

Spintronic components based on chiral molecules

Initiative: Integration molekularer Komponenten in funktionale makroskopische Systeme (beendet, nur noch Fortsetzungsanträge)

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Laufzeit: 3 Jahre

It is proposed to realize a new avenue into spin electronics spintronics by utilizing chiral organic molecules as building blocks for novel prototypical spintronic devices. The project is based on recent discoveries of the partners, in which they proved a spin-selective electron transmission through self-assembled monolayers of helical molecules (DNA, bacteriorhodopsin) and spin-selective electron conduction through single DNA molecules, reaching polarization values of up to 60 % at room temperature. Further, a prototype of a chiral spin memory device has been shown. It is expected that a thorough understanding and theory-guided assembly of optimal chiral or helical nanostructures will yield functional spin-based devices such as memory, XOR gates, and spin-based transistors, which will be built and their function be evaluated. In a later stage laterally nanostructured spin-selective contacts and devices will be produced by dip-pen nanolithography.

Projektbeteiligte

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Magnetization switching in ferromagnets by adsorbed chiral molecules without current or external magnetic field