

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

**Helmholtz Centre:** Forschungszentrum Jülich GmbH – [www.fz-juelich.de](http://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](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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