

The future for antiferromagnetic information storage

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A review published in *IEEE Transactions on Magnetics* compiles the approaches that have been employed for reading and storing information in antiferromagnets and answers the question about how to write on antiferromagnetics successfully. Dr Xavi Martí and Dr Ignasi Fina, together with Tomas Jungwirth from the Institute of Physics ASCR in Prague, are the authors of the review.

Antiferromagnetic materials might become a more robust alternative to [ferromagnetic materials](#), which enable today's storage of digital information. Dr Xavi Marti and Dr Ignasi Fina have published an article, together with Tomas Jungwirth from the Institute of Physics ASCR in Prague, in which they review approaches that have been employed for reading, writing, and storing information in antiferromagnets. The article, titled "Prospect for Antiferromagnetic Spintronics," has been published in *IEEE Transactions on Magnetics*.

Ferromagnetic materials are made by very small compasses all pointing to the same direction. These can be manipulated by the application of an external magnetic field, which can define a preferential direction, for example "north-south" or "south-north". These "north-south" or "south-north" alignments are the basic magnetic information unit for credit cards, transport cards, hard disks, etc. In all these cases, proximity of a sufficiently strong magnet will erase the contents and destroy the stored information.

Antiferromagnetic memories are an appealing alternative, though still in

a development stage. In antiferromagnetic materials, the magnetic moments point alternatively in antiparallel directions. This arrangement cannot easily be manipulated by [external magnetic fields](#), thus delivering a significantly more stable solution against electromagnetic perturbations. Unlike the "north" or "south" in ferromagnets, in antiferromagnetic [materials](#) the units of information are arranged either "north-south" or "east-west". The key question is how to write such "north-south" or "east-west" bits if they cannot be easily manipulated by magnetic fields?

In their paper, the researchers compile a list of the strategies for writing to an antiferromagnetic medium. The writing method comprises a significant bottleneck for practical applications of antiferromagnetic storage, and this work will be of interest to the antiferromagnetic spintronics community and a valuable guide for researching potential applications.

More information: Prospect for Antiferromagnetic Spintronics. *IEEE Transactions On Magnetics*, 51, 4. [DOI: 10.1109/TMAG.2014.2358939](https://doi.org/10.1109/TMAG.2014.2358939)

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