

Standard Instruments for X-ray Diffraction and Scattering at SACLA

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SACLA

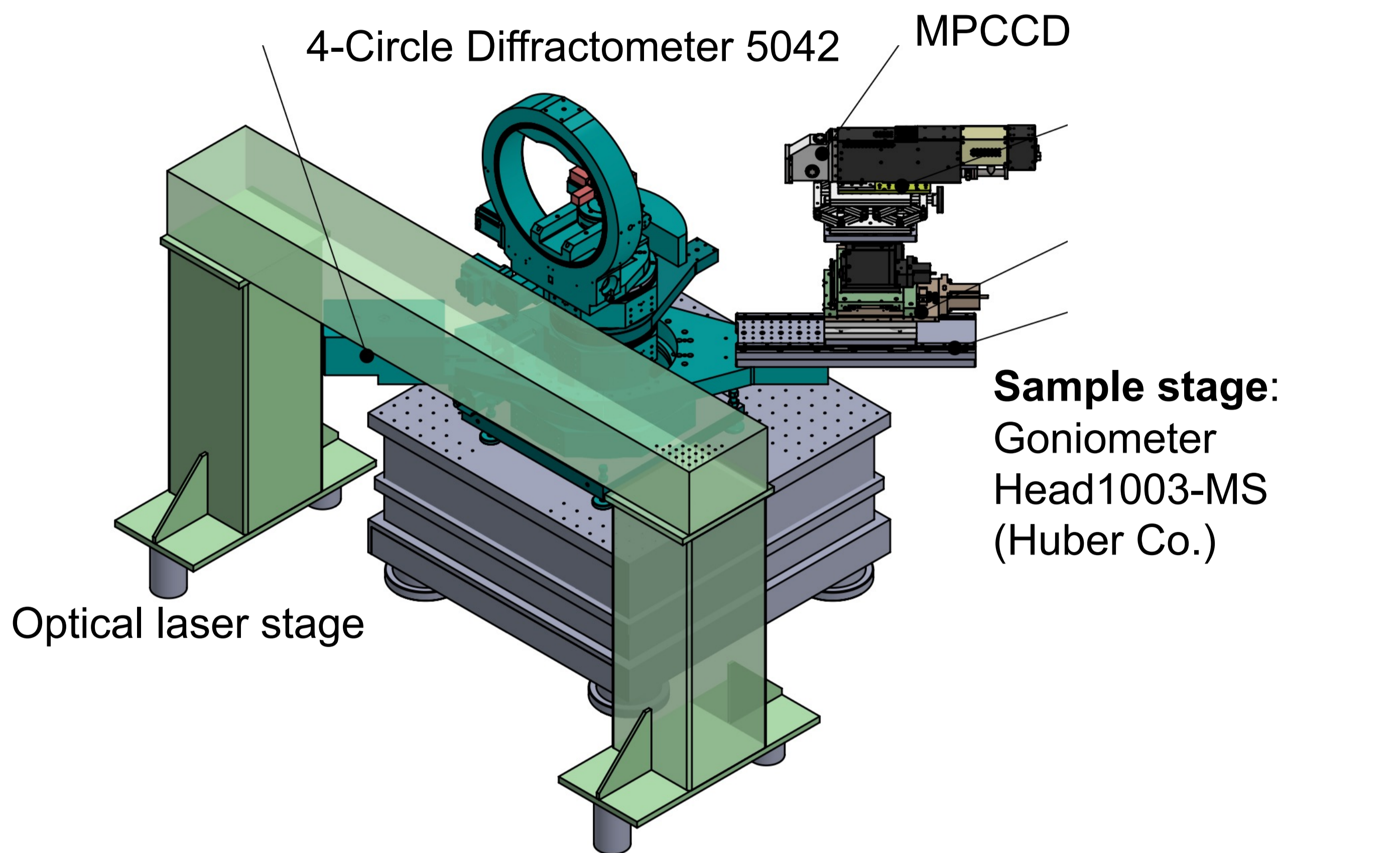


Pump-probe X-ray diffraction and scattering measurements are mainly used to investigate ultrafast phenomena in materials at SACLA. Several diffractometers are available depending on the measurement targets. A cryostat with a window that is transparent to both optical lasers and X-rays enables versatile diffraction measurements in a wide temperature range including below 10 K.

