



City of Dresden
Saxony
Germany





MAX-PLANCK-GESELLSCHAFT

**Max-Planck-Institut
für Chemische Physik fester Stoffe**

**Max-Planck-Institute
for Chemical Physics of Solids**





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Mission

NEW MATERIALS – NEW PROPERTIES



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CHEMISTRY meets PHYSICS



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*Mission
Organization*

NEW MATERIALS – NEW PROPERTIES

CHEMISTRY meets PHYSICS



Phys. of Quantum Materials
A.P. Mackenzie



Inorganic Chemistry
C. Felser

F. Steglich

Central Expert Facilities:

*material development, structure, metallography, chemical analysis,
TEM, neutron and electron spectroscopy, chemical bonding,
material specific calculations, extreme conditions*

R. Kniep

Chemical Metals Science
J. Grin

Physics Correlated Matter
L.H. Tjeng





MAX-PLANCK-GESellschaft

**Max-Planck-Institut
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International Cooperations



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International Cooperations

Max Planck Partnergroups

- Shanghai Institute of Ceramics
- Zhejiang University in Hangzhou
- Institute of Low Temperature and Structure Research Wroclaw
- Faculty of Chemistry at the Moscow State University

Max Planck Fellowships

- Indian Institute of Science, Education and Research, Thiruvananthapura



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Max Planck Fellowships

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Max Planck Centers

- POSTECH Korea - Center for Complex Phase Materials (MPI CPfS)
- Univ. of British Columbia - Center for Quantum Materials (MPI FKF)



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“Long Night of Science“

Outreach

2011: ca. 3400 visitors

2012: ca. 3800 visitors





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Research interests:

- Strongly correlated electron systems
- Competing phases, instabilities
- Transition metal and rare earth compounds

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- heavy-fermion, Kondo

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- *orbital-, spin-, and charge degrees of freedom*
- *atomic and electronic superstructures*

Experimental Methods : *electronic excitations*

- photoelectron spectroscopy
- x-ray absorption spectroscopy (incl. MCD)
- inelastic hard-x-ray scattering
- STM/STS

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- dynamical mean field theories (in collaboration – FOR1346)
- many body modeling

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Spectroscopy + Theory \rightarrow low-energy many-body Hamiltonian

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Spectroscopy + Theory → low-energy many-body Hamiltonian

Materials ↔ Mechanisms ↔ Phenomena

Physics Correlated Matter

Secretary



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Electronic Structure of Correlated Materials



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Physics of Correlated Matter

Direktorin: Prof. Dr. Liu Hao Tjeng

Interview with Prof. Tjeng



Thin Films



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Collaboration with University of Cologne: Electronic Fermion Compounds



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Technical Support

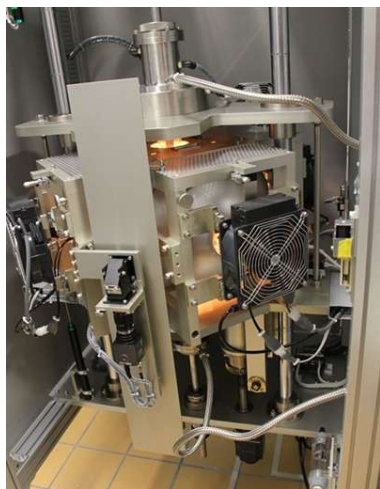


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Dipl.-Phys. Christoph Becker
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Special oxide single crystal preparation facility

