

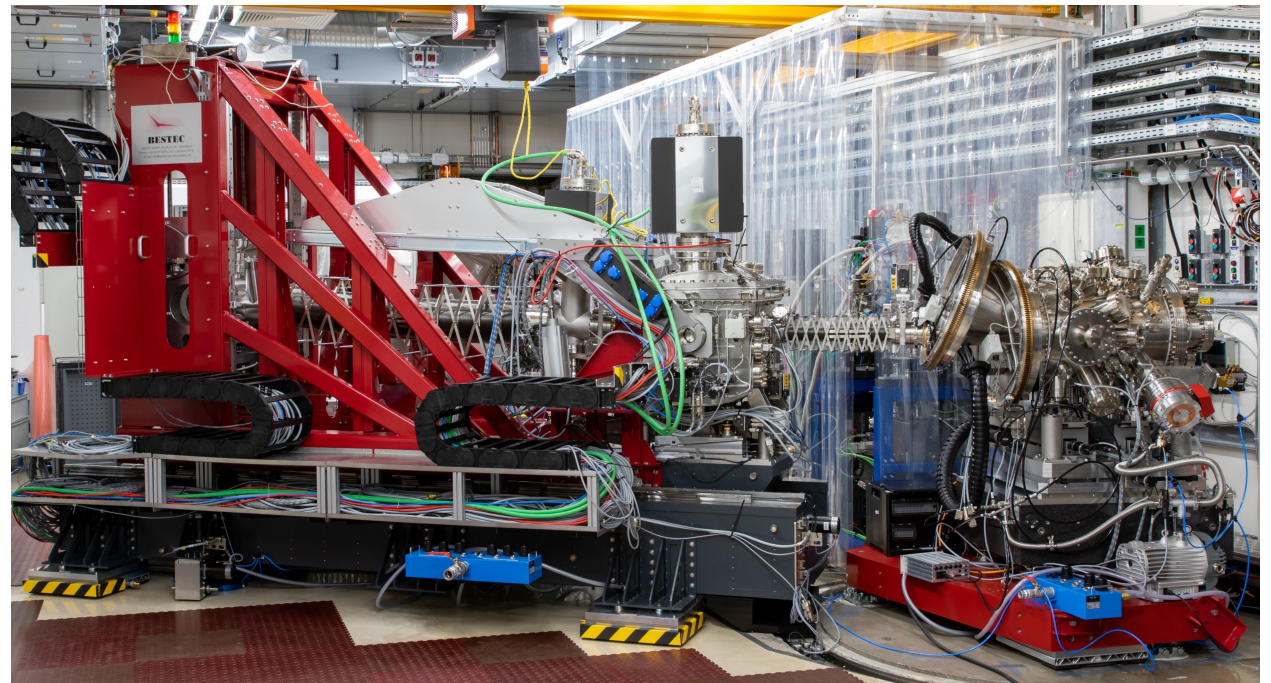
SCS instrument



European XFEL Virtual User Information Meeting 8th Call for Proposals

Andreas Scherz
Spectroscopy and Coherent Scattering
(SCS instrument)

