

Advanced hard X-ray imaging techniques applied to archaeology and palaeontology: a tool complementary to neutron imaging

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X-ray microtomography, synchrotron radiation, microfocus sources, phase-contrast imaging, quantitative analysis, cultural heritage applications.

Summary

Imaging techniques play an important role in several research fields such as medicine, material science, geology, cultural heritage, food science, and in industrial applications. In recent years great interest has been posed on X-ray computed microtomography (m-CT) techniques, based on both microfocus and third generation synchrotron radiation sources. In fact, m-CT is a nondestructive characterization technique producing three-dimensional (3D) images of the internal structure of objects with a spatial resolution at the micron- and submicron- scale. The investigation of specimens can be performed directly in the 3D domain overcome the limitations of stereological methods usually applied to microscopy-based analyses. Moreover, m-CT techniques enable to get 3D images of the internal core of a sample in a non-destructive way, more suitable for further analyses and for precious or unique samples (fossils, archeological finds, etc.). An intriguing challenge lies on the extraction of quantitative measures directly from these kinds of images. However, accurate image processing and analysis methods for an effective assessment of morphological and textural parameters are still an open issue in several applications.

The talk will illustrate a short overview of the potentialities of hard X-ray imaging techniques applied to archaeology and palaeontology, and their complementary aspect with respect to neutron imaging.

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