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Electric Field Effect in Multilayer $Cr_2Ge_2Te_6$: a Ferromagnetic Two-Dimensional Material WENYU XING, YANGYANG CHEN, International Center for Quantum Materials, Peking University, Beijing 100871, China, PATRICK M. ODENTHAL, Department of Physics and Astronomy, University of Utah, UT 84112, USA, XIAO ZHANG, WEI YUAN, TANG SU, QI SONG, TIANYU WANG, JIANGNAN ZHONG, SHUANG JIA, X. C. XIE, International Center for Quantum Materials, Peking University, Beijing 100871, China, YAN LI, Department of Physics and Astronomy, University of Utah, UT 84112, WEI HAN, International Center for Quantum Materials, Peking University, Beijing 100871, China — Two-dimensional (2D) ferromagnetic materials are very attractive for their magnetic properties and future spintronics devices applications. In this talk, I will present our experimental results on the preparation and characterization of a 2D ferromagnetic material: $Cr_2Ge_2Te_6$ (CGT). The bulk crystal CGT is synthesized by flux method, and it is a ferromagnetic insulator with the Curie temperature of ˜65 K. Owing to the van der Waals nature of the crystal structure, we are able to prepare CGT flakes with thicknesses down to a few nanometers using the mechanical exfoliation method. Then the electrical measurements are performed by fabricating nano devices on a series of CGT flakes with different thicknesses. There, we have observed that the intrinsically insulating 2D CGT flakes could be tuned to be metallic using the electric field effect. Furthermore, the ferromagnetic properties of the 2D CGT flakes are characterized by Kerr rotation and anomalous Hall measurements.

Wenyu Xing
International Center for Quantum Materials, Peking University

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