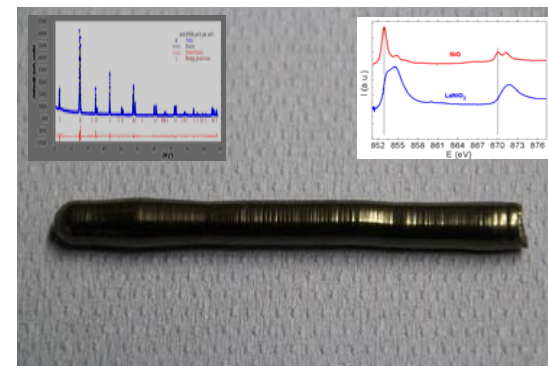


CSC Mirror furnace



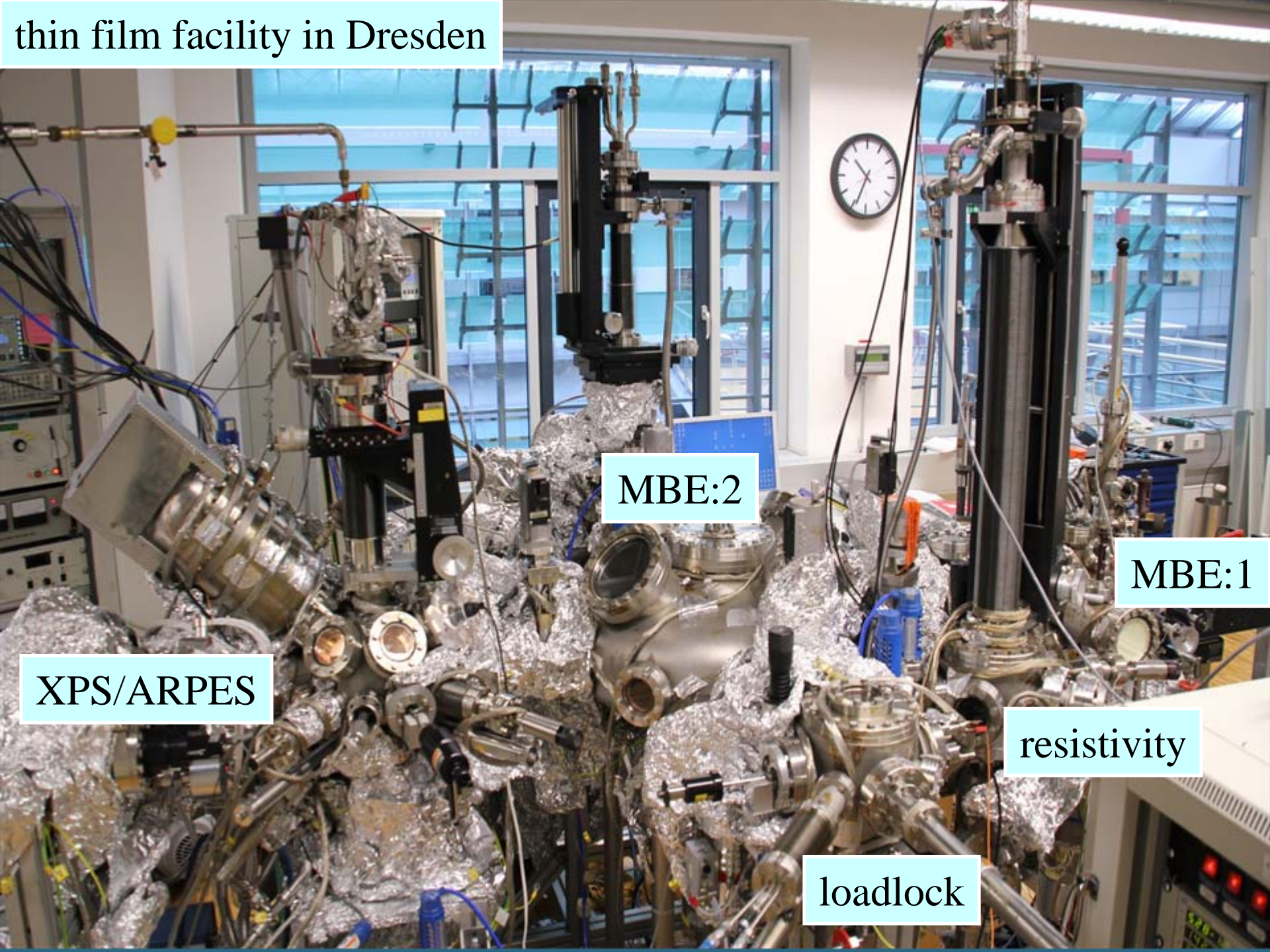
HKZ Scidre Mirror furnace – up to 150 bar O_2
- dedicated for high oxidation state materials -

Dr. Alexander Komarek
Max Planck Institute for
Chemical Physics of Solids



the first mm-size $LaNiO_3$ single crystal in
the world !!

