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**Experimental exploration of magnetism in ultrathin  $M_2P_2X_6$  flakes** CHENG GONG, YANG XIA, WEI BAO, YUAN WANG, XIANG ZHANG, University of California, Berkeley — Transition metal phosphorus chalcogenides  $M_2P_2X_6$  ( $M = \text{Mn, Ni, Fe, etc.}$ ;  $X = \text{S, Se, Te, etc.}$ ) constitute a large family of van der Waals materials that possess rich magnetic phases. We systematically studied the magnetic behaviors of ultrathin  $M_2P_2X_6$  flakes. We found that magnetism in thin layers is suppressed, revealing a strong dimensionality effect. Our work unveils the dominant physics that controls the magnetic behavior in vdW layers, which can guide the design of magnetic vdW layers, heterostructures, and superlattices.

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