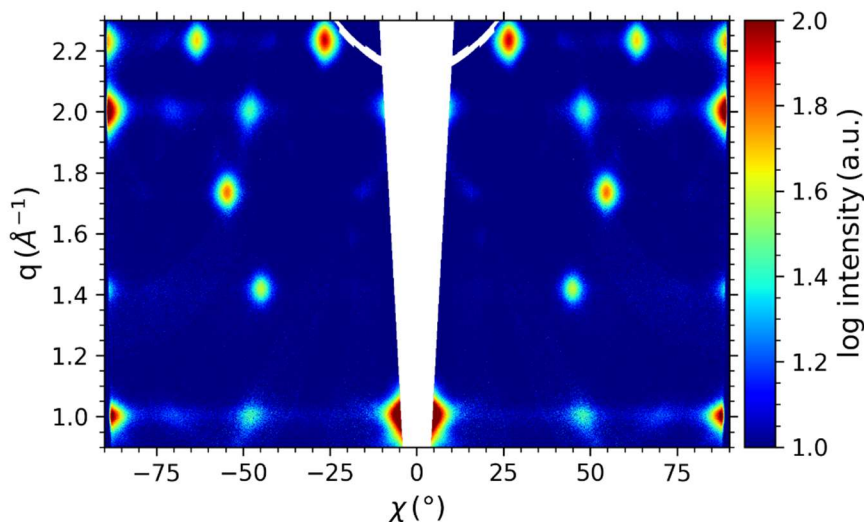


Doktorarbeit / PhD thesis

High-throughput analysis of in situ and operando scattering data with Information Field Theory



At the Chair for Functional Materials at the Technical University of Munich, we investigate the physical basis of material properties using state-of-the-art scattering methods (neutron, X-ray, and light scattering) and spectroscopic techniques. The general goal of our research is to infer functional properties from knowledge of microscopic structure and dynamics.

We are looking for a PhD student to work on the project "In situ and operando probing of soft materials at buried solar cell interfaces". The salary is 1/2 TVL E13 for 3 years.

Information about the chair can be found at:

<https://www.ph.nat.tum.de/en/functmat/about-us/>

Topic: The advanced scattering methods, grazing incidence small-angle X-ray and neutron scattering (GISAXS and GISANS), are powerful tools for the analysis of the morphology of thin film samples, which can have applications in solar cells or batteries. To probe the crystal structure information of thin films, common grazing incidence wide-angle X-ray scattering (GIWAXS) is used. When combined with in-situ or operando approaches following the device fabrication or device aging, typically very large scattering data sets are measured. The detailed analysis of such large data sets containing 10000 images or more, one by one, is challenging and highly time-consuming. Thus, automated approaches making use of machine learning are gaining interest. The project focuses on the reconstruction through Information Field Theory (IFT) of large GISAXS, GISANS, and GIWAXS data sets obtained at the synchrotron or a neutron source. It is part of a large consortium with an interest in IFT. The aim is to develop new visual analysis techniques for the datasets reconstructed via IFT. These developments aim in particular at the visual representation of uncertainties and correlations in the reconstruction results.

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