

Low-dose phase-contrast tomography at Elettra: status and perspectives

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In the last years, the use of Synchrotron Radiation (SR) for bio-medical CT imaging has significantly developed, according to three main directions: the high resolution imaging for *in-vitro* studies, the development of small animal models with perspectives of *in-vivo* exams and the clinical protocols with applications to patients.

In all the above mentioned cases, there is the need to produce high quality images, limiting the radiation doses within certain levels. To achieve these objectives, several factors have to be considered: the choice of the imaging technique, the scan parameters, the pre-processing filtering, the reconstruction algorithm and the post-processing treatment.

Once the scans are performed, to compare the reconstructed images obtained using different configurations, image quality indexes and functions, featuring appropriate figures of merit, have to be defined and evaluated.

Considering the complexity and variability of biological tissues, a reproducible comparison among the different procedures and the exam optimization can be facilitated using adequate test objects realized with materials mimicking the compositions and properties of the sample under study.

In this context, the SYRMA-CT project, aiming at developing a clinical tomographic protocol of mammography with SR at the SYRMEP beamline, turns out to be very challenging and relevant for the characterization of lesions in the diagnosis of breast cancer. High image contrast is required with very strict constrains for the average delivered dose.

The talk will give a review of the main issues that will be addressed by the project and report on some preliminary results already obtained for the protocol optimization.

Moreover, the availability of low-dose tomographic protocols would be very beneficial for a variety of applications with small animals. These new perspectives will be presented as well.