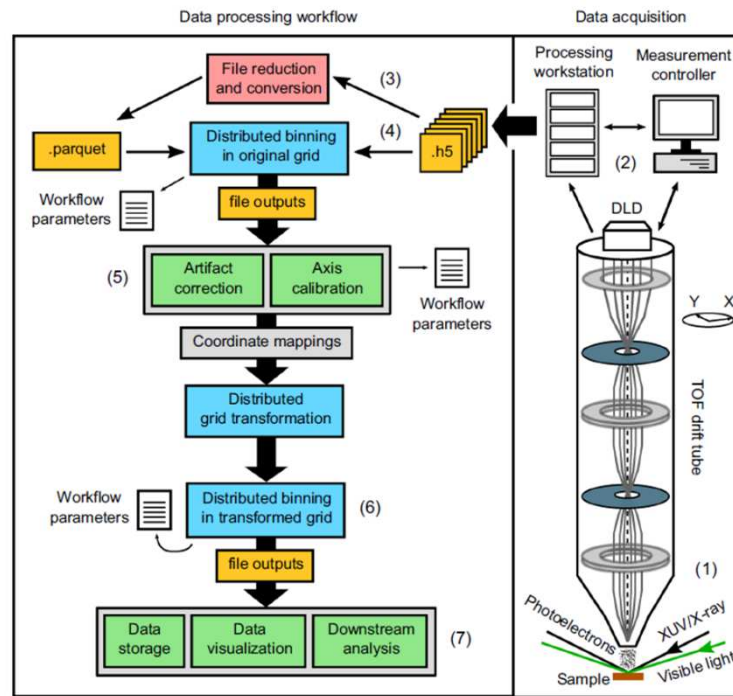


Talk by Gerd Schönhense

Data Analysis: End to end data solutions



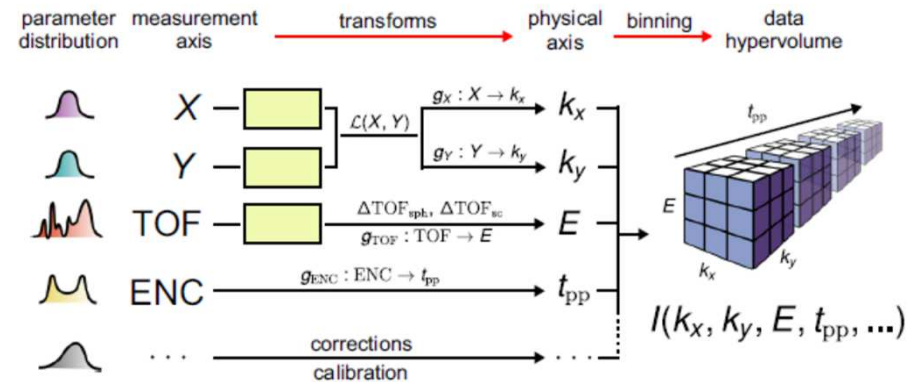
David Doblas
R&D SXP PEDAL:
"SXP Plural
Experiment Data
Analysis Libraries"

