

Fritz-Haber-Institut der Max-Planck-Gesellschaft

Physikalische Chemie — Direktor: Prof. Dr. Martin Wolf



MAX-PLANCK-GESellschaft

## Department Seminar:

**Monday, May 6, 2019, at 11:00 a.m.;**

— all are invited to meet at around 10:40 for a chat and coffee —

**Prof. Dr. Helmut Zacharias**      Center for Soft Nanoscience &  
Dynamics at Interfaces Group,  
Physikalisches Institut  
Westfälische Wilhelms-Universität Münster.

## **Helical structures for electron spin filtering**

PC Seminar Room G2.06, Building G, Faradayweg 4

R. Ernstorfer

### Abstract:

Helical molecules adsorbed in monolayers on various substrates preferentially transmit one longitudinal spin component of electrons emitted by the substrate. First shown for natural biomolecules, like oligo-DNA with a spin polarization up to 60%, bacteriorhodopsin, and oligo-peptides, which only appear in their natural enantiomeric form, this effect has recently also been observed for hepta-helicene molecules adsorbed on precious metal surfaces Cu(332), Ag(110), and Au(111). Using both pure enantiomers it could be shown that the sign of the electrons spin polarization is directly connected with the chiral sense of the helicene. Further, this conjugated organic molecule is conducting, different from the hopping conduction of the biomolecules. A recent extension of this effect to chiral inorganic CuO thin films opens applications in catalytic systems. Further, first realizations for spintronics devices are shown.