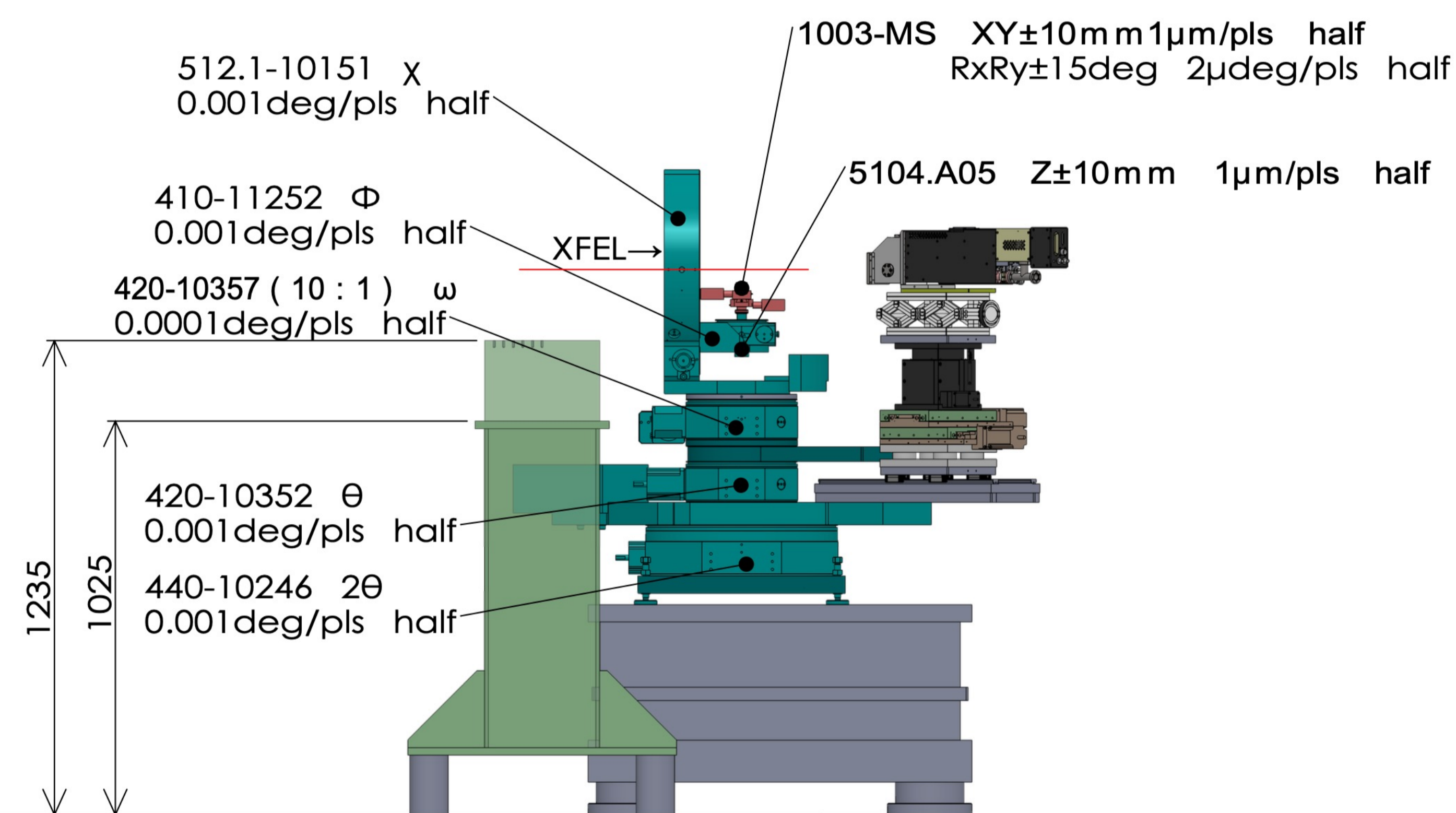
Standard Setup for Pump-Probe X-ray Diffraction

4-Circle Diffractometer (Huber Co.)