03. November 2021

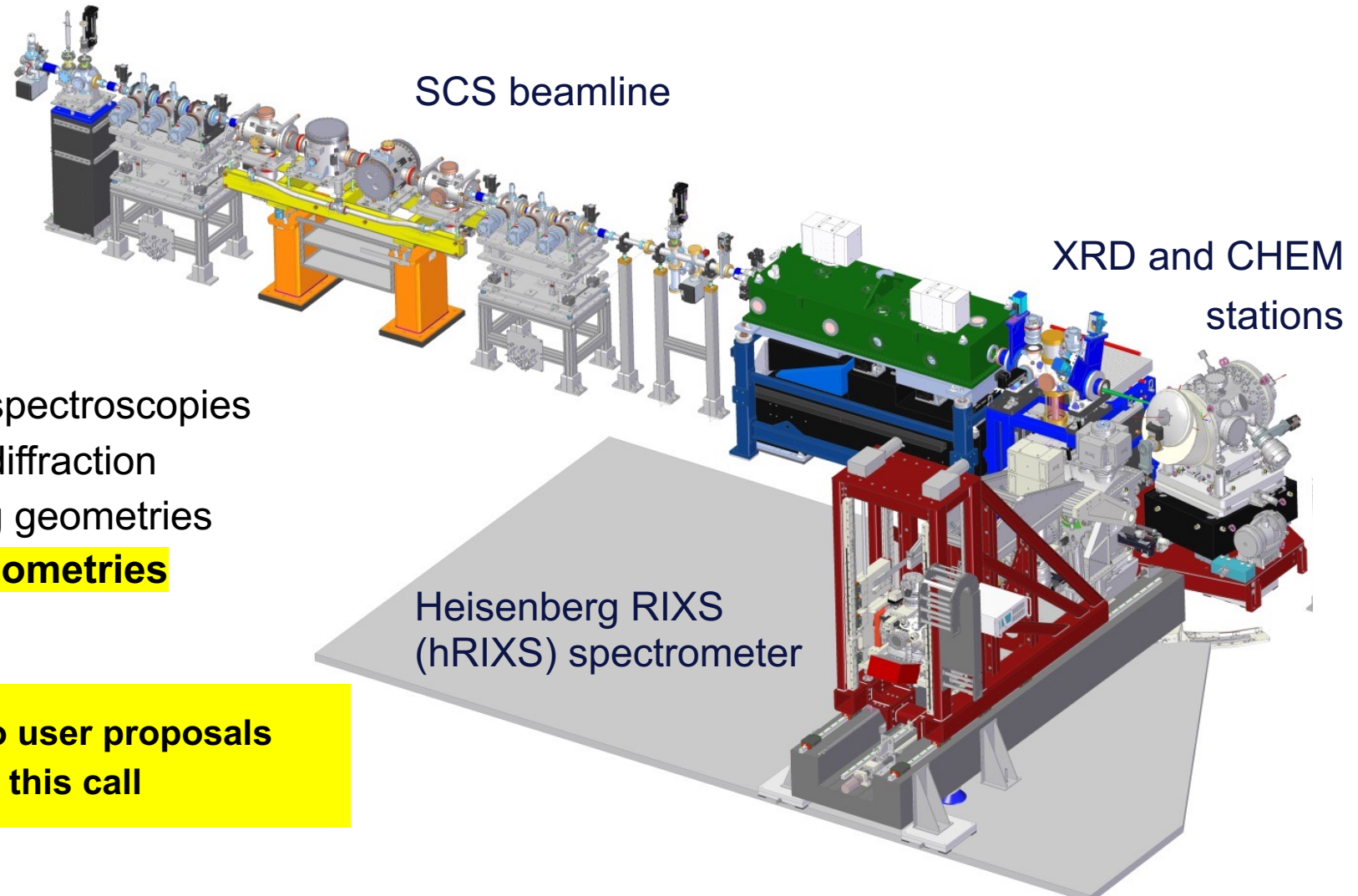


SCS Instrument @ SASE3, European XFEL

Spectroscopy and Coherent Scattering (SCS):

- Soft x-ray beamline 0.5 – 3keV
- Time-resolved/ non-linear x-ray spectroscopies
- Time-resolved/ non-linear x-ray diffraction
- Forward- / small-angle scattering geometries
- **Reflection- / backscattering geometries**
- **RIXS**
- **Solid samples**
- **Liquid-jet samples**

