

The In-Situ GIXS Heuristic Tool for Efficient Reduction of 2D Grazing-Incidence Data

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Large-scale facilities have gained importance for extended characterization methods in the field of material sciences. In particular, structure analysis of thin-films in grazing-incidence geometry using highly brilliant synchrotron X-rays allows investigating drying, crystallization, or degradation processes in-situ. Developments in detector resolution and increasing the frame rates increase the amount of data that must be processed, ideally in real-time. This has raised the necessity to advance data-processing software tools to help scientists extract the essential conclusions from big data sets quickly and efficiently.

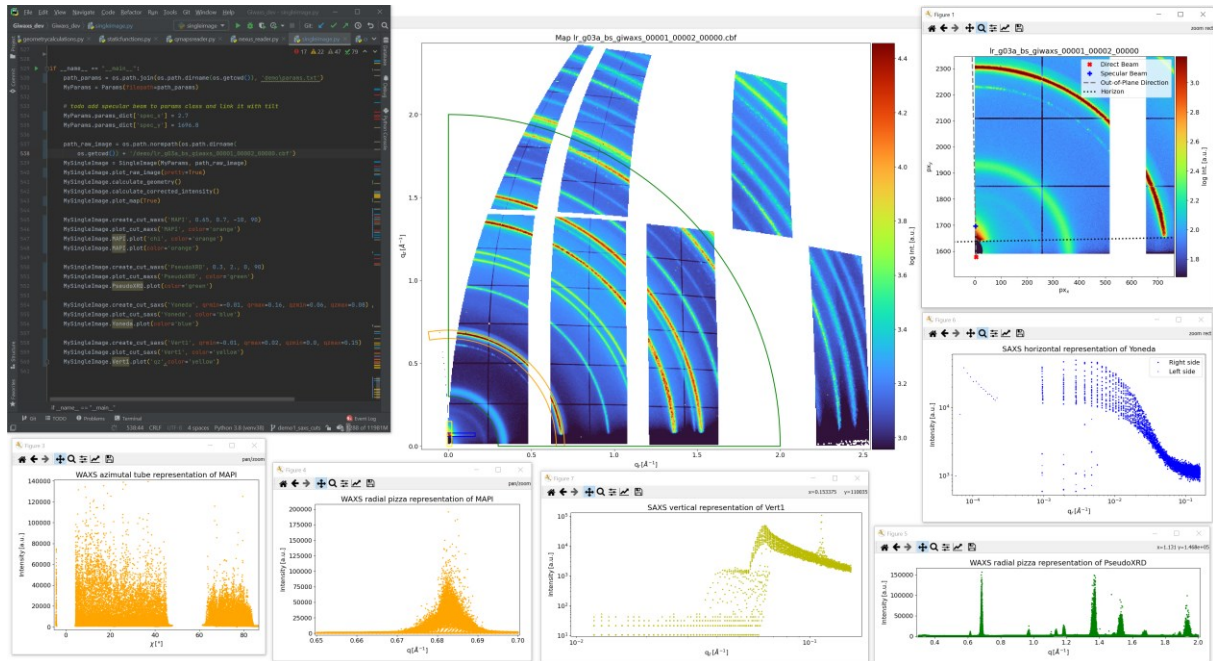


Fig. 1 Interactive data processing of 2D GIXS data.

In this work, we present a self-contained, python-based tool for the analysis of in-situ grazing-incidence X-ray scattering (GIXS). The focus lies on the performant and loss-free processing of GIWAXS datasets with high system compatibility for the users. In our software, the IN Situ Giwaxs Heuristic Tool (INSIGHT), we included the full geometrical transformation from real space coordinates into reciprocal space including common intensity corrections while maintaining full access to the raw data. This allows for post-processing the original data in q -space without any quality loss.