7th International Workshop on 2D Materials

Title of the Presentation: Gigantic current control of coercive field and spin-orbit-torque in topological van-der-Waals ferromagnet Fe_3GeTe_2

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Short Biography:

I got my PH. D degree from University of Science and Technology of China (USTC), and I am now a postdoctoral researcher of Prof. Je-Geun Park's group in Seoul National University (SNU). My research interests are mainly focused on 2D magnetic materials and their device applications.

Abstract:

Controlling magnetic states by a small current is essential for the next-generation of energy-efficient spintronic devices. Very recently, van-der-Waals (vdW) magnets have rapidly emerged as key members of the field of two-dimensional materials and device physics [1-6]. Among all the magnetic vdW materials, Fe_3GeTe_2 received special attention because it is the only topological ferromagnetic vdW metal [7].

Here we report that surprisingly an in-plane current can tune the magnetic state of nm-thin vdW ferromagnet Fe_3GeTe_2 from a hard magnetic state to a soft magnetic state, through substantial reduction of the coercive field. This surprising finding is possible because the in-plane current produces a highly unusual type of gigantic spin-orbit torque for Fe_3GeTe_2, which is directly related to the large Berry curvature and so its band topology. And we further demonstrate a working model of a new nonvolatile magnetic memory based on the principle of our discovery in Fe_3GeTe_2, controlled by a tiny current. Our findings open up a new window of exciting opportunities for magnetic vdW materials with potentially huge impacts on the future development of spintronic.

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