

In the work group for Nanomaterials Characterization (Scattering Methods, Prof. T. Unruh) at the Institute for Crystallography and Structural Physics (ICSP), **Friedrich-Alexander-Universität Erlangen-Nürnberg** we are looking for

2 PhD students (2/3 TVL E13)

for studies on the **picosecond dynamics of liquid metal catalysts in confinement** and the **structure of complex liquid metal model catalysts**, respectively. Both projects are part of a collaborative interdisciplinary research initiative on innovative new concepts in chemical catalysis. This initiative is funded by the Deutsche Forschungsgemeinschaft (DFG) via the Collaborative Research Center CRC1452.

Project 1 contributes to the understanding of the details of the atomic motion in nanometer sized liquid Gallium alloys which have recently been found to outperform state-of-the-art hydrogenation and de-hydrogenation catalysts in industry. The dynamics will be studied by **quasi elastic neutron scattering (QENS)** performed at large scale neutron facilities as e.g. FRM II, Garching, Germany or ILL, Grenoble, France. Close cooperation with theory groups in Erlangen providing dedicated quantum mechanics MD simulations is foreseen.

Project 2 is dedicated to the study of 2D regular assemblies of liquid Gallium alloy nano-droplets with lateral symmetry. Such systems are used in the CRC as model catalysts and will be provided by the project partners. A detailed characterization of the systems by **grazing incidence X-ray small and wide angle scattering (GISXAS7GI-WAXS)** shall be worked out. This continues preliminary work in our group and includes the development and extension of the experimental setup and the evaluation methods.

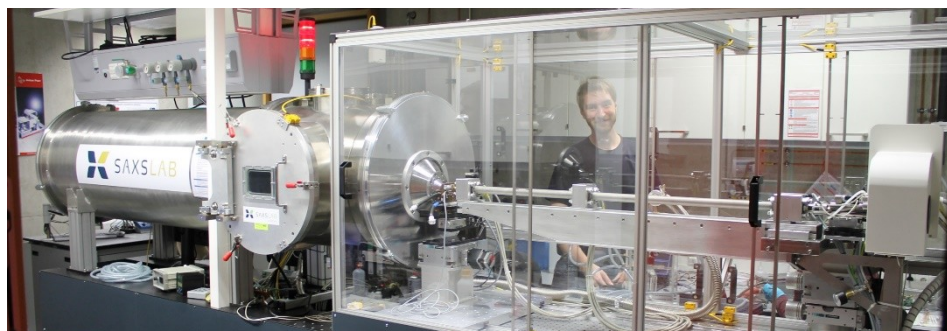
Both projects are embedded in the mentioned CRC and the already established close interdisciplinary cooperation shall be used and intensified. This includes cooperation with the external large scale synchrotron and neutron radiation facilities. The projects include the development and construction of new experimental setups with the experts of our mechanical workshop, planning and performing the experiments, evaluation of the experimental data and discussing the results with our interdisciplinary partners from engineering, chemical, and physical departments. Finally, in-situ and operando studies of real catalysts shall be performed to apply the gained knowledge on the fundamental processes to real world catalysis.

The positions shall be filled at the next possible date. If you are interested, please do not hesitate to contact:

Prof. Dr. Tobias Unruh via email: Tobias.Unruh@fau.de (www.nat.icsp.fau.eu) Staudtstraße 3, 91058 Erlangen



The neutron time-of-flight spectrometer TOFTOF at FRM II, Garching, Germany



State-of-the-art SAXS/GISAXS instrument at ICSP