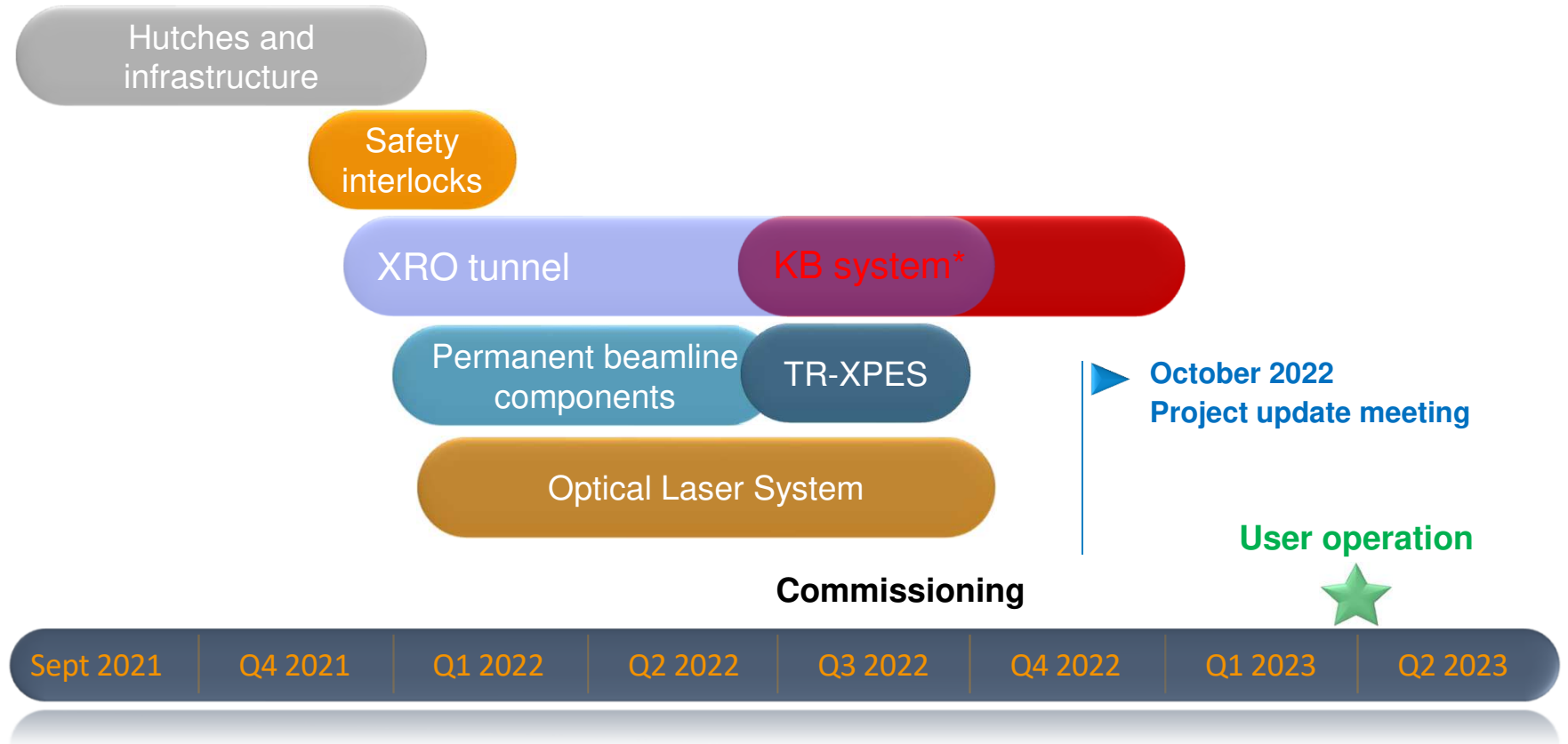


SCIENTIFIC DATA

OPEN **ARTICLE** **An open-source, end-to-end workflow for multidimensional photoemission spectroscopy**

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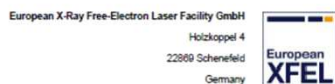
Perspectives (I)

XFEL.EU TR-2022-001B

TECHNICAL DESIGN REPORT

Scientific Instrument Soft X-Ray Port (SXP). Part B: First Implementation

January 23, 2022



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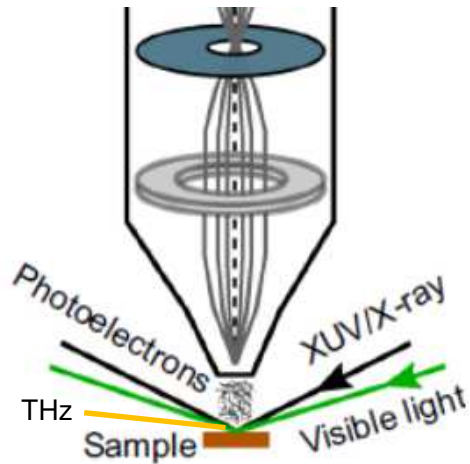
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TDR: SXP-B

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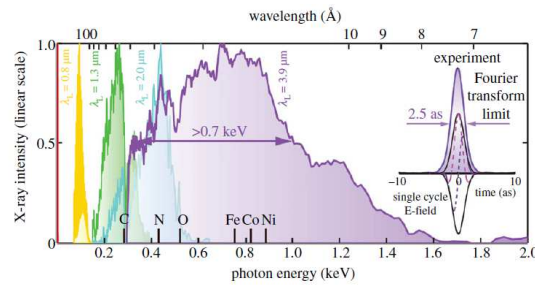
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Perspectives (II)

