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The new tomography data processing software of the ESRF

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The ESRF (European Synchrotron) hosts several tomography beamlines, which use different types of contrast and offer vastly different resolutions and performance. Their acquisition and processing software are exceedingly fragmented. There exist many different codes and solutions for similar problems. This hampers the exchange and processing of data collected on different beamlines, while its associated maintenance / development costs hindered its progress.

The tomography acquisition system and processing workflows are being re-developed from scratch. The goal is to modernize them, both in terms of offered features and used technologies, while rendering their maintenance easier and less resource demanding.

In particular, we aim at delivering both a homogeneous experience across all the beamlines, and robust high-performance processing software.

In this contribution, we present the new tomographic data processing software of the ESRF. The new software suit consists of mainly three projects, which address three different aspects of the data treatment: data conversion & management, data processing & reconstruction, and graphical user interface. The three corresponding software packages are: NXtomomill, Nabu and TomWer.

NXtomomill guarantees an identical output data format for each ingested raw data format and data type. It decouples data handling from data reconstruction, resulting in uniform user experience, easier development, reduced maintenance costs.

Nabu is a high performance tomographic reconstruction software. It is derived from the popular PyHST, but it is built on modern software technologies, design patterns, and development strategies. It is modular, and it has a low deployment burden.

TomWer is a workflow based GUI for building and automatizing tomographic reconstructions. It greatly decreases the steepness of the learning curve for performing tomographic reconstructions (from raw data to volumes). It also allows to define data processing and reconstruction workflows, which can be later deployed on a large number of datasets.

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