<https://www.xhuber.com/en/>



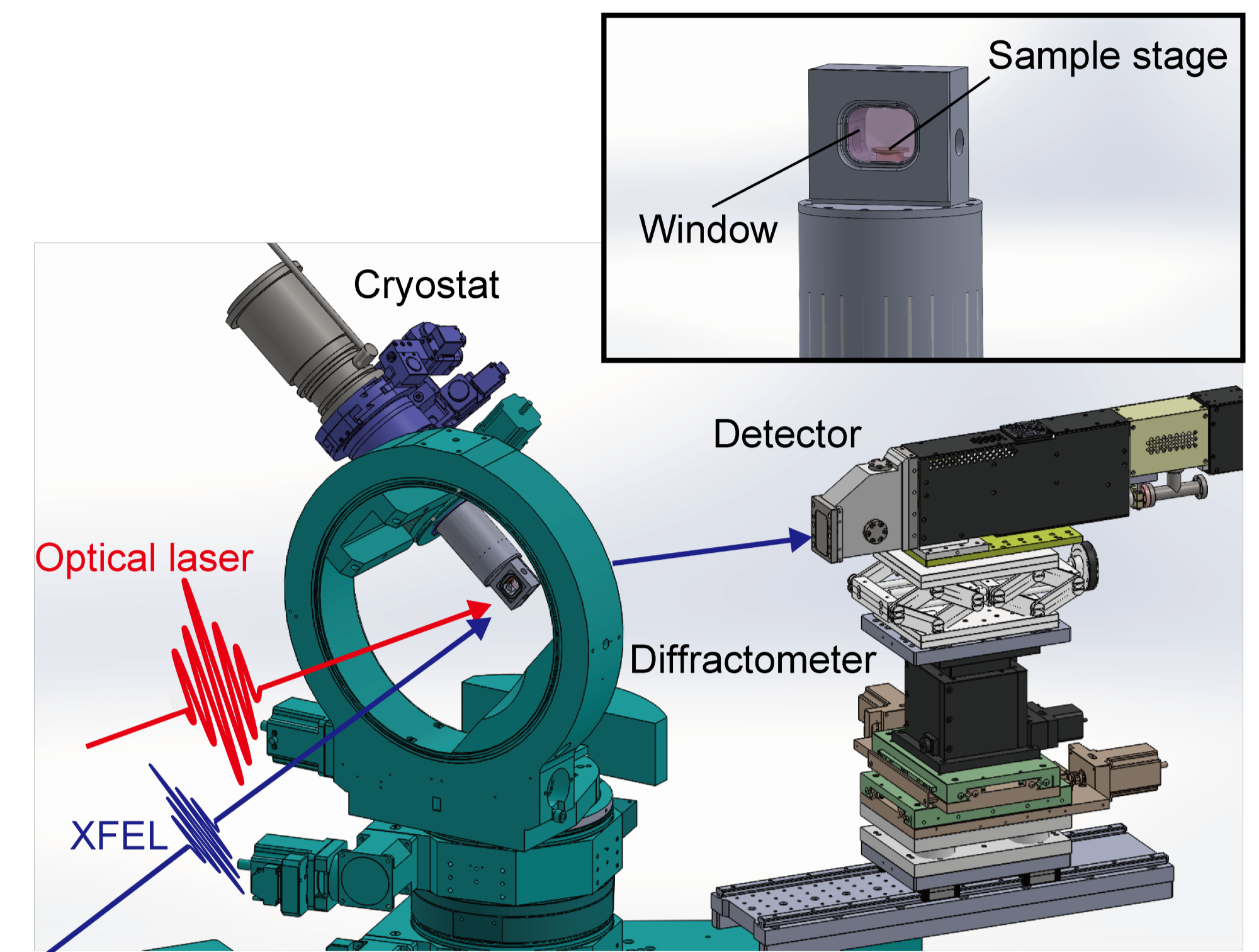
Sample stage:
Goniometer
Head1003-MS
(Huber Co.)



