Efficient Control of 2D Magnets

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The emergent two-dimensional (2D) layered magnets [1,2] provide ideal platforms to enable the atomically thin magneto-optical and magnetoelectric devices. Though many have envisioned that 2D magnets should allow efficient control of magnetism by a variety of external stimuli, true breakthroughs are still lacking, with limited proof-of-concept demonstrations reported thus far. There appear to be fundamental obstacles for efficient control, e.g., through electrical and optical means. In this talk I will analyze the challenges and present our theoretical and experimental progress on efficient electrical [3-7] and optical control [8,9] of 2D magnets. Specifically, the results show that the voltage of a few volts can effectively change the magnetic anisotropy of 2D magnets and the laser shinning of tens of uW/um^2 can effectively affect the domain behaviors of 2D magnets. These efficient controls of 2D magnets potentially open up new avenues towards low-power spintronics and photonics.

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