

Between the spins

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The exchange interaction induces spins alignment in magnetic materials, and is responsible for ferromagnetism and antiferromagnetism. Our understanding of exchange mechanism goes back the work of Heisenberg in 1926, which revealed that it arises from the combination of the Coulomb interaction and the Pauli exclusion principle. By implementing Femtosecond Stimulated Two-magnon Raman Scattering we photoinduce and detect an increase of the exchange energy over a few tens of femtoseconds. Our results, just appeared in *Nature Photonics*, may have implications for magnetic recording:

Since IBM introduced the first hard disk in 1956, the quest for more efficient storage has triggered an impressive improvement: the current recording density is more than 50 million times higher than the original prototype. With this technology, normally based on magnetic heads, however, the time required to read a single bit has already attained its limit, which, researchers say, cannot be reduced below 1 nanosecond. Our study opens potential perspectives for pushing magnetic writing at speeds ten thousands times faster than those currently available.