

MXCuBE site report

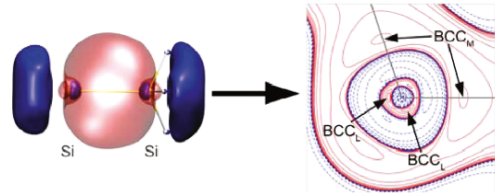
Bo-Yi Liao

NSRRC

2024/11/22

Brief beamlines summary

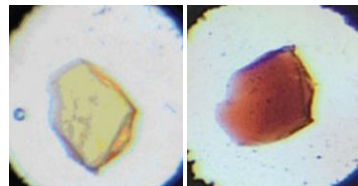
Scientific opportunity



J. Phys. Chem. A, **2011**, *115*, 13061

- Chemical bond characterization,
- Intra- and inter-molecular interactions

Charge Density Analysis
Fundamental study



0.0 GPa 7.6 GPa

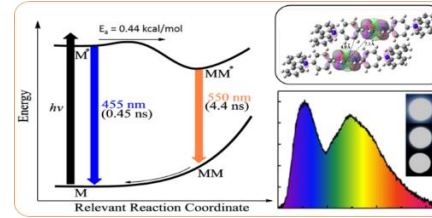
- Phase transition
- Pressure synthesis
- New physical properties

Chem. Commun., **2015**, *51*, 8868-8871

High Pressure Crystallography, Geoscience



Pump-probe Laue Crystallography



Phys. Rev. Lett., **2023**, *130*, 176802

- Metastable, intermediate structures of photochromism related materials
- bond breaking and reformation process

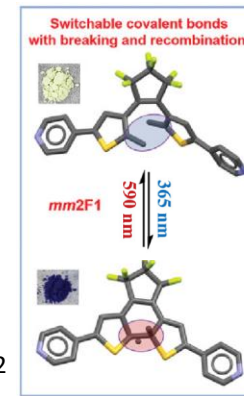
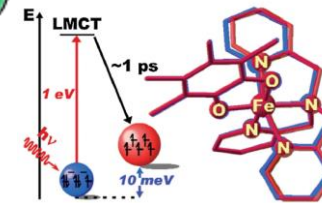


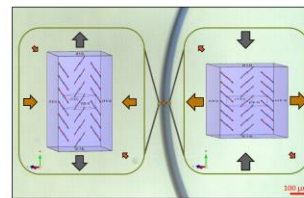
Photo-crystallography

Phys. Rev. Lett., **2009**, *103*, 028301

- Spin crossover
- Photo-excitation
- Photochromism
- Static excited state structure



Micro-crystal and Advanced Crystallography



- Bending crystal structure mapping
- Micro-crystals
- Porous materials (micro, meso and macro)
- Drug development

Nat. Chem., **2018**, *10(1)*, 65-69

Brief beamlines summary

End-stations

15A1 Beam size (@37.5 m)
 $200 \times 200 - 100 \times 100 \text{ } \mu\text{m}^2$
(define by slits)

STADIVARI

Eulerian Cradle type, horizontal design
Goniometer with robot and auto centering system

EIGER 2X CdTe 1M

Larger size crystal, high pressure
Robot auto sample mount/unmount



STADIVARI



EIGER 2X
CdTe 1M

15A1 opens to user now!
15A2 starts commissioning in 2025-1

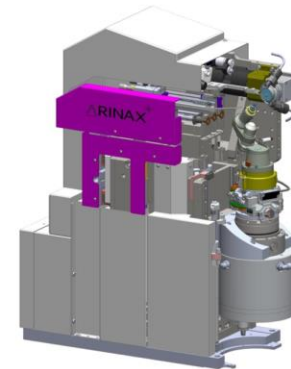
15A2 Beam size (@56 m)
 $70 \times 70 - 10 \times 10 \text{ } \mu\text{m}^2$
(2×2 with aperture of MD3)

MD3-UP

High precision goniometer (SCO $\sim 100 \text{ nm}$)
Vertical design

EIGER 2X CdTe 9M

Small size crystal, crystal structure mapping,
pump-probe, high pressure



MD3-UP



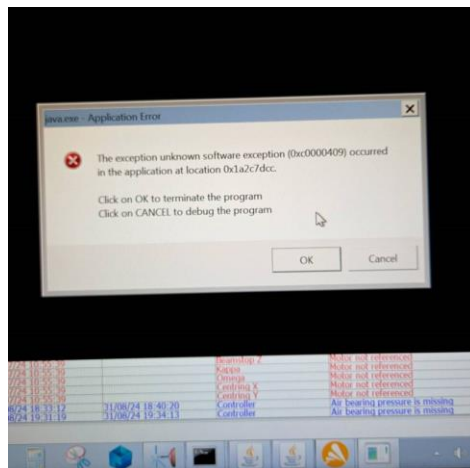
EIGER 2X
CdTe 9M

MXCuBE status

- MXCuBE:
 - MD3UP configuration
 - Connection is established, but then some exception occurred.

Date	Time	Level	Origin	Description
15/07/24	00:00:13	INFO	Folder Cleanup	Initializing cleanup of E:\deploy\MD\data\diag - time to live = 86400000
15/07/24	00:00:13	INFO	Folder Cleanup	Finished cleanup of E:\deploy\MD\data\diag - removed files = 0
15/07/24	09:53:59	INFO	Exporter Server [TCP 9001]	Exception in connection thread: 172.19.15.192:56424 - Connection reset (Connection reset)
15/07/24	10:29:37	INFO	Controller	Status = Omega Moving
15/07/24	10:29:37	INFO	Controller	State = Moving
15/07/24	10:29:37	INFO	Controller	State = Ready
15/07/24	10:32:15	INFO	Exporter Server [TCP 9001]	Exception in connection thread: 172.19.15.192:58602 - Connection reset (Connection reset)

- Keep working to figure it out with beamline_config.yml
- We find that our MD3-UP server program crashed sometimes.



Plans for the next six months

- MXCuBE plan:
 - Set up the detector (Eiger) configuration
 - Add more EPICS Hardwares
- Thanks for the supports from **ESRF** and **NFPSS**.