open to user proposals
this call



Online seminar hRIXS@SCS Instrument of European XFEL

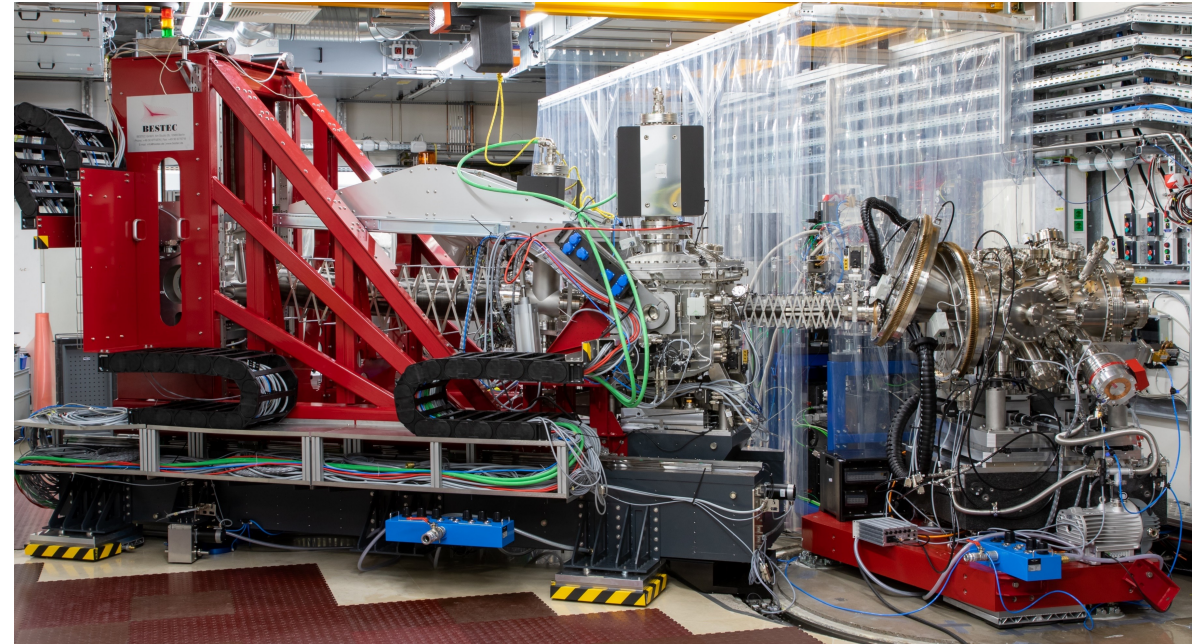
presented on October 21, 2021



Agenda:

- Status of hRIXS instrumentation
- Report about hRIXS commissioning
- Parameters for upcoming call
- Q-A Session

**60min of detailed information
and Q&A**



 > Facility > Instruments > SCS

Scientific Instrument SCS

Go to the SCS instrument web page

8th-Call-for-Proposals: RIXS@SCS



SCS instrument and beam parameters
8th Call-for-Proposals, scheduled for the second half of 2022

DOWNLOAD

Online hRIXS Seminar: Proposal Run 8



Online seminar slides for download
Provides more information about hRIXS instrumentation, performance and parameters

