

Helmholtz Call for Chinese Applicants Interested in Running for CSC 2021 Fellowship

Helmholtz Centre: Forschungszentrum Jülich GmbH – www.fz-juelich.de
Department/Institute: Peter Grünberg Institute, Electronic Properties (PGI-6)
http://www.fz-juelich.de/pgi/pgi-6/EN/Home/home_node.html
Supervising scientist: PD Dr. Daniel E. Bürgler
University for registration or for a future degree: University of Cologne
Research Field: Molecular spintronics with chiral molecules
Position open for: **PhD Student X** **Sandwich PhD Student**
Title of the research: Spin selectivity of chiral molecules on surfaces

More description of research topic:

Recent research results prove a previously unnoticed interaction between the electron spin and the handedness of chiral molecules. This interaction is manifested by the facts that (i) electrons (photoemission or conduction electrons) are spin-polarized when passing through a layer of enantiopure molecules and (ii) the adsorption of chiral molecules on ferromagnetic surfaces is enantio-selective. With the first effect, purely organic sources of spin-polarized currents can possibly be realized, which would be of great importance for molecular spintronics. The second effect promises a new and efficient process for the separation/selection of enantiomers as well as applications in chemical sensor technology. In this project, both aspects of chirality-induced spin selectivity will be investigated by spin-polarized scanning tunnelling microscopy (SP-STM) on single adsorbed chiral molecules or thin molecular layers adsorbed on non-magnetic and ferromagnetic single crystal surfaces. Experiments will be conducted in ultra-high vacuum with a low-temperature STM in high magnetic fields. The project is embedded in a larger initiative with chemistry and theory groups performing adapted molecule synthesis and DFT calculations.

Specific requirements:

Requirements are an above-average grade in Physics, good knowledge of solid-state physics, possibly experience in surface science (ideally STM), good interpersonal communication skills, and interest in working with state-of-the-art instrumentation in an interdisciplinary and international environment. The project is highly competitive as we strive for (i) exploiting intrinsic single-molecule properties (e.g. chirality, substrate hybridization) in organic layers to derive novel device functionalities and (ii) bridging the gap in understanding between magnetotransport properties measured in mesoscopic organics-based junctions and the microscopic structural, electronic, and magnetic properties of single molecules studied by SP-STM. Therefore, we are searching for a highly motivated PhD student who wants to contribute to our top-level research.

Working Place: Forschungszentrum Jülich, Germany (near Cologne)

Earliest Start: September 2021

Language Requirement: Very good knowledge of English language, written and spoken. German language courses are organised in the context of our in-house training program and are free of charge.

Name and Address of the Supervisor: Dr. Daniel E. Bürgler, Peter Grünberg Institute (PGI-6),
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