

ICABU 2023,  
Working Group 3\_Synchrotron Utilization  
Summary

Nov. 10<sup>th</sup> 2023  
Deok-Yong Cho and Kyung-Tae Ko

### **3 Invited Talks**

- PLS-II, Soft X-ray Microscopy
- XFEL, Time-Resolved (Pump-Probe) Soft X-ray Spectroscopy
- PLS-II&APS, Hard X-ray Scattering

### **2 Contributed Talks**

- 4GSR, Design of In-vacuum Undulator
- 4GSR, Design of Hard X-ray Microscope

**& 7 Posters**

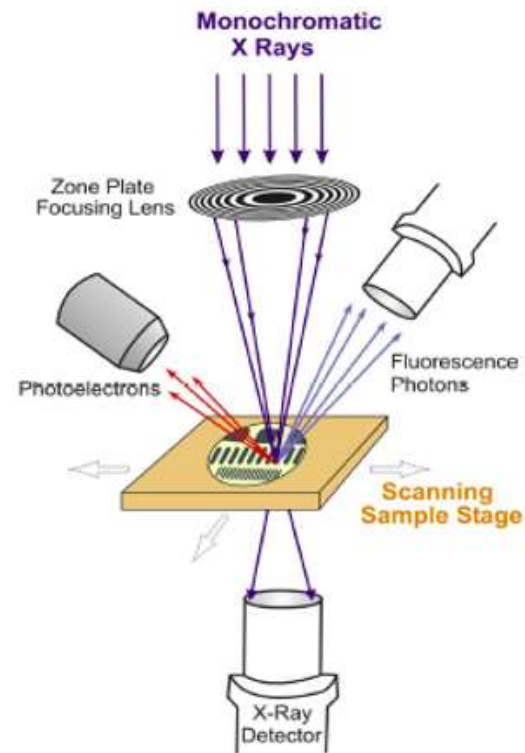
## Scanning Transmission X-ray Microscopy Study on Low Dimensional Magnetic Systems

*Wondong Kim*

*Low-dimensional material team,  
Interdisciplinary Material Measurement Institute,  
Korea Research Institute of Standards and Science*



# Scanning Transmission X-ray Microscopy(STXM)



- Element specific measurement with high spatial resolution ( $\sim 20$  nm in chemical contrast)  $\rightarrow$  *Spectro-microscopy*
- High magnetic sensitivity with circularly or linearly polarized X-ray
- X-ray in/X-ray out technique  $\rightarrow$  *in operando* measurement

# 4D visualization of a nonthermal coherent magnon in a laser heated lattice by an X-ray free electron laser

Hoyoung Jang<sup>1,2</sup>, H. Ueda<sup>3,4</sup>, Hyeong-Do Kim<sup>1</sup>, Minseok Kim<sup>1</sup>, K. W. Shin<sup>5</sup>, Kee Hoon Kim<sup>5</sup>, Sang-Youn Park<sup>1</sup>, Hee Jun Shin<sup>6</sup>, P. Borisov<sup>7,8</sup>, M. J. Rosseinsky<sup>8</sup>, Dogeun Jang<sup>1</sup>, H. Choi<sup>1</sup>, Intae Eom<sup>1</sup>, Urs Staub<sup>3</sup>, and Sae Hwan Chun<sup>1,2\*</sup>



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<sup>4</sup>SwissFEL, Paul Scherrer Institute

