

O 92: Invited Talk (Helmut Zacharias)

Time: Friday 13:15–14:00

Location: H36

Invited Talk

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Room-temperature electron spin filtering by ordered thin films of helical organic molecules — •HELMUT ZACHARIAS
— Physikalisches Institut, Westfälische Wilhelms-Universität, 48149 Münster, Germany

Since more than a decade the manipulation of the electron spin is considered as a method to facilitate electronic operations, so-called spintronic devices. Recently, the transmission of low-energy photoelectrons through ordered self-assembled layers of chiral molecules has been studied, showing an intensity dichroism for the two circular polarizations. This observation has been interpreted as a spin-dependent transmission through these ordered layers. We extend these studies

by directly measuring the electron spin polarization using a calibrated Mott detector. For ordered layers of double-stranded oligo-DNA on gold and at room temperature a significant spin orientation is observed, even for linearly polarized light, ranging from about -8% for 26 base-pair (bp) DNA to -57% for 78 bp DNA [1]. The order of the self-assembled monolayer is very important for the spin filtering effect. Using further magnetized Ni as substrate to inject spin-polarized electrons into attached oligo-DNA of the same type as used in the photoemission experiment also a spin-dependent conductance through the helical molecules is observed [2]. First model calculations yield results which are qualitative in agreement with the experiment.

[1] B. Göhler et al., *Science* 331, 894 (2011); [2] Z. Xie et al., *Nano Lett.* 11, 4652 (2011)