



EBERHARD KARLS
UNIVERSITÄT
TÜBINGEN



CSC-Tübingen PhD Scholarship Program

2026/2027 application round: prospective PhD positions at the University of Tübingen

Faculty:	Faculty of Science
Institute / Section / Subject:	Institute of Physical and Theoretical Chemistry
Supervising Professor(s):	apl. Prof. Dr Maria Benedetta Casu
About the Supervisor(s):	Prof. Casu is an experimentalist, working in the field of organic materials using soft X-ray techniques. She pioneered research on radical thin films introducing the use of soft X-ray-based techniques, such as X-ray photoelectron spectroscopy and photoemission electron microscopy, also with synchrotron radiation, to the investigation of radicals. Since May 2011, Head of the “Organic Spins” Group at the Institute of Physical and Theoretical Chemistry, University of Tübingen. Website: https://uni-tuebingen.de/en/42240
Specification/Project title:	Studies of growth and characterization of radical assemblies by using soft X-ray techniques.
Topic Description:	Organic radicals are composed only of light elements, and they carry one unpaired electron that gives rise to a permanent magnetic moment. Radicals represent an underexplored resource for nanomagnetism. The research on radical films introducing the use of organic molecular beam deposition is a fundamental prerequisite to testing their suitability for thin film processes. This is an advantage when working with radicals because we can directly access their electronic structure by soft X-ray techniques that are those present in our lab (see “Nanoscale studies of organic radicals: Surface, interface, and spinterface, M. B. Casu, <i>Acc. Chem. Res.</i> 51 (2018) 753). The work will be performed in our photoelectron laboratory. We have the following instruments: Photoelectron spectroscopy station with small spot XPS with SPECS FOCUS 500 X-ray monochromator, SPECS High-intensity UV lamp. Phoibos 150 MCD analyzer (SPECS). Conventional XPS/UPS (VSW analyzer, Leybold UV). Low energy

electron diffraction (LEED) optics. Preparation chamber for organics. Preparation chambers for inorganic substrates.

The PhD student will receive training in

- Ultra-High Vacuum
- Thin film growth techniques
- Experimental procedures
- Fitting procedures.
- Data analysis.

If necessary, to build the proper background, the candidate will be invited to attend the following lectures:

- Surface analysis,
- High energy spectroscopy
- Microscopy
- Scanning probe microscopy
- The Hitchhiker's Guide to the Galaxy: Introduction to Academic Writing and Research Skills.

Extreme care will be dedicated to developing communication skills (e.g., presenting a poster, giving a talk, and writing a manuscript) as well as to ethics in science.

Intended Degree:	Dr. rer. nat.
Type of the PhD Study:	Full-time (complete doctoral studies at the University of Tübingen)
Required Degrees and Qualifications:	Master's degree in chemistry, physics or nanoscience. Good knowledge of solid-state Physics or Chemistry. Good background in Physical Chemistry/Chemical Physics. Our research group does not perform synthesis of the radical molecules. The molecules that will be used will be synthesized by other research groups that collaborate with us. Thus, synthesis is not a required or wished skill. Knowledge of surface science concepts, experience with ultra-high vacuum and related technique are considered an asset. Good manual skills are also necessary.
Language Requirements:	English: Good written and spoken command. Applicants must meet the CSC's formal language proficiency requirements.
Notes	Motivation, curiosity, team spirit and good manual skills are important. Willingness to learn technical aspects related to ultra-high vacuum techniques is a prerequisite.