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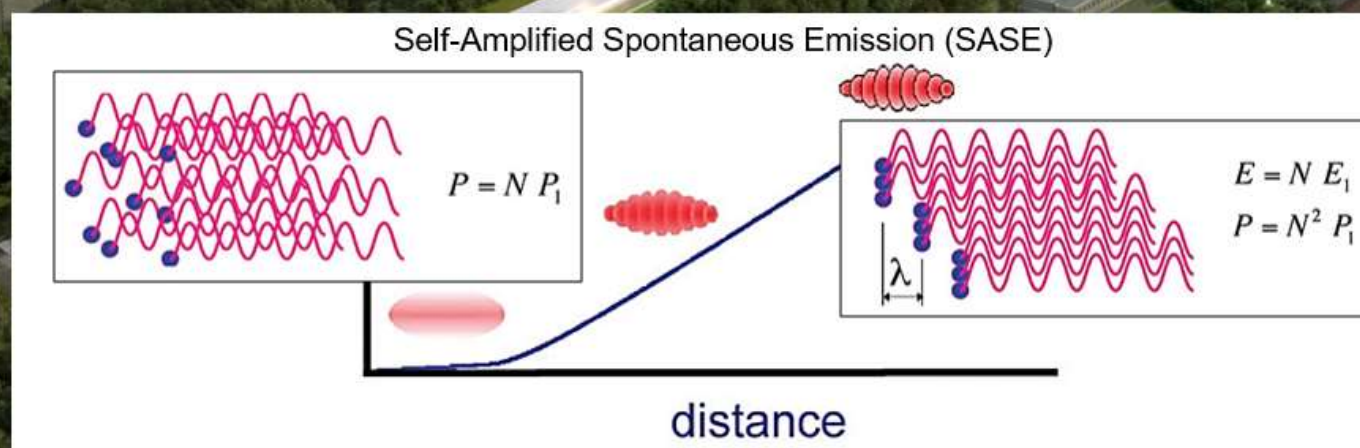
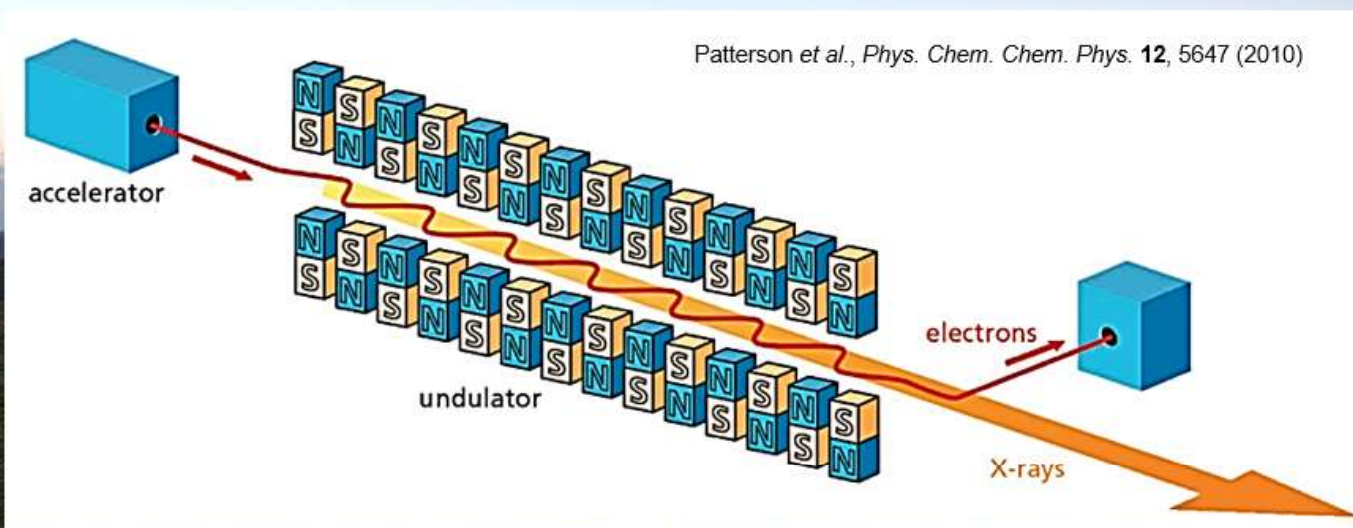
<sup>6</sup>PLS-II, Pohang Accelerator Laboratory