Cooling Systems

Cryostat (down to < 10 K)

- Highly transparent polyimide film as a window material
- Mounted on a standard 4-cycle diffractometer
- There are two types.
 - closed-cycle type (liquid He free)
 - liquid He flow type (low vibration)



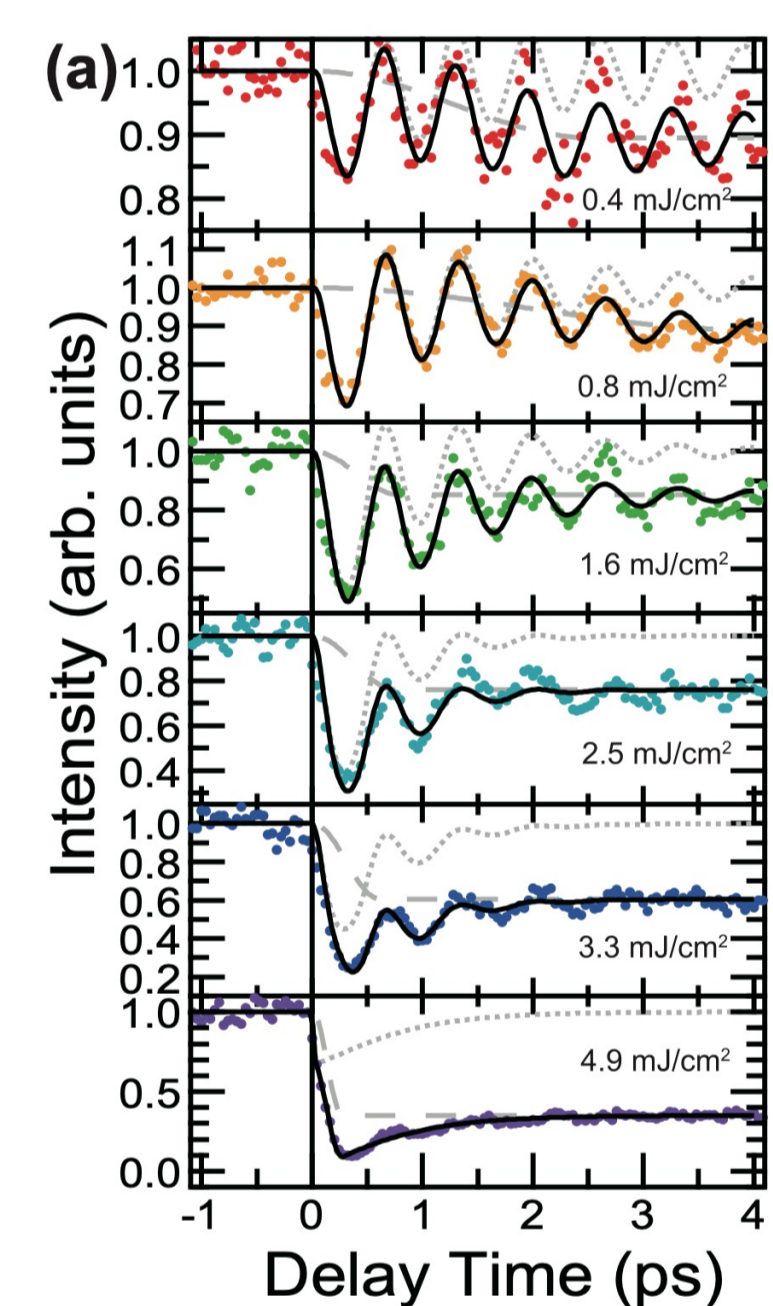
Y. Kubota *et al.*, Appl. Phys. Lett. **122**, 092201 (2023)

Cryostreams (down to ~ 100 K) are also available.

