

Last Advances on Antiferromagnetic Spintronics

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Recently, antiferromagnets (AFM) have been proposed as alternative materials to ferromagnets for memory applications out of the spintronics mainstream [1,2]. AFMs can share with FMs the intrinsic radiation-hardness, nonvolatility, and speed, which are the important merits making magnetic memories attractive complements to charge-based devices. In addition, AFM can bring to magnetic memories insensitivity to strong magnetic field perturbations, whether generated externally or internally within the memory circuitry.

Two are the first questions that arise when one envisage an AFM material to be used as the container for bits of information: *how do we read them?* and *how do we write on them?* We will revise the range of the explored methods for writing and reading AFM. Reading AFM materials is not a real bottle-neck for their use, because the strategies for electrical-reading can be very similar to those used on ferromagnetic materials. The simplest one is anisotropic magnetoresistance (AMR), but also tunnel anisotropic magnetoresistance (TAMR) can be used to infer magnetic states in AFM. Regarding the writing procedures, three methods have been demonstrated to be effective: i) exchange bias,[3,4,5,6] ii) heat assisted magnetic recording,[7,8] and most recently iii) electric spin transfer torque.[9] Our attention will be focus on the last advances of the electrical means of writing on AFM.

Finally, we also do a fast screen on alternative appealing AFM materials.

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