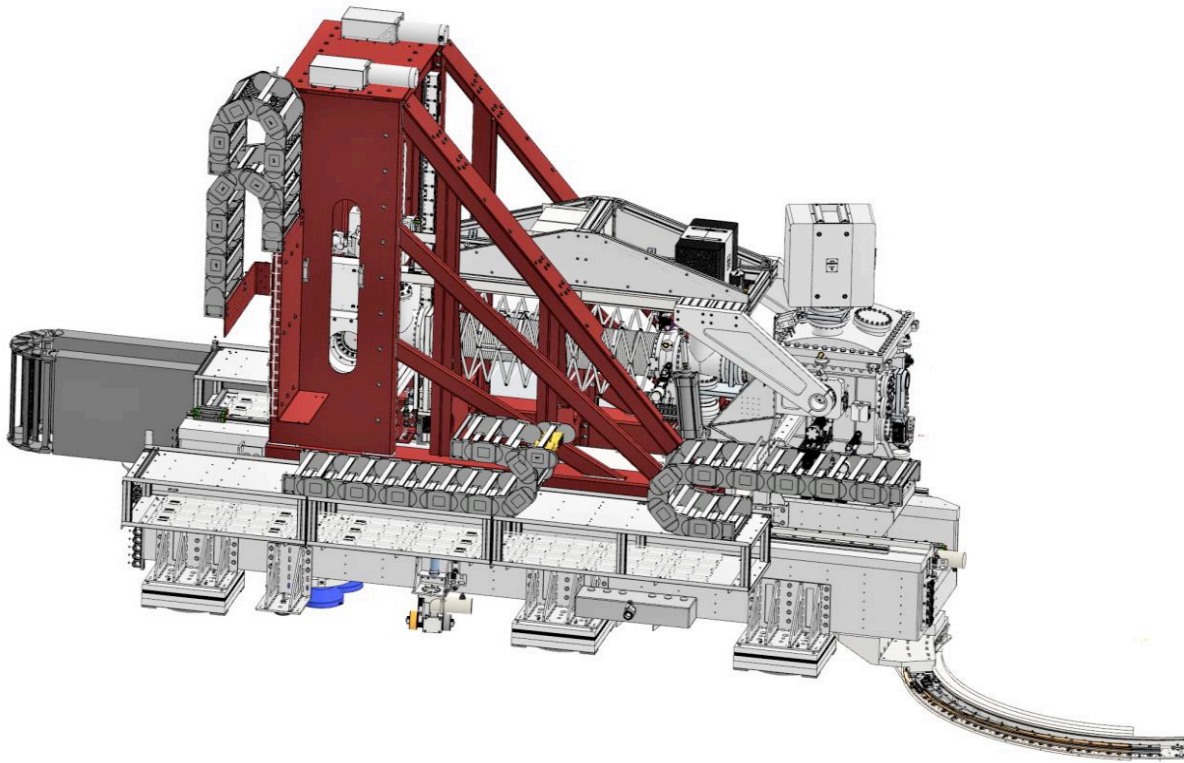
DOWNLOAD

hRIXS online seminar

We host a hRIXS webinar on Oct 21st, 2021 at 5pm (CEST) to inform you about the outcome of the RIXS commissioning at the SCS instrument. In preparation for the next call for proposals, we will outline the offered parameters for (time-resolved) RIXS studies at the SCS instrument. The presentations will be posted afterwards. Please refer to the agenda and access information on the [online seminar](#) page.

contact us:
scs@xfel.eu

hRIXS parameters for run 8th



hRIXS parameters

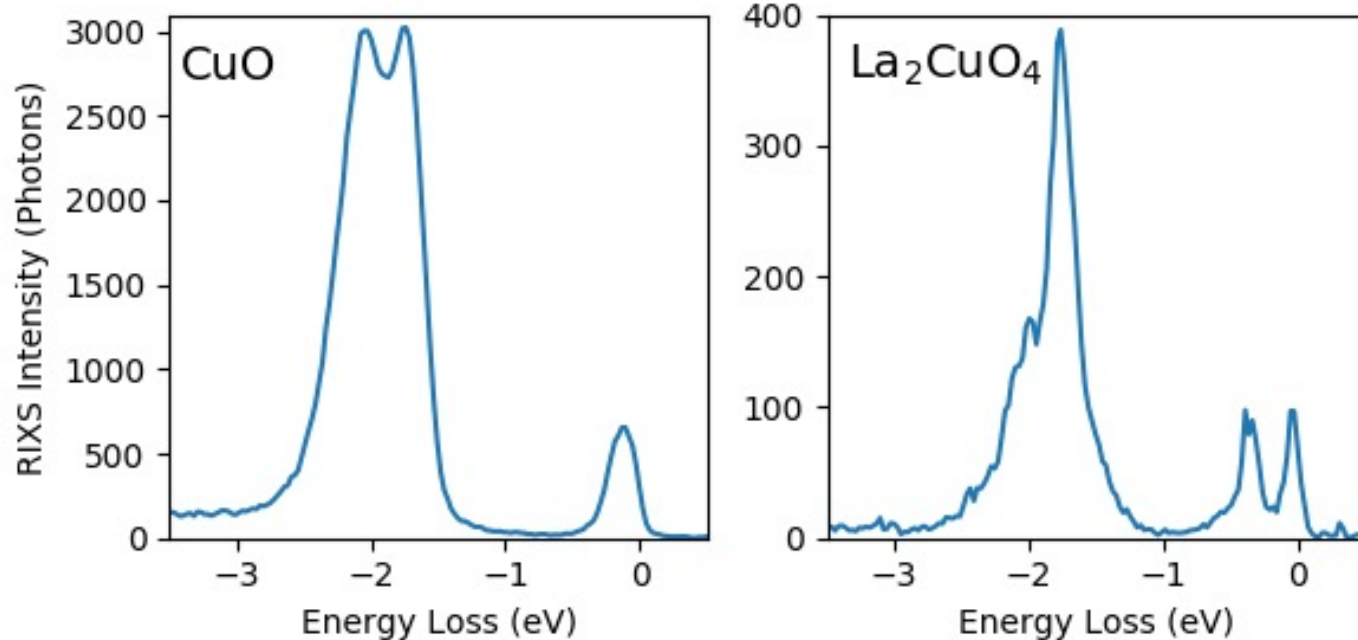
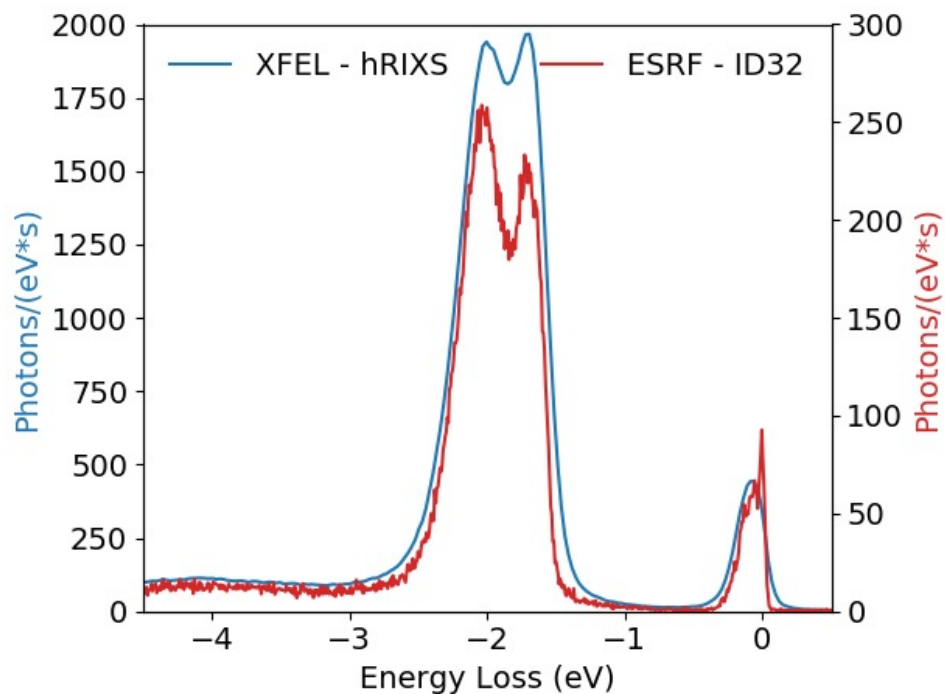
Photon energy	0.5 – 1.5 keV
Combined resolving power	Up to 10.000 (mono HR) 3.000 (mono LR)
Transmission	$\sim 10^{-6}$
Time resolution	Limited by mono: 80-150 fs (mono HR) 30-50 fs (mono LR)
Scattering angle	Fixed, angles depend on experimental station

■ Continuous motion will be commissioned in beginning of 2022-II and will not be offered yet