<sup>7</sup>Dept. of Physics, Loughborough University

<sup>8</sup>Dept. of Chemistry, University of Liverpool



# Why is it called X-ray free electron "LASER"?



# Visualizing Quantum Materials using Hard X-ray Scattering Technique

ICABU 2023  
IBS Daejeon, S. Korea

Seo Hyoung Chang

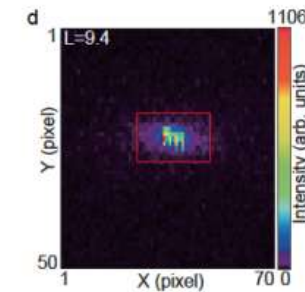
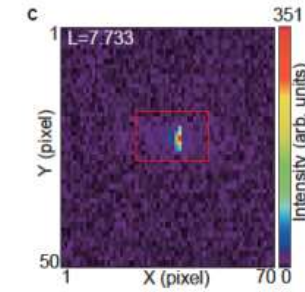
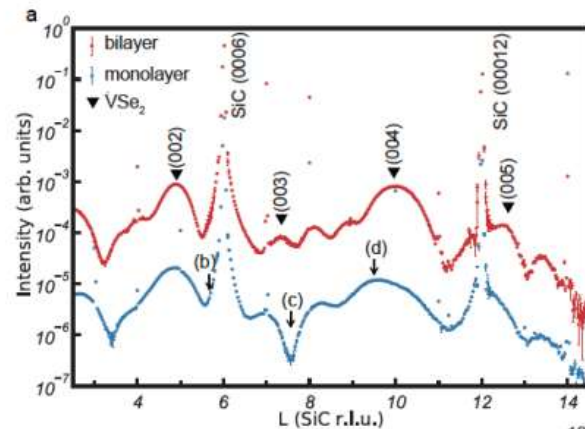
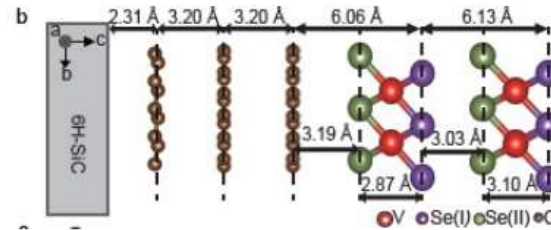
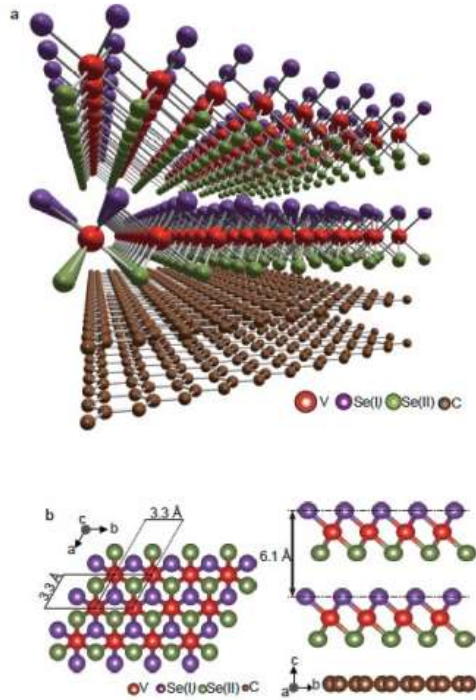
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# Surface X-ray scattering at 5A

- VSe<sub>2</sub> mono/bi-layers



R. Kim and S. H. Chang\* et al, CAP (2023)

Sample: YJC (UoS) MBE

PAL: 5A, HHL COBRA setup





**ICABU 2023**

The 25<sup>th</sup> International Conference  
on Accelerators and Beam Utilization



# In-Vacuum Undulators for the First Phase Beamlines of the Korea-4GSR

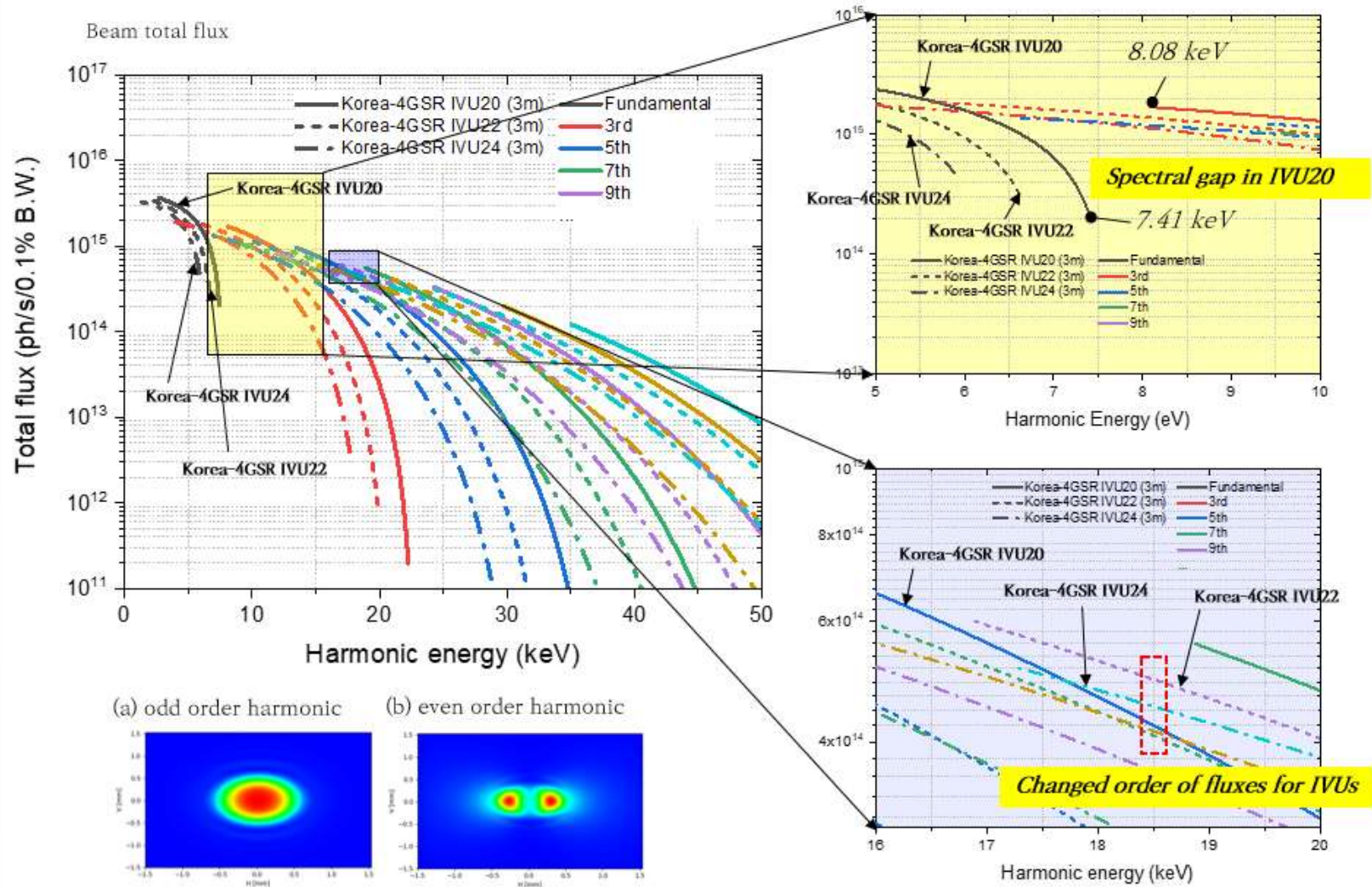
Changwan Ha, Dong Eon Kim, Ki-Jeong Kim, Jae-Hong Lim\*, Jehan Kim\*

