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Synchrotron X-Ray micro-computed tomography on beamlines BM18 and BM05 at the ESRF and current applications in biomedicine, material sciences and natural and cultural heritage

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Synchrotron X-ray micro-computed tomography has shown its importance through time for biomedical, structure of materials, and natural and cultural heritage research. The new installation of BM18 and upgrade of BM05 (Extremely Brilliant Lightsource, EBS), which are both propagation phase contrast micro-computed tomography (PPC-SR μ CT) beamlines, at the European Synchrotron and Radiation Facility (ESRF) presents a novel opportunity for advances in these three fields of imaging. Here, it is presented some of the fruitful results from experiments on both these beamlines which highlight the advances made in imaging techniques. Ground-breaking research is made possible for biomedical imaging with whole organ imaging and hierarchical tomography. The possible represented applications of PPC-SR μ CT to investigate fossils includes non-destructive histological studies, dental sequencing and studying the gross anatomy in specimens. Higher available X-ray energy ranges combined with a large field of view has proven to be important for imaging larger and denser manufactured components, which is crucial for industrial development and material sciences research. As imaging technologies advance, X-ray imaging will continue to be pivotal tool for these impactful fields of research.s

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