Ferromagnetics breakthrough could change storage as we know it

By **Jon Gold**, Network World

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A previously misunderstood magnetic phenomenon has been apparently explained by a paper published on Sunday in Nature Materials and the explanation could lead to wholesale transformation in magnetic storage.

Essentially, according to MIT professor Geoffrey Beach's team, the positive or negative "poles" of a very thin ferromagnet behave in a predictable way when placed next to specific types of materials. What this means is that, due to a complicated asymmetry created when the magnetic media is the middle layer in a sandwich of two others, it's possible to switch a value on the disk from 1 to 0 using about 1/100th the energy as in current systems. (Since power scales with the square of the current, this represents a 10,000-fold improvement in power dissipation.)

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"The idea is not to improve hard disks, but to replace them with magnetic solid-state devices. In a hard disk, bits are fixed in position on the surface of the disk, and individual bits are accessed by physically rotating the disk," Professor Beach told *Network World*. "If the bits are instead stored as a series of magnetic domains arranged along a magnetic nanowire, they can be moved by shifting the domains using an electrical current, without any mechanical motion."

This not only means increased energy efficiency, but increased speed, since the need for mechanical motion has been obviated. And since it's non-volatile memory, it could both replace RAM and do away with the need to perform boot sequences when computers are powered on, he said.

We could see these "magnetic solid-state" devices sooner, rather than later according to Beach, the materials involved are the same as those in present-day HDD technology.

Email Jon Gold at jgold@nww.com and follow him on Twitter at @NWWJonGold.