Measurement Count Rates

Cu L-edge

Incident Beam 1.3×10^{13} ph/s



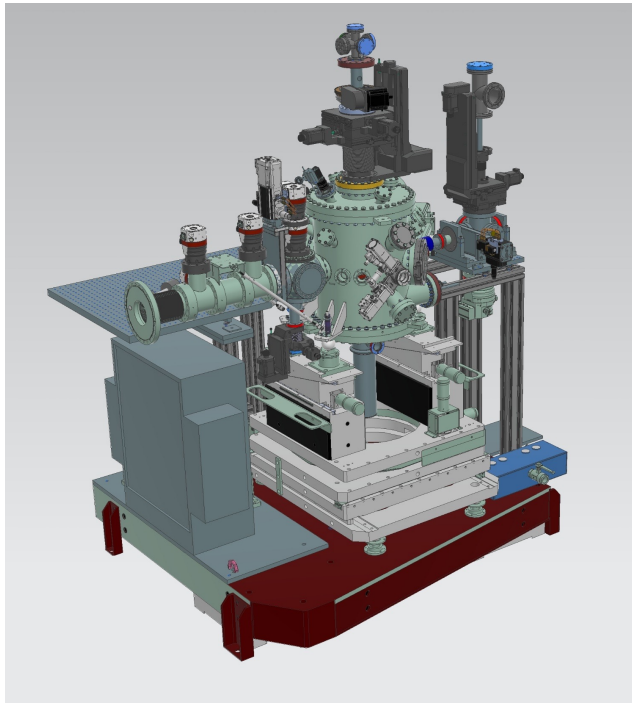
- CuO spectrum measured with 100% GATT transmission (~2 mW), 400 pulses/train, and a 1 min acquisition, 80% wt. Cu
- La₂CuO₄ thin film spectrum measured with 10% GATT transmission (~0.2 mW), 400 pulses/train, and a 10 min acquisition, 16% wt. Cu

Edge	Energy (eV)	ΔE (meV)	$E/\Delta E$
Cu L ₃	930	106	8 700
Ni L ₃	853	122*	6 900*
O K	530	49	10 400

Sample environment for Time-Resolved RIXS at SCS

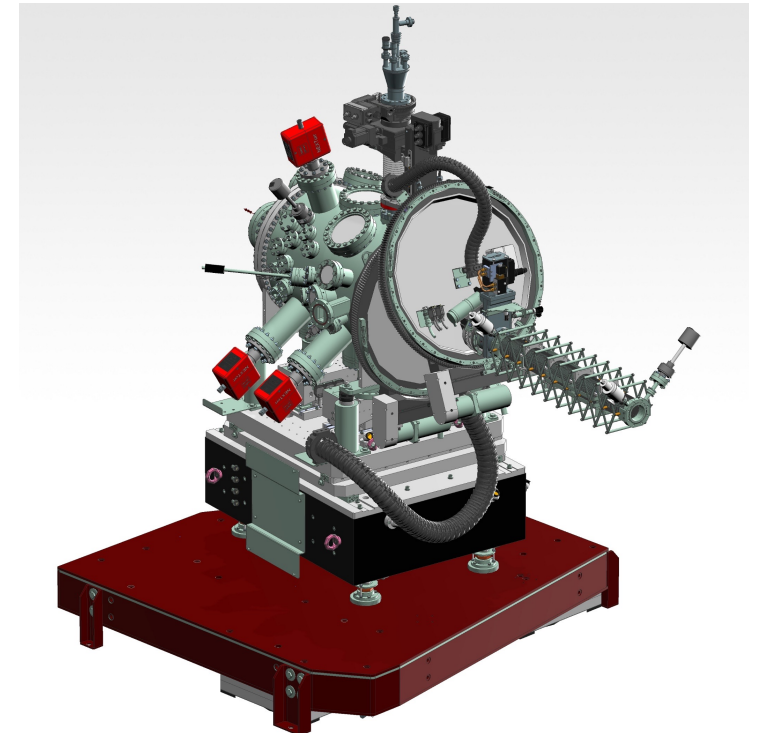
CHEM-setup

Liquid-jets samples / chemical solid samples (setup by hRIXS UC)

