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Protected giant magnetic anisotropy in transition-metal adatoms on defected tungsten disulfide monolayer[1] JIE LI, State Key Laboratory of Surface Physics, Key Laboratory of Computational Physical Sciences, and Department of Physics, Fudan University, Shanghai, HUI WANG, RUQIAN WU, Department of Physics and Astronomy, University of California, Irvine — Giant magnetic anisotropy, especially in systems with magnetic units protected, is very important for the development of spintronics and quantum computing devices. Through systematic first-principles calculations, we identified that Ir@D-WS2 and Os@D-WS2 may have magnetic anisotropy energies up to 40 meV even when they are covered by graphene, sufficient to frustrate the thermal fluctuation at room temperature. Moreover, the magnetic anisotropy of Os@D-WS2 can be enhanced by 300% when an external electric field is applied in a range of 0.5 to -0.5 V/. This finding of giant magnetic anisotropy in a well protected materials opens an vista of the development of data storage and spintronic devices.

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