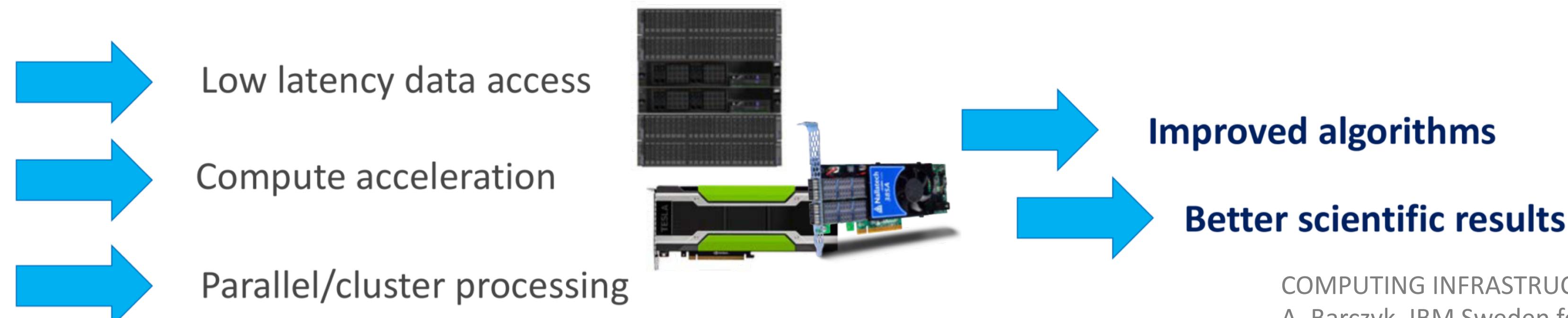
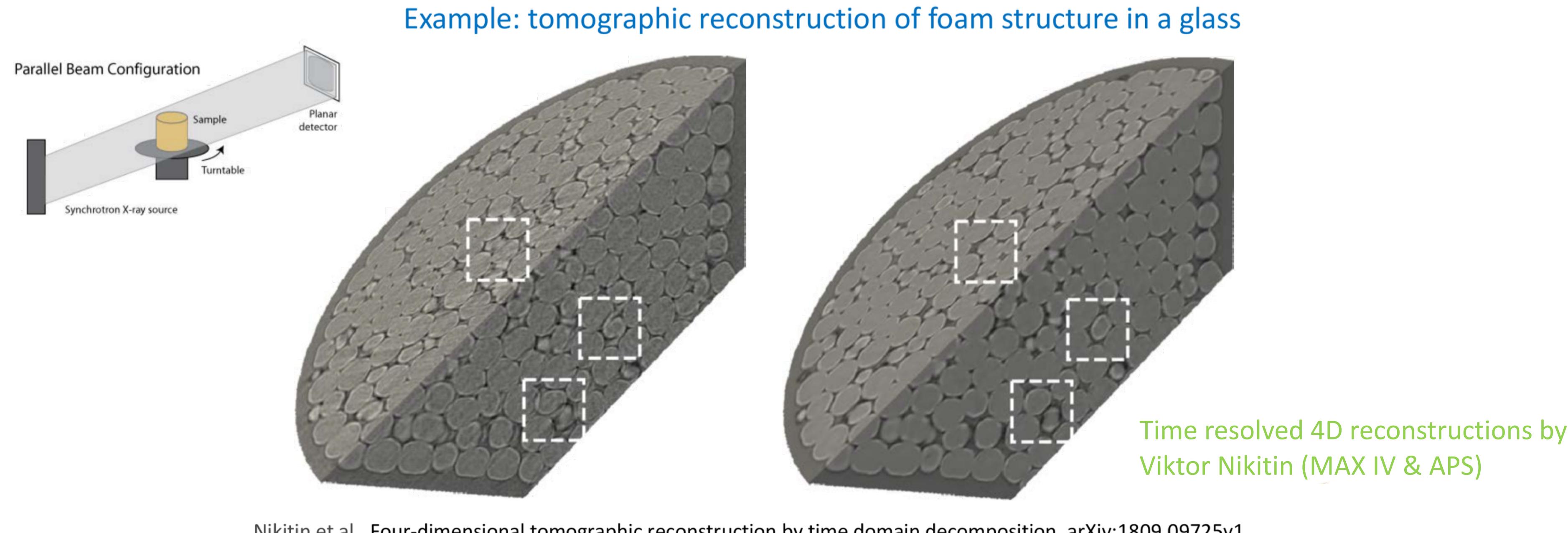