- liquid N₂ type (Oxford Cryosystems)
- N₂ gas type (Rigaku)

Recent results

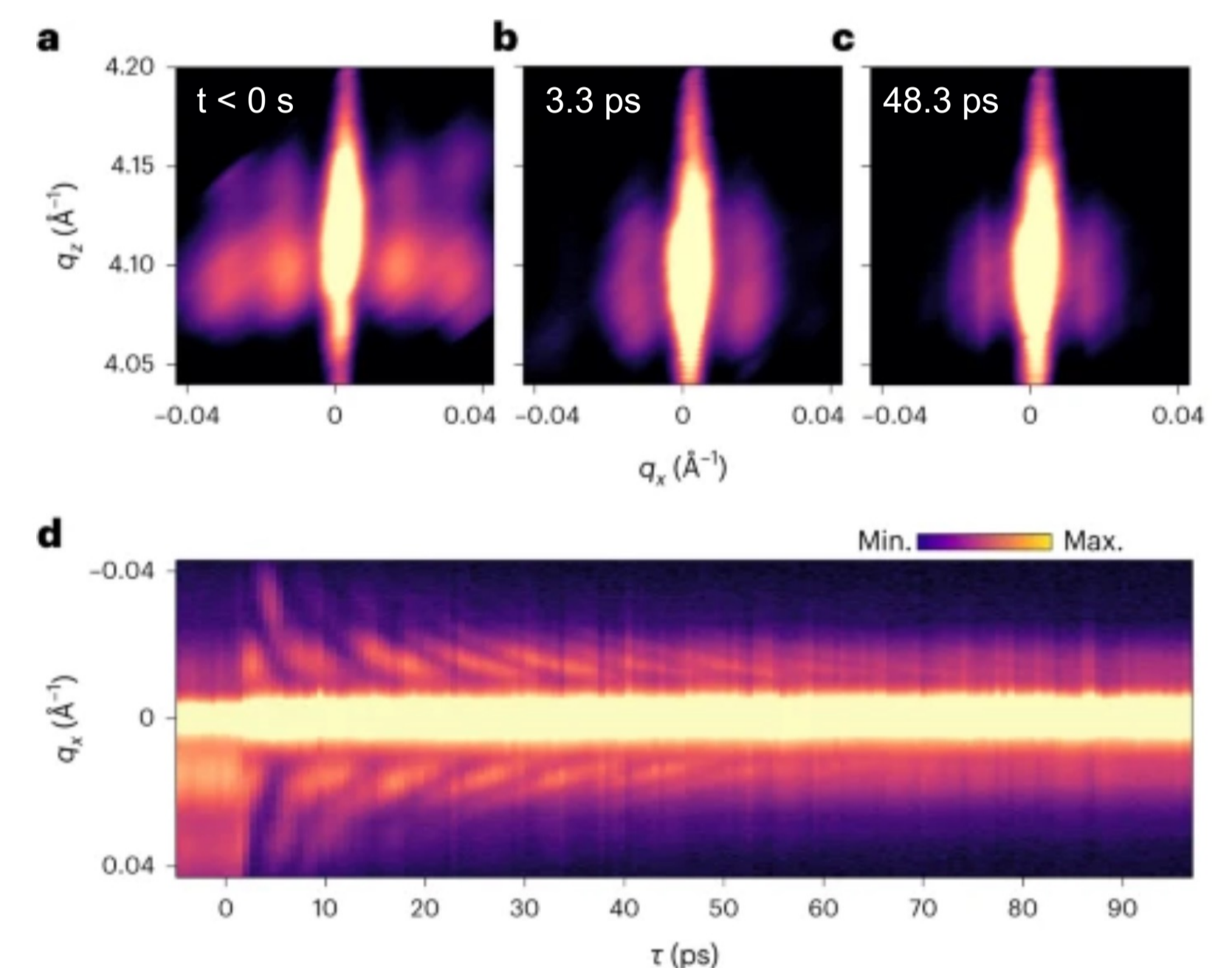
Charge-density-wave amplitude mode in VTe₂



T. Suzuki *et al.*, Phys. Rev. B **108**, 184305 (2023)

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Photoinduced dynamics of the structural nano-texture in Mott insulator Ca₂RuO₄

