Press release

Friday 29 May 2015

Official Launch of the Upgrade Programme Phase II

The ESRF designs a new generation of synchrotrons

***Friday 29 May 2015* – On the occasion of the first meeting of the new Science Advisory Committee (SAC) of the ESRF (European Synchrotron Radiation Facility), Francesco Sette, ESRF Director General, Desmond McMorrow, Chairman of the SAC and Miguel Ángel García Aranda, Vice-Chairman of the ESRF Council, inaugurated two new beamlines and officially launched the Phase II of the Upgrade Programme, UP-PII, an ambitious programme which will pave the way to a new generation of synchrotrons.**

After 20 years of success and scientific excellence, the ESRF – the world's most intense X-ray source – has initiated an ambitious and innovative renovation project - the Upgrade Programme. With an overall budget of 330 million euros, the Upgrade Programme spans the period 2009-2022 and is implemented in two phases:

- Phase I (180M€), initiated in 2009 and to be completed by end 2015, is a success story among the projects appearing in the European Strategy Forum on Research Infrastructures (ESFRI) roadmap.
  This first phase enabled the construction of a new generation of beamlines (19 experimental stations) to explore the nanoworld, and is close to completion with two of the remaining four beamlines inaugurated on 29 May: ID01 and ID31.
  To enable this new instrumentation portfolio, the creation within Phase I of a new *ultra-stable* experimental hall of 8000 m^2 was required as well as the improvement and refurbishment of most of the cutting-edge scientific equipment and accelerator infrastructure. Finally, Phase I has allowed the ESRF accelerator scientists to design a novel *ultra-bright* synchrotron source to be located in the present storage ring tunnel with performances 100 times superior to the present ESRF source and other synchrotrons worldwide. Now close to completion, Phase I is on time and within budget.

- Phase 2 (150M€) will cover the period 2015-2022. It is this new phase of renovation that was officially launched on Friday, 29 May 2015.
  This phase represents a real technological challenge: to complete, within a limited period and based on a pre-existing structure, with minimal disruption of the ongoing user programme, the shutdown, dismantling and installation of a new radiation source. After procurement and pre-assembly of the new storage ring foreseen to be completed by end 2018, the user programme will be put on hold for 17 months to dismantle the existing accelerator, and to assemble and commission the new one. The user programme is due to restart by June 2020. Phase II includes also the construction of new state-of-the-art beamlines, an ambitious instrumentation programme with particular focus on high-performance detectors and an intensified *'big data'* strategy, designed to exploit the enhanced brilliance, coherence flux and performances of the new X-ray synchrotron source.

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Preparing the future, and pushing the boundaries of scientific exploration of matter

With Phase II of the Upgrade Programme, and in a highly competitive environment, the ESRF confirms its pioneering role and world leadership in conceiving a new generation of synchrotron light sources that will produce more intense, coherent and stable X-ray beams.

"In relation to the work completed over the past decade concerning the constant improvement of synchrotron-generated light, a quantum jump was required. The ESRF accelerator scientists found an innovative solution, which will boost the brilliance of the X-rays and their coherence by a factor of 100. Many technological challenges lay ahead, but the most critical one is to install a new storage ring inside the existing structure, 90% of which will be reused. The unrivalled properties of this new light source will transform the facility into a unique instrument, opening up new perspectives for X-ray science in many fields of fundamental and applied research." commented Harald Reichert and Jean Susini, Research Directors at the ESRF.

This qualitative leap opens new fields of investigation thanks to the possibility to efficiently reach spatial resolution at the *nanometre* level, enabling unprecedented characterisation and understanding of materials and living matter. Applications can be found in a variety of areas: nanoscopy for the conception of new materials, science in extreme conditions (planetary science, technological materials), multidimensional (3D, time, chemical, etc.) *nano*-imaging, structural biology and medicine, materials science, nanotechnologies, environmental and energy sciences to cite a few.

As emphasised at the inauguration by Francesco Sette, ