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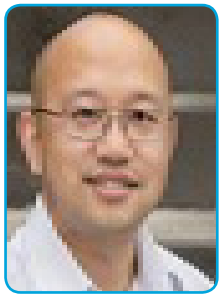

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Ferromagnetism and spintronic devices based on van der Waals hetero structures

Two Dimensional (2D) van der Waals (vdW) materials, consisting of atomically thin layers, have fascinating physical properties and intriguing thickness-dependent characteristics. To date, research on these materials has pre-dominantly focused on various devices based on their optical and electronic properties, whilst reports on magnetic and spintronic devices based on 2D vdW materials are scarce, because vdW materials with desirable magnetic properties have yet to be found. By performing anomalous Hall-effect transport measurements, we reveal that the magnetic properties of single crystalline vdW Fe_3GeTe_2 vary dramatically with thickness. Importantly, a single hard magnetic phase with a near square-shaped magnetic loop, large coercivity (up to 550 mT at 2 K) and strong perpendicular magnetic anisotropy were all observed in Fe3GeTe2 nanoflakes. These merits make Fe3GeTe2 the first vdW ferromagnetic material suitable for fabricating vdW magnetic heterostructures. Based on this material, various spintronic devices has been designed and fabricated.

Biography

Lan Wang has completed his PhD in materials sciences from University of Minnesota, Twin cities. After his PhD thesis he worked as Assistant Professor at Nanyang Technological University in Singapore. He has published over 90 peer reviewed articles in prestigious journals, including *Nature Communications, Physical Review Letters, Nano Letters*, etc. He is currently working as the Leader of Theme B of the ARC CoE–Future Low Energy Electronics Technologies. His research interests focus on various quantum materials, including topological insulators, 2D semiconductors, etc.

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