



IBS Center for Molecular Spectroscopy and Dynamics

---

## Seminar

---

- **SPEAKER**

Prof. Kyung Hwan Kim (POSTECH)

- **TITLE**

X-ray Studies of Water's Anomalous Properties with Free Electron Lasers

- **ABSTRACT**

Water is the most important liquid for our existence on Earth and plays an essential role in physics, chemistry, biology, and geoscience. In the liquid form, water has numerous anomalous properties as compared to other liquids such as density maximum at 4-degree C. As an explanation for these anomalous experimental observations, a hypothetical liquid-liquid transition (LLT) and a liquid-liquid critical point (LLCP) has been proposed deep in the supercooled regime but has never been observed. Thus, the microscopic origin of the anomalous properties of water is elusive and there has been an intense debate for over a century.

X-ray science has evolved dramatically with the use of X-ray free electron lasers (XFELs) that can generate ultrashort X-ray pulses with unprecedented brilliance and coherence. This has been a breakthrough for many X-ray related techniques on a broad range of scientific disciplines and brought us to investigate many interesting new sciences that was previously not accessible. Recently a new method of rapid cooling and ultrafast probing with wide-angle X-ray scattering (WAXS) using FELs (LCLS, SACLA, and PAL-XFEL) has allowed the venture into no-man's land and we found the first experimental evidence of the existence of the Widom line and LLT, which are supposed to emanate from the LLCP.

- **DATE AND VENUE**

November 11, 2020 (Wednesday, 5:00 - 6:00)  
Seminar Room B (119), KU R&D Center

- **INVITED BY**

Prof. Kyungwon Kwak

- **LANGUAGE**

Korean