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Current-driven writing process in antiferromagnetic Mn2Au for memory applications

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Current pulse-driven Neel vector rotation in metallic antiferromagnets is one of the most promising concepts in antiferromagnetic spintronics. We show microscopically that the Neel vector of epitaxial thin films of the prototypical compound Mn2Au can be reoriented reversibly in the complete area of cross-shaped device structures using single current pulses. The resulting domain pattern with
aligned staggered magnetization is long-term stable enabling memory applications. We achieve this switching with low heating of ≈ 20 K, which is promising regarding fast and efficient devices without the need for thermal activation. Current polarity-dependent reversible domain wall motion demonstrates a Neel spin-orbit torque acting on the domain walls.

Category

Solid State (Experiment)

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