Chiral molecules based nano spintronics

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With the increasing demand for miniaturization, nano-structures are likely to become the primary components of future integrated circuits. Different approaches are being pursued towards achieving efficient electronics, among which are spin electronics devices (spintronics). In principle, the application of spintronics should result in reducing the power consumption of electronic devices. A new, promising, effective approach for spintronics has emerged using spin selectivity in electron transport through chiral molecules, termed Chiral-Induced Spin Selectivity (CISS). Recently, by utilizing this effect we demonstrated a magnet less spin based magnetic memory.[1] The presented technology has the potential to overcome the limitations of other magnetic-based memory technologies to allow fabricating inexpensive, high-density universal memory-on-chip devices. Another option is to achieve local spin-based magnetization generated optically at ambient temperatures, as well as local charge separation using a slightly different configuration.[2]

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[1] **.** O. Ben Dor, S. Yochelis, S. P. Mathew, R. Naaman, and Y. Paltiel *A chiral-based magnetic memory device without a permanent magnet* Nature Communications **4**, 2256 Highlighted in Nature Nanotechnology: "A memory device with a twist" 7.8.2013 http://www.natureasia.com/en/research/highlight/8613

[2] O. Ben Dor, N. Morali, S. Yochelis and Y. Paltiel *Local Light-Induced Magnetization Using Nanodots and Chiral Molecules;* **Nano Letters (2014).**