Tomograms



COMPUTING INFRASTRUCTURE FOR MAX IV
A. Barczyk, IBM Sweden forum, Stockholm



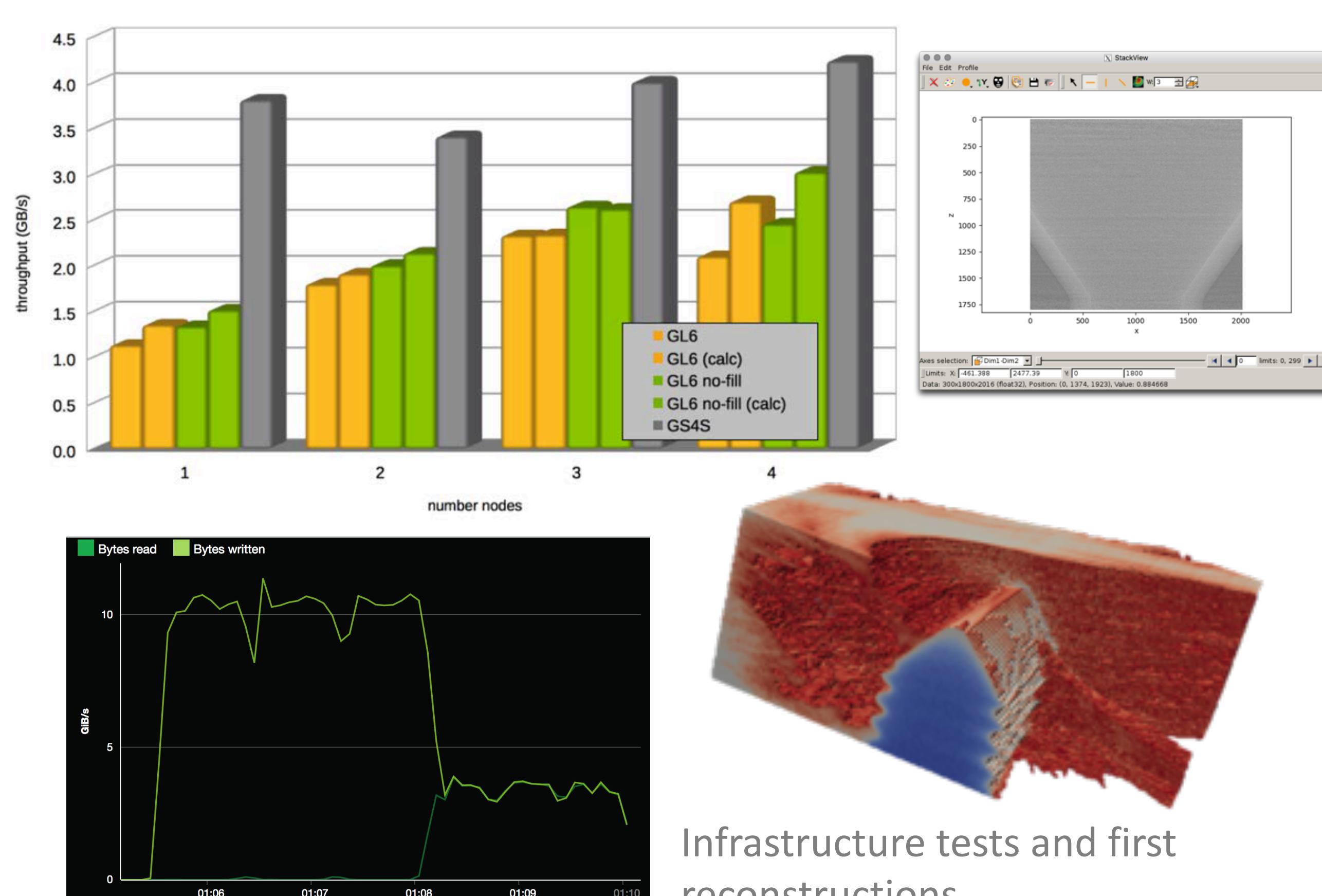
Nikitin et al., Four-dimensional tomographic reconstruction by time domain decomposition, arXiv:1809.09725v1