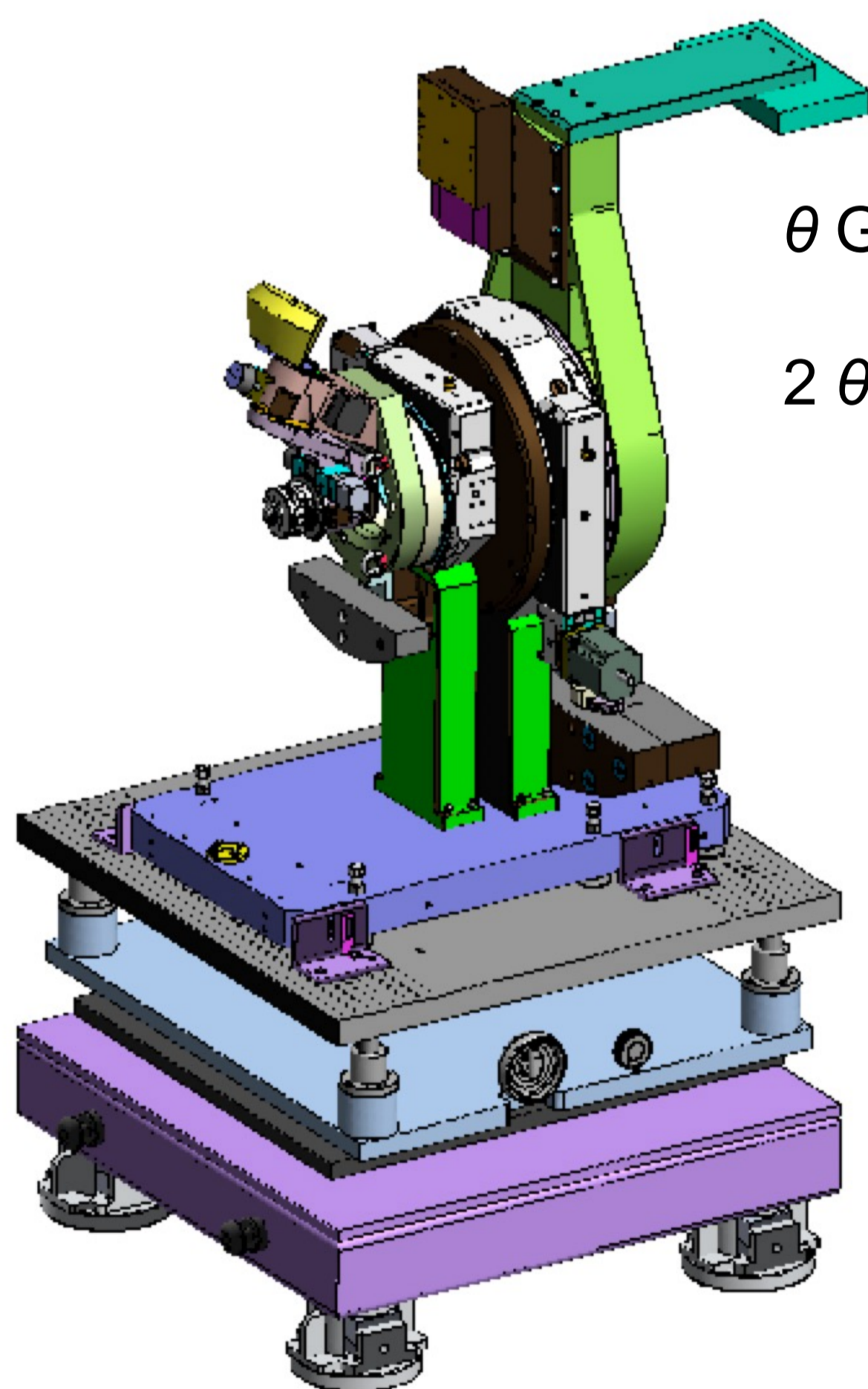


A. Verma *et al.*, Nat. Phys. in press

