

## 量子物理学・ナノサイエンス第 416 回セミナー

# Modulation of Magnetic Interlayer Coupling in the $\text{Fe}_{5-x}\text{GeTe}_2$ with In-Plane Bias

**講師** : Professor Sanghoon Kim  
University of Ulsan, Republic of Korea

**日程** : 8 月 1 日 (金) 15:00 -

**場所** : 南 5 号館 1 階 103B 物理学系輪講室

## 概 要

In this presentation, microscopic structures and magnetic properties of the  $\text{Fe}_{5-x}\text{GeTe}_2$  single crystal, recently discovered as a promising van der Waals (vdW) ferromagnet, are introduced. Our study demonstrates a new way of the magnetization control of the vdW magnets via the electrical control of the interlayer coupling from ferromagnetic (FM)-to-antiferromagnetic (AFM). The current-induced phase transition results in drastically enhanced magnetoresistance from 5% to 170% with current in-plane geometry. This observation is fundamentally different from other conventional ways such as spin torque effects and gate voltage effects [1,2].

This study will provide essential information to understand the complex magnetic properties and the origin of the new vdW ferromagnet,  $\text{Fe}_{5-x}\text{GeTe}_2$  for future topology-based spin devices.

[1] T. T. Ly, *et al.*, Direct Observation of Fe-Ge Ordering in  $\text{Fe}_{5-x}\text{GeTe}_2$  Crystals and Resultant Helimagnetism, *Advanced Functional Materials* **31** (17), 2009758 (2021)

[2] K. Kim, *et al.*, Giant Modulation of Magnetoresistance in a Van Der Waals Magnet by In-Plane Current Injection, *Advanced Materials* **37** (10), 2414917 (2025)

**連絡教員** 山田 貴大 (内線 2454)