SUPPORT FOR TOMOGRAPHY RECONSTRUCTIONS AND IMAGING

Synchrotron based tomography imaging is known to be very demanding on storage and computing infrastructure. This applies to all steps of tomography data processing workflow including **reconstructions, segmentation, labelling, quantification and visualisation**. Full-field tomography imaging techniques will be available at DanMAX and ForMAX beamlines. In order to ensure MAX IV environment fits basic needs for tomography data processing a **Tomograms** project was started at MAX IV in 2017. During years it developed from prototyping reconstruction methods at MAX IV to **supporting imaging data analysis in user community at the Lund University for data taken at other synchrotron facilities as PSI, ESRF, DLS and APS**. This is done in close collaboration with the **Lund University Computing Centre (LUNARC)**, **Lund Institute of Advance Neutron and X-ray Science (LINXS)** and The Center for Quantification of Imaging Data (QIM) at **DTU Copenhagen**.

TOMOGRAPHY RECONSTRUCTIONS in 2017

The project started by benchmarking future MAX IV data storage in 2017. Two most known I/O demanding synchrotron data processing workflows, in particular MX data processing and **tomography reconstruction pipelines**, were used to test capabilities of the new MAX IV storage hardware. Beside establishing a future infrastructure with standard I/O bandwidth 5 GB/s (up to 10 GB/s) per compute node a series of tomography reconstruction frameworks has been made routinely available at MAX IV. It includes ASTRA, **TOMOPY** (APS) and **SAVU** (DLS). With proper infrastructure at MAX IV the focus could move towards improving reconstructions and imaging methods.



TOMOGRAAMS

Core of the Tomograms project (2017-2019) consists of a group of 10 people at MAX IV including MAX IV staff, students and visitors and 3 SNIC users that expressed special interest in supporting tomographic reconstructions and imaging methods around MAX IV, Lund and Copenhagen area.

TOMOGRAAMS PAGE

Two Tomography Quatim Hackathons were organised by LINXS with an aim to bring together imaging experts and user community at LU. The hackathons were supported by LUNARC. A part of the MAX IV Tomograms software environment were transferred to LUNARC within these events. A community oriented web <https://tomograms.rtfd.org> has been raised that should document the events and other activities of the group.

The screenshot shows a Mozilla Firefox browser window with the URL <https://tomograms.readthedocs.io/en/latest/>. The page displays the Tomograms software ecosystem, including the Tomograms project, Tomograms guide, and Mushrooms guide. It also features a sidebar with links to References, Doc, Conda, Lunarc, Events, Quantim Mar 2019, Quantim Nov 2018, Projects, Mixed Scale Dense Networks, Pyphase, Data Layout, About, GitHub, and Next. The main content area includes a brief description of the project, a "Mushrooms guide" section, and a note that it is built with MkDocs using a theme provided by Read the Docs.

TOMOGRAAMS web including current contributions from Max Langer (PyPhase) and Diogo Figueirinhos

IMAGING AT LUNARC

The recent activity was related to creating example **Jupyter notebooks** for **tomographic reconstruction, image quantification and phase retrieval** leveraging use of **PyPhase** and Mixed Scale Dense Networks.

The screenshot shows a Mozilla Firefox browser window with the URL <https://jupyterhub.maxiv.lu.se/user/zdemata/lab/?redirections=1>. It displays a JupyterLab interface with several notebooks open. One notebook, "imquant_foam.ipynb", is visible with code for binarization and simple thresholding. Another notebook, "tomorec_jungs.ipynb", is also shown. The interface includes a file browser, a terminal, and a code editor. A legend at the bottom left indicates "JupyterHub at MAX IV by Jason Brudvik".

Example notebooks by Rajmund Mokso