Multi-technique detection



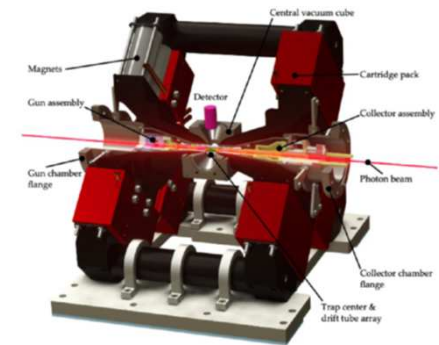
HHG source



SCS	SQS	SCS	SQS	SXP
SQS	SCS	SXP	SCS	SQS

SXP 20%

EBIT (Electron Beam Ion Trap)



Reflectivity:

- Optical pump - X-ray probe
- X-ray pump - optical probe

THz detection



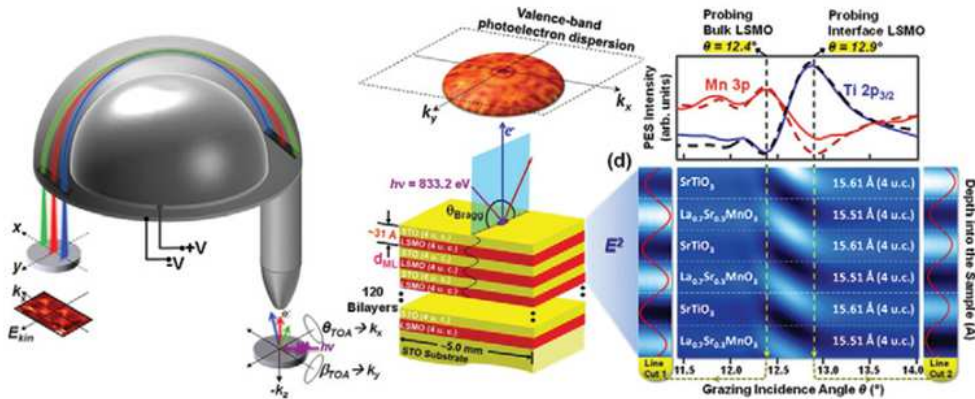
Vahagn Vardanyan
 R&D SXP AIMS:
 "Advanced Instrument
 Mechanical Systems"

Perspectives (III)

TR-SW-ARPES

Momentum-resolved electronic structure at a buried interface from soft X-ray standing-wave angle-resolved photoemission

A. X. GRAY^{1,2,3}, J. MINÁR⁴, L. PLUCINSKI⁵, M. HULBEN⁶, A. BOSTWICK⁷, E. ROTENBERG⁷, S.-H. YANG⁸, J. BRAUN⁴, A. WINKELMANN⁹, G. CONTI^{1,2}, D. EITENEER^{1,2}, A. RATTANACHATA^{1,2}, A. A. GREER^{1,2}, J. CISTON¹⁰, C. OPHUS¹⁰, G. RIJNDERS⁶, D. H. A. BLANK⁶, D. DOENNIG¹¹, R. PENTCHEVA¹¹, J. B. KORTRIGHT², C. M. SCHNEIDER⁵, H. EBERT⁴ and C. S. FADLEY^{1,2}



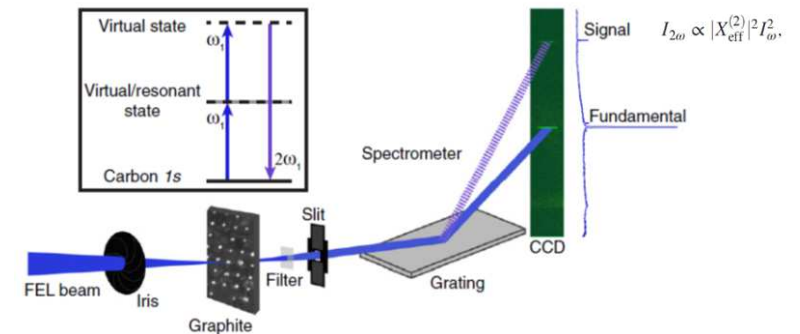
Four Wave mixing (SHG)