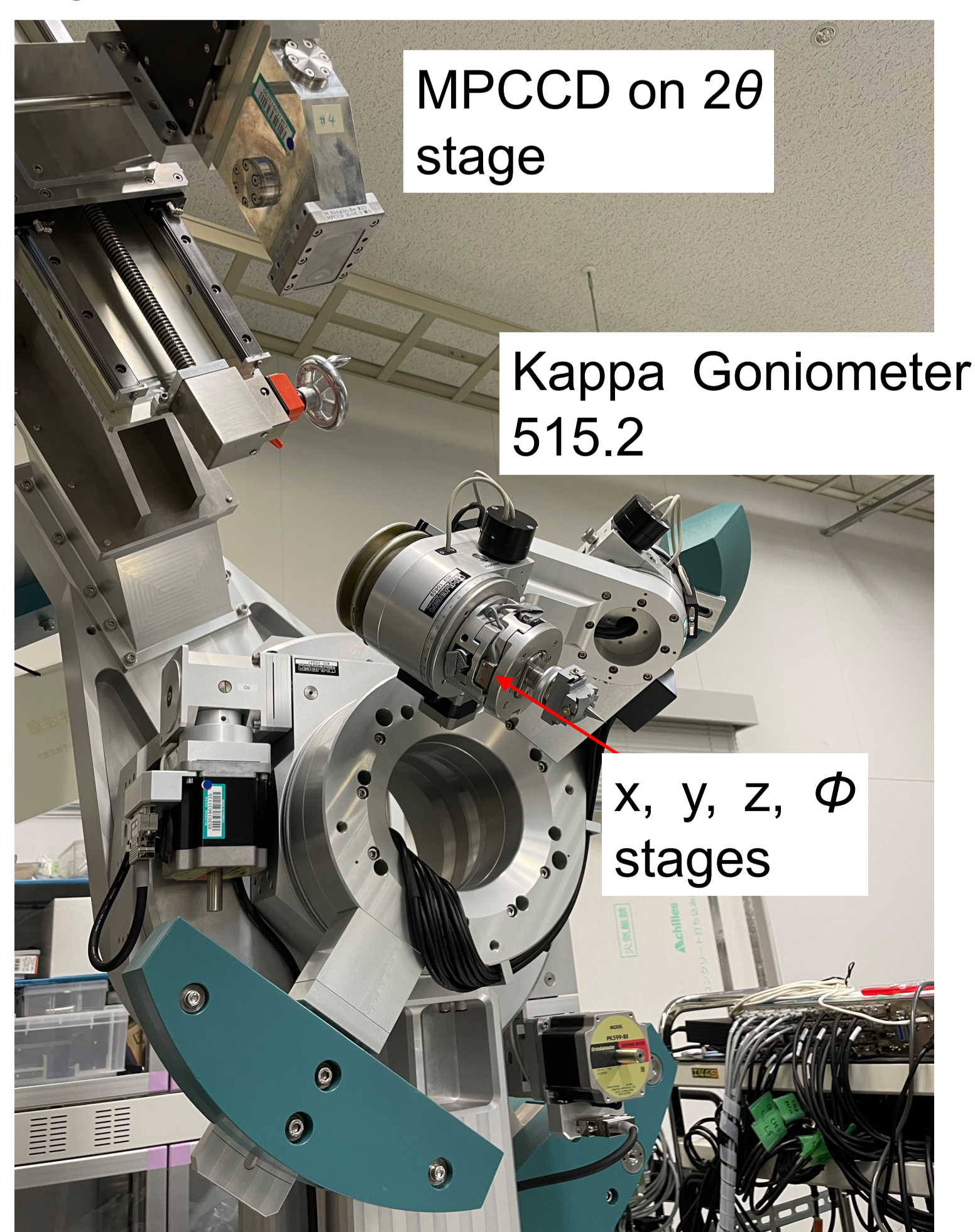
Other Instruments

Diffractometer with Kappa Goniometer (Huber Co.)

