

Combining synchrotron radiation phase-contrast and fluorescence nano-tomographies to obtain high resolution 3D imaging and elemental distribution and quantification of biological tissues

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Imaging techniques exploiting synchrotron radiation have several advantages compared to the same techniques based on conventional X-ray sources. In particular, X-ray phase-contrast and X-ray fluorescence computed tomography (respectively XPCT and XFCT) can nowadays reach a resolution down to 15nm and sub-ppm sensitivity. Other than the resolving power, an advantage of XPCT, respect to conventional X-ray absorption tomography, is the ability to image low absorbing materials with similar densities, as is the case of biological tissues. An additional advantage of exploiting synchrotron radiation is the possibility of combining different imaging techniques to obtain complementary information. As an example, in this presentation it will be shown that the combination of phase-contrast and fluorescence tomographies allows obtaining a more reliable elemental quantification by means of the exact knowledge of the local density and thickness of the studied material.