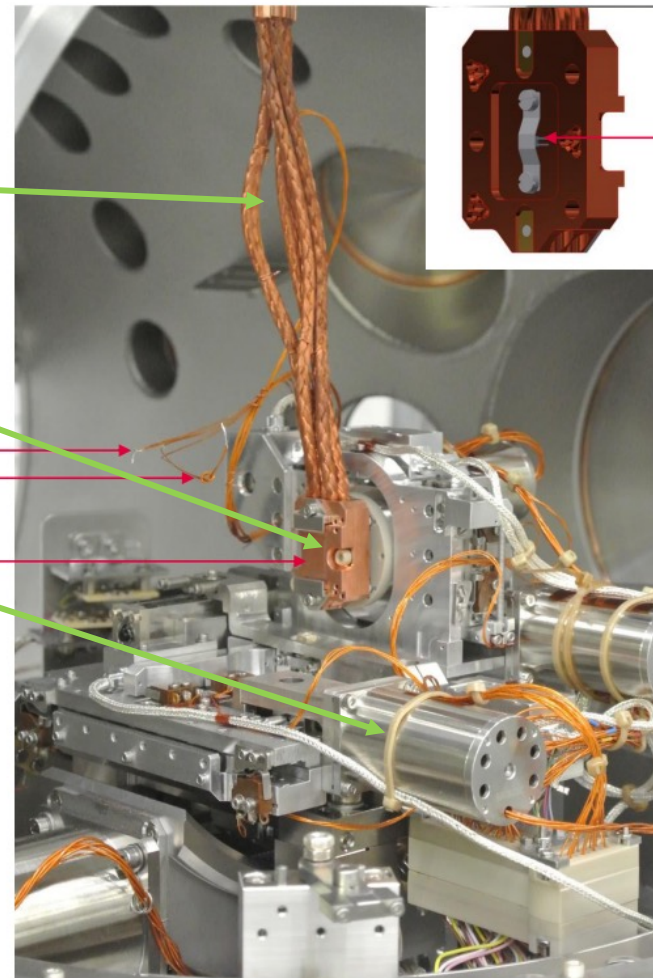
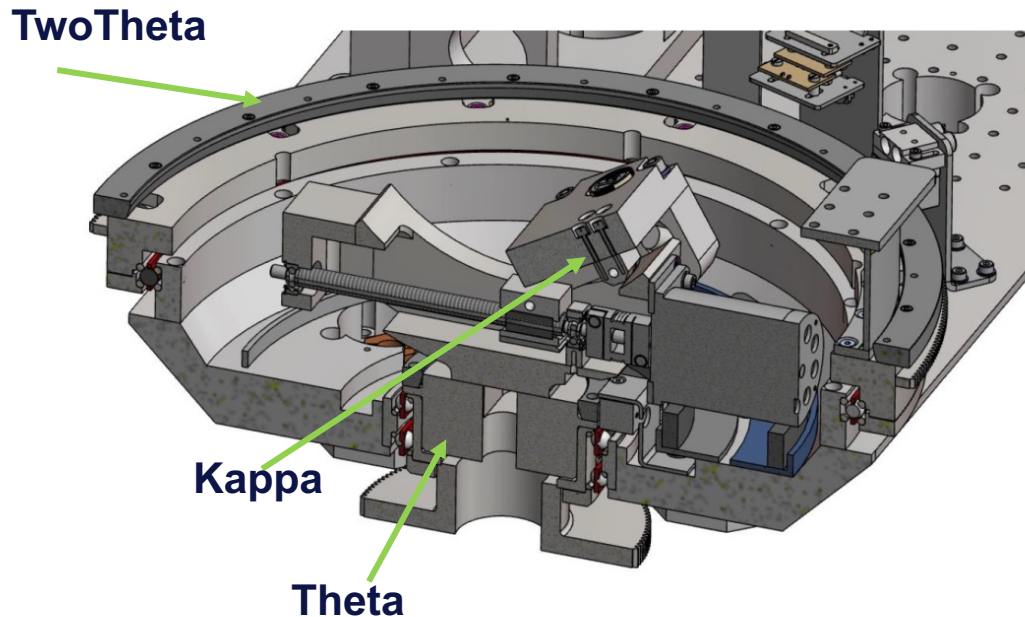


XRD-setup

Solid samples: UHV and cryogenic conditions (baseline SCS setup)