PHYSICAL REVIEW LETTERS **120**, 023901 (2018)

Editors' Suggestion Featured in Physics

Soft X-Ray Second Harmonic Generation as an Interfacial Probe

R. K. Lam,^{1,2} S. L. Raj,^{1,2} T. A. Pascal,³ C. D. Pemmaraju,⁴ L. Foglia,⁵ A. Simoncig,⁵ N. Fabris,^{6,7} P. Miotti,^{6,7} C. J. Hull,^{1,2} A. M. Rizzuto,^{1,2} J. W. Smith,^{1,2} R. Mincigrucci,⁵ C. Masciovecchio,⁵ A. Gessini,⁵ E. Allaria,⁵ G. De Nino,^{5,8} B. Diviacco,⁵ E. Roussel,⁵ S. Spampinati,⁵ G. Penco,⁵ S. Di Mitri,⁵ M. Trovò,⁵ M. Danailov,⁵ S. T. Christensen,⁹ D. Sokaras,¹⁰ T.-C. Weng,¹¹ M. Coreno,^{5,12} L. Poletto,⁶ W. S. Drisdell,² D. Prendergast,³ L. Giannessi,^{5,13} E. Principi,⁵ D. Nordlund,¹⁰ R. J. Saykally,^{1,2,6} and C. P. Schwartz^{3,10,†}



Perspectives (IV)

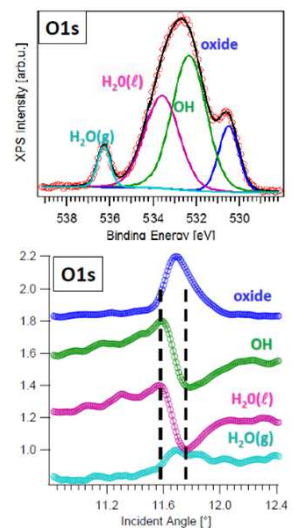
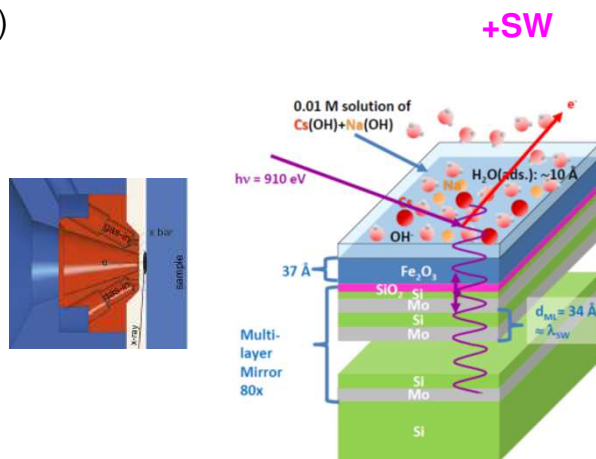
TR-NAPP solid-gas and solid-liquid interfaces

TR-NAPP liquid-gas interfaces

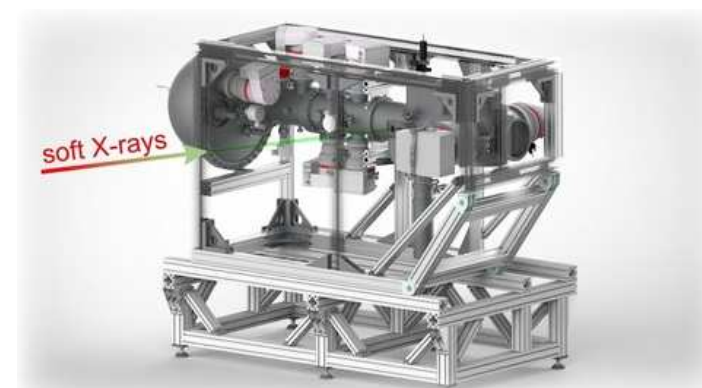
VC HAXPES (Nilsson, P22)



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LJ-PES (Bernd Winter, FHI, P04)



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SXP group



Thank you for your attention!