From antiferromagnets to altermagnets: functionalizing novel magnetic phases

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While known for a long time, antiferromagnetically ordered systems have previously been considered, as "interesting but useless". However, since antiferromagnets potentially promises faster operation, enhanced stability and higher integration densities, they could potentially become a game changer for new spintronic devices. Here we show how antiferromagnets can be used as active spintronics devices by demonstrating the key operations of "reading" [1], "writing" [2], and "transporting information" [3] in antiferromagnets.

Going beyond antiferromagnets, we develop altermagnetic materials [4,5]. This recently identified class magnets with collinear antiferromagnetic magnetic order can exhibit spin splitting and particular spin transport properties and torques [4]. Here we demonstrate the spin splitting in RuO_2 and CrSb [5] und analyze particular symmetries of the Hall signal in the altermagnet hematite [6].

Reference

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