thin film facility in Dresden



MBE:2

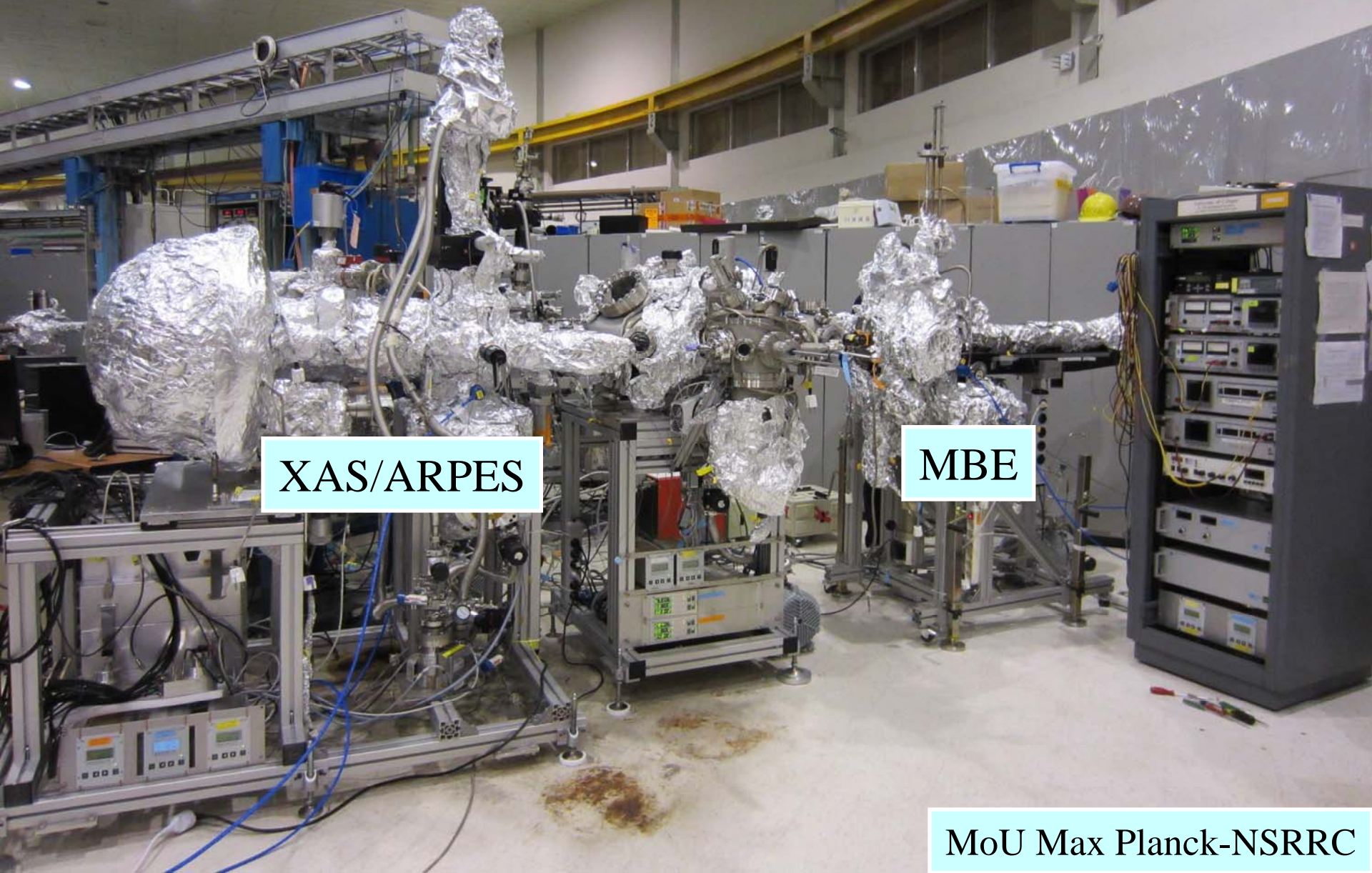
MBE:1

XPS/ARPES

resistivity

loadlock

XAS/ARPES+ MBE at the NSRRC – Taiwan

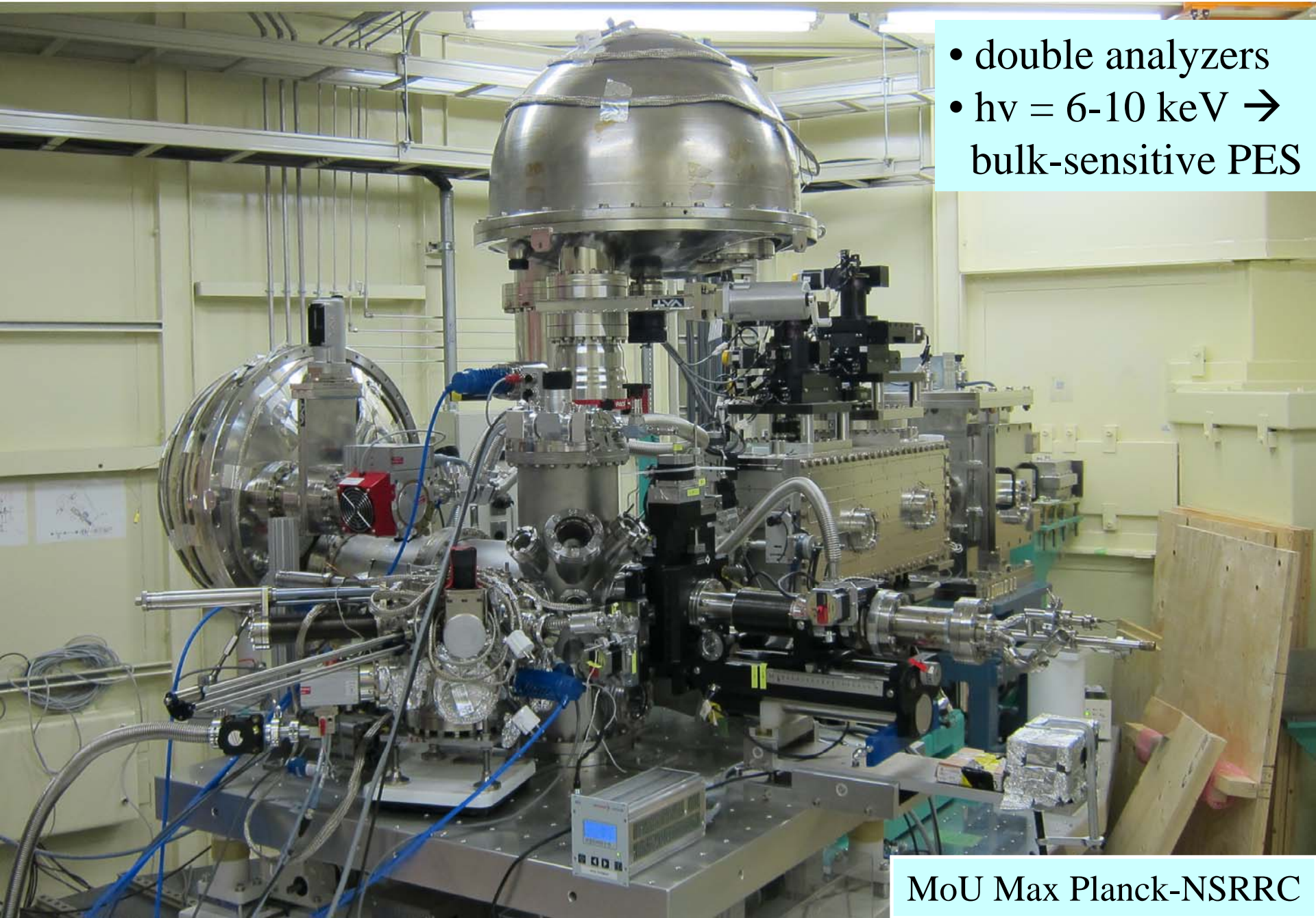


XAS/ARPES

MBE

MoU Max Planck-NSRRC

HAXPES at NSRRC-BL12XU beam line – Spring8 - Japan



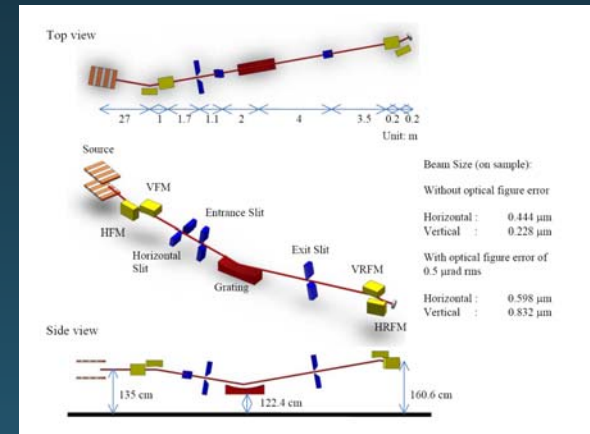
- double analyzers
- $h\nu = 6-10 \text{ keV} \rightarrow$
bulk-sensitive PES

Max-Planck-NSRRC submicron soft-x-ray beamline at TPS

L.H. Tjeng - C.T. Chen



- small emittance
- novel AGM
- JTEC innovation



Characteristics:

- soft-x-ray (400-1500 eV), helical undulator
- beam spot size: $< 1 \mu\text{m} \times 1 \mu\text{m}$
- photon energy resolution: 15 meV at 700 eV.

Objectives:

- XPS-ARPES-SpinPES, XAS-MLD-MCD
- small samples, selecting homogenous parts of samples