

Epitaxial growth and electrical control of antiferromagnetic materials

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Having the advantages of immunity to external magnetic fields and fast spin dynamics, antiferromagnetic materials open a new door towards the next generation of high-speed data storage devices. Here, we optimized the growth condition of epitaxial Mn₂Au and NiO films, an antiferromagnetic metal and an insulator film, which can be controlled electrically with two different spin-orbit torque mechanisms [Ref.1, ref.2]. The materials are consequently patterned into star shaped devices for electrical switching measurements. Due to current-induced switching of Neel vectors, we observe a change of Anisotropic Magnetoresistance (AMR). This Neel vector switching offers a platform to investigate magnetization dynamics in antiferromagnetic materials.

[1] J. Železný et al., Phys. Rev. Lett. 113, 157201 (2014)

[2] X.Z. Chen et al., Phys. Rev. Lett. 120, 207204 (2018)

Position

Phd

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