

## **Next-Generation X-Ray Analyses and the ESRF Upgrade Programme**

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In the last decades we have witnessed breathtaking developments in our microscopic understanding of the structure and function of matter, materials and living matter. Novel accelerator-based X-ray technologies, i.e. X-ray synchrotron radiation and –most recently- X-ray laser facilities, have played a key role in these success stories which are revolutionizing the understanding of the world we live in. Today is commonly accepted that modern X-ray facilities with dedicated experimental instrumentation belong to the necessary research infrastructure of a knowledge and technology based society.

Synchrotron radiation facilities have developed into mature analytical centres which offer X-ray beams and instrumentation to best meet users' demands. In parallel accelerator technologies have made enormous progress over the last years allowing us now to design and conceive new ultra brilliant storage ring sources and novel X-ray laser sources (free electron lasers) with new possibilities to explore atoms, molecules and matter with unprecedented spatial and time resolutions.

The presentation will provide examples on the impact of synchrotron facilities in science, and review present efforts in preparing the X-ray synchrotron sources of tomorrow. In this context, progress and plans on the ongoing Upgrade Programme of the European Synchrotron Radiation Facility will be reviewed.