ID-8-P-1641 RX-TomoJ : Multimodal hard x-ray scanning tomographic software

Bergamaschi A.1, Messaoudi C.2, Somogyi A.1, Medjoubi K.1, Marco S.2,3

1Synchrotron SOLEIL, St aubin, France, 2Institut Curie, Paris, France, 3Inserm U759, Orsay, France

Email of the presenting author: antoine.bergamaschi@gmail.com

Hard X-ray scanning imaging allows simultaneous acquisition of multimodal information, by absorption, phase and dark-field contrasts, providing structural and chemical details of samples. Combining these scanning techniques with the infrastructure developed for fast data acquisition at Synchrotron Soleil1 permits multimodal tomographic imaging at the Nanoscopium 155m long beamline, which will be open to users in mid-2015. A main challenge of such imaging technique is the online processing and analysis of the important amount of generated multimodal data. To this purpose we are developing a plugin for imageJ2, that we named RX-TomoJ.

RX-TomoJ will offer state-of-the-art processing and reconstruction algorithms3, adapted for multimodal scanning tomography, tuned to run on conventional computers. The software takes advantage of the multimodality to extract useful information from one mode to improve the results obtained in the others modes. For instance, the fluorescence data can be used to retrieve the number of chemical elements which might be taken as the number of classes for discrete reconstruction algorithms. In addition, to minimize the damage that can be induced by the radiation on the sample, new approaches reducing the amount of data required to compute reconstruction will be integrated.

We will present the first version of RX-TomoJ which includes: Hdf54 format reading and data management, pre-processing tools, spectroscopic analyses tools and 3D reconstruction for different modalities. This is implemented in a user friendly interface (Figure 1), allowing the user to control and perform the entire framework of image reconstruction and analysis.

Fig. 1: RX-TomoJ raw data processing interface. This interface is divided into two parts, the first (on the top) allows users to have a look on absorption and fluorescence raw data, and the second contains the computation of different modalities.