
7th International Workshop on 2D Materials

Thickness dependent magnetic phase diagram of iron-based metallic van der Waals magnets

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Short Biography:

Eunsu An is a PhD student in Prof. Jun Sung Kim's lab at POSTECH, Pohang, Korea. He mainly studies on magnetotransport properties of van der Waals magnets.

Abstract:

We report magnetic properties of a new iron-based van der Waals (vdW) magnets Fe_4GeTe_2 and $(\text{Fe},\text{Co})_4\text{GeTe}_2$ with variation of their thickness. Fe_4GeTe_2 holds a unique position among vdW magnets, showing a nearly room-temperature ferromagnetic (FM) order, together with a large magnetization and a high conductivity [1]. The FM order of Fe_4GeTe_2 is highly tunable with Co doping, leading to high- T_N antiferromagnetism of $T_N \sim 226$ K [2]. These magnetic properties are well retained even in cleaved crystals down to several layers, with significant modulation of the spin configuration and also the magnetic anisotropy, which can be effectively read-out by their coupling to the electrical conduction. These findings manifest strong merits of metallic vdW magnets as an active component of vdW spintronic applications.

[1] J. Seo, D. Y. Kim, E. S. An, *et al.* *Sci. Adv.* 6. 8912 (2020).

[2] J. Seo, E. S. An, T. Park, *et al.* *submitted*.