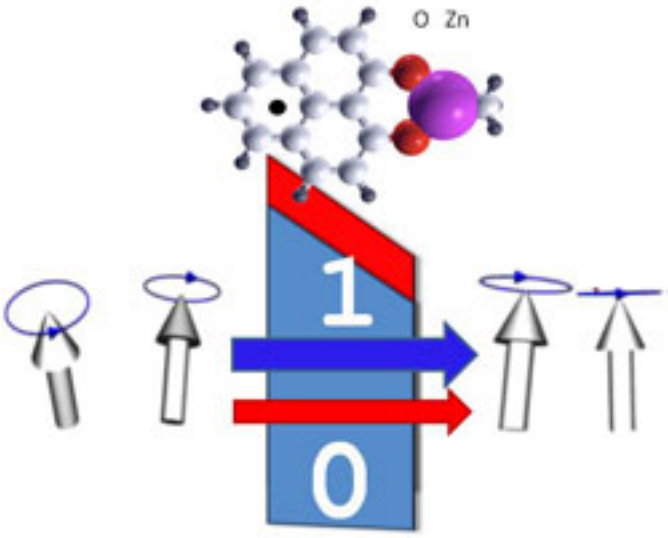
Researchers achieve breakthrough in spin storage



An international team of researchers affiliated with Göttingen University has found a way to store vast amounts of data—up to one petabyte—per square inch. One petabyte is equivalent to 1,000 terabytes or one million gigabytes. Using information stored in the spin of an electron, the scientists succeeded in storing the information in an organic molecule and reading it at a temperature close to room temperature. The results were published in the journal *Nature*.

Elementary particles, many atomic nuclei and atoms with certain electron configurations have what is called spin, defined as the rotation of a body around its own axis. This enables an alternative form of electronic data processing—called “spin electronics or spintronics.” The scientists developed a unique molecule that serves as the memory for their electronic device: They fused non-magnetic carbon atoms linked to one another in three benzene rings into one unit. Using spin injection, they chemically added an unpaired electron that carries a net spin. This can be exploited to store information as “0” and “1” by having the electron’s spin orientated up or down. Another accomplishment of the researchers was to use a magnetic reference electrode to read out the stored information at room temperature.

“Spin storage on an organic material and the successful reading at room temperature represent a breakthrough in organic spin electronics,” says Prof. Markus Münzenberg, one of the physicists from Göttingen. “Spintronics integrated into flexible plastic components are already a familiar part of the organic LEDs employed in today's displays, TV screens and smartphones. Our recently developed molecular units have a similar potential.”

Alongside the physicists and chemists at Göttingen University, scientists at the

Indian Institute of Science Education and Research in Calcutta, the Massachusetts Institute of Technology (MIT) in the USA and the Jülich Research Centre were also involved in the study.

Interface-engineered templates for molecular spin memory devices [1]

Source: University of Goettingen [2]

Links:
[1] http://www.nature.com/nature/journal/v493/n7433/abs/nature11719.html
[2] http://www.uni-goettingen.de/en/3240.html?cid=4387