Science at the ESRF: The Next Step in the Exploitation of Storage-Ring-Based High Energy X-ray Sources

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\textbf{Abstract.} The ESRF is in the middle of an ambitious upgrade that has the potential to revolutionize storage ring based X-ray sources and serves a blueprint for a large number of green-field construction programmes or upgrade programmes for existing facilities worldwide.

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The European Synchrotron Radiation Facility is Europe's premier hard X-ray synchrotron radiation source serving 45 experimental stations for public use. The facility has finished Phase I of an ambitious upgrade programme (2009-2015) covering all aspects of the facility: photon production, experimental facilities for users, user service, and X-ray technology development. The upgrade benefits all areas of X-ray applications: Imaging, Spectroscopy, and Diffraction. Recent examples will be used to demonstrate first results from the new instruments.

In parallel we have started work on the ESRF-EBS project (Phase II of the upgrade programme, 2015-2022) focusing on the construction of a new storage ring with the goal to reduce the horizontal emittance by a factor of 40 by 2020 [1]. The associated linear increase in brilliance and coherence will enable new applications of X-rays for the study of soft and hard condensed matter. After an introduction of the main concepts behind this new revolutionary source the current status will be explained.

Over the past 2 years, we have also refined our plans for the future beamline portfolio of the ESRF. A programme for the construction of new beamlines as well the refurbishment of existing beamlines has been proposed to and accepted by the ESRF Council. This programme will enable users to take full advantage of the vastly improved source properties and help to create new user communities. The beamlines and their potential for new science – not only for fundamental, but also applied and industrial applications – will be introduced.

\textbf{References}