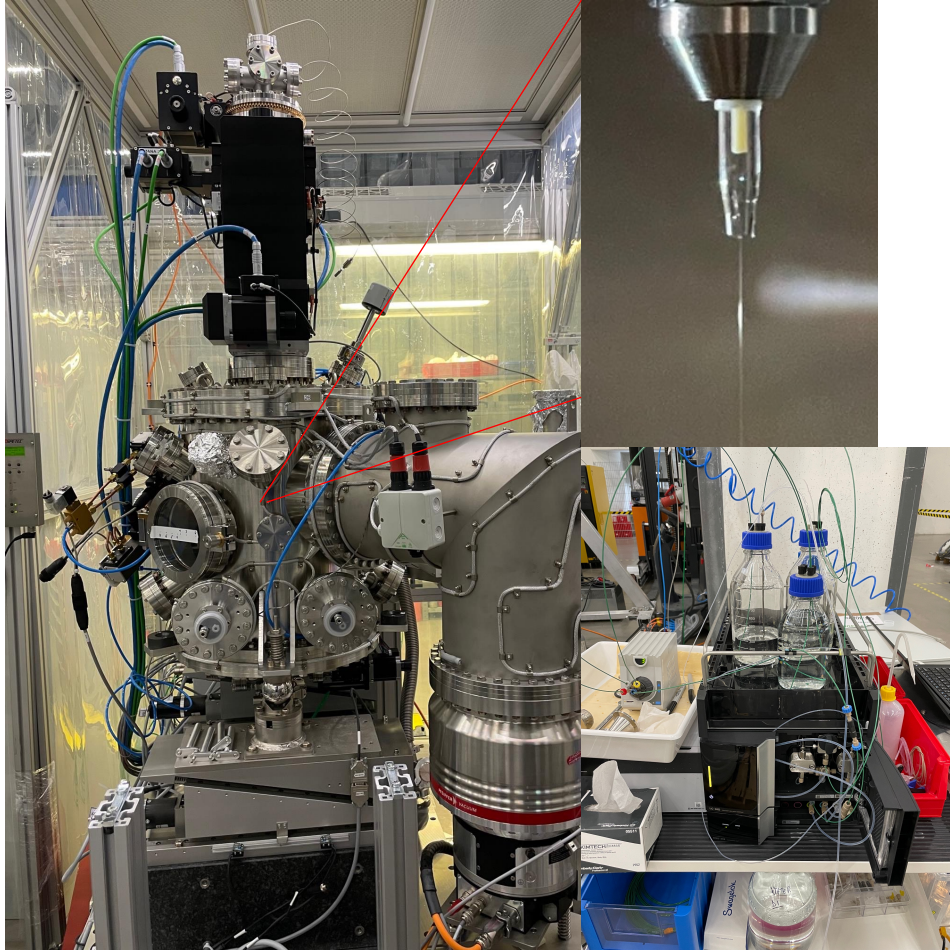
XRD inner mechanics



- In-vacuum diffractometer
- Sample: 6 DOF
- Temperatures: RT – 20 K (specification)
- Sample transfer system

Motion	Range	Repeatability
TwoTheta	± 180 deg	< 1 μrad
Theta	± 180 deg	< 1 μrad
Kappa	± 30 deg	< 1 μrad
Azimuth	± 90 deg	< 0.0002 deg
X	± 5 mm	0.5 μm
Y	± 5 mm	0.5 μm
Z	± 5 mm	0.5 μm

CHEM Chamber liquid jet system



Optimized Chem chamber for high resolution time resolved RIXS studies of chemical samples in the liquid phase:

- liquid jet with diameter ranging from 15 μm till 50 μm
- running jet for bio-chemical relevant solvents, i.e. liquid water, ethanol, iso-propanol
- a high spatial resolution microscope
- Switching channel device for up to 6 samples
- Renewable sample, up to MHz repetition rate

Optical laser parameters

- * Central wavelength: 800 nm, 2 mJ/pulse @ 113 kHz
- * Wavelength conversion: SGH – 0.56 mJ/pulse, THG – 0.14 mJ/pulse
Conversion with OPA: 380 nm – 2500 nm.
Contact sergii.parchenko@xfel.eu, robert.carley@xfel.eu for details
- * Polarization: linear, circular
- * Repetition rate: 113 kHz (default), 1.1 MHz – 113 kHz (0.2 - 2 mJ/pulse)

Laser in-coupling geometry.