4GSR Project Headquarters, Pohang Accelerator Laboratory, POSTECH, Rep. Korea



# Photon flux & energy spectrum for Korea-4GSR IVUs

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# Conceptual Design of the High Energy Microscopy Beamline at the Korea 4th Generation Storage Ring (Korea-4GSR)

**Jae-Hong Lim<sup>1</sup>, Yong Sung Park<sup>1</sup>, Ki-Jeong Kim<sup>1</sup>, Jong Hyun Kim<sup>2</sup>**

<sup>1</sup>4GSR Project Headquarters, Pohang Accelerator Laboratory, POSTECH

<sup>2</sup>Pohang Light Source-II, Pohang Accelerator Laboratory, POSTECH

ICABU2023

Nov. 9<sup>th</sup>, IBS Science Culture Center, Daejeon, Korea

# High Energy Microscopy (HEM) beamline at the Korea 4GSR

- Designed after benchmarking against the PLS-II X-ray imaging beamlines and commercial X-ray imaging systems



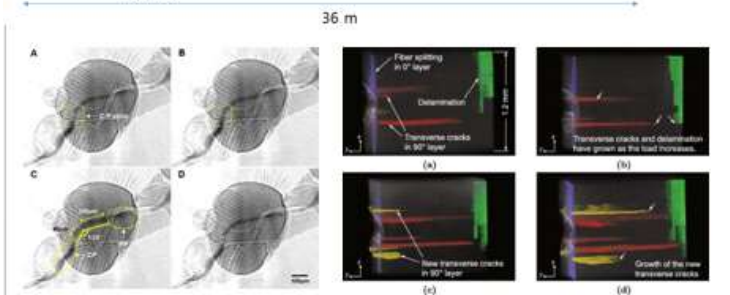
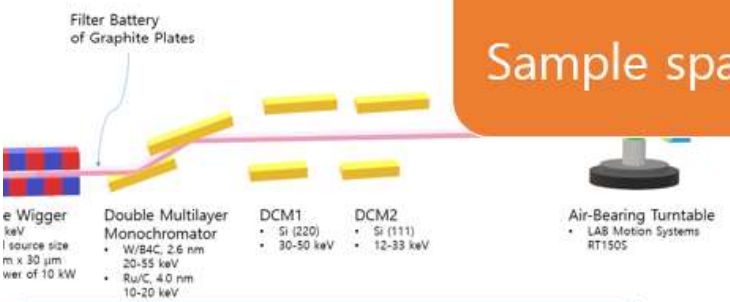
• Sensitivity  
Speed  
Sample space

> 60 keV  
Large samples (~200 mm)

HEM conceptual design



Images from Zeiss.com (160 kV)



Kim et al., *J. Exp. Biol.* 214, 1163-1169 (2011)

Jo et al., *Composite Part A: Applied Sci. and Manuf.* (2020) 128, 105661