<https://www.xhuber.com/en/>



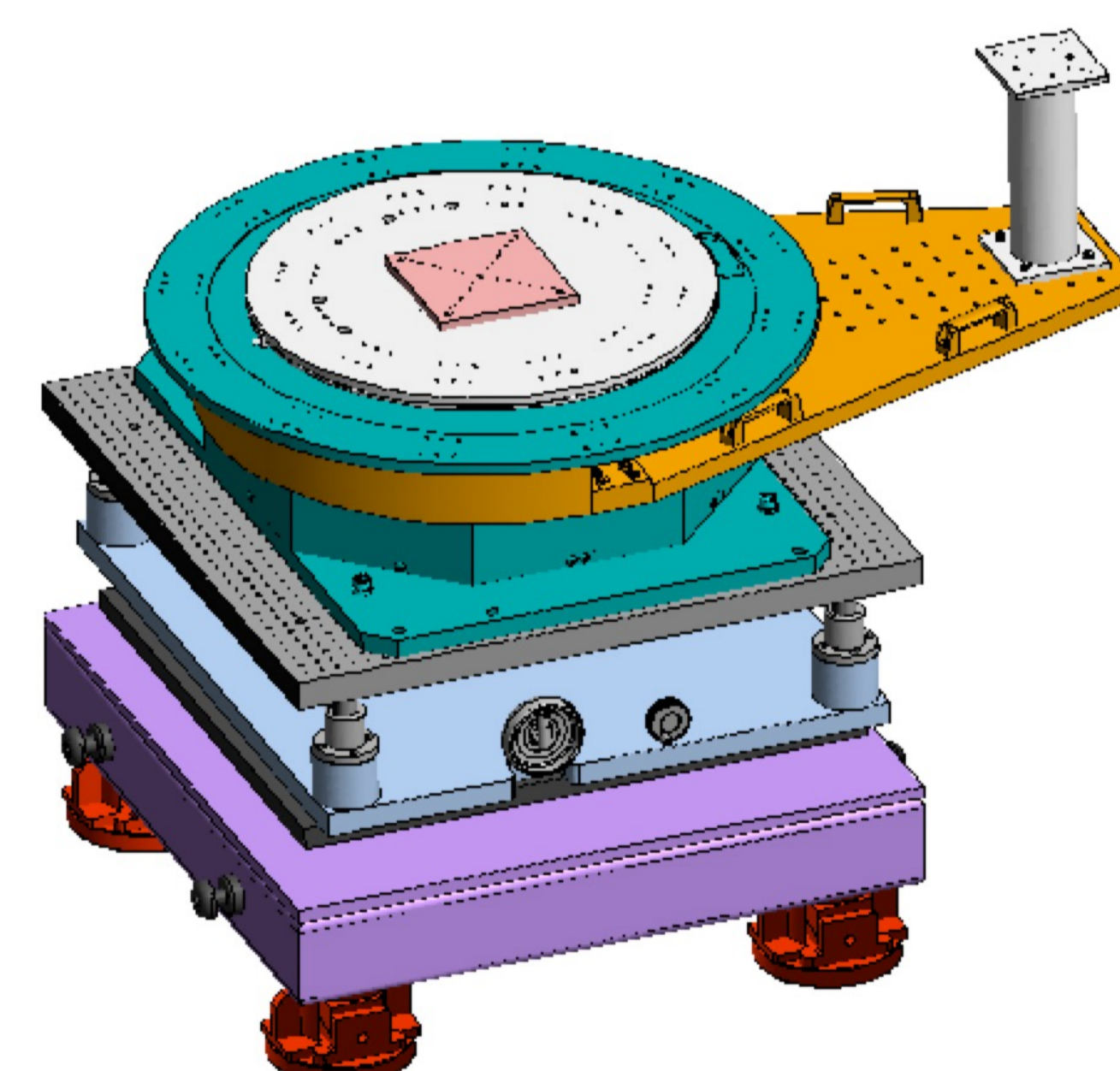
θ Goniometer 420
0.0001 deg/pulse
2 θ Goniometer 440
0.0001 deg/pulse



- More freedom around the sample
Advantageous for optical lasers, cryostreams, and so on
- Vertical reflection geometry
Accessible to high 2θ angles

General-Purpose Diffractometer (KOHZU Co.)

<https://www.kohzuprecision.com/i/>



θ
Size: Φ 700 mm
Res.: 0.00004 deg/pulse
2 θ
Arm length: 1000 mm
Res.: 0.00004 deg/pulse

X-ray Diffuse Scattering

