Ultra-fast X-ray microtomography : a breakthrough in materials science

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X-ray microtomography is now a conventional tool used for 3D charaterizing in materials science. Thanks to fast CCD cameras it is even possible to perform in situ characterisation during phase transformation or damage in metals during tensile experiments : scan can be acquired in about 10 seconds with spatial resolution of the order of 2µm. However despite this fast acquisition a lot of phenomena can not be studied. New CMOS cameras, such as PCO DIMAX available at ESRF, allow decreasing the acquisition time by a factor of 100 leading to possible acquisition of a scan in less than 0.2 seconds with the same spatial resolution. We will show several example concerning phase transformation and damage during tensile experiments where such ultra-fast microtomgraphy was applied. Since this technique is at the beginning, we will also indicate the main technical development that should be performed in order to apply it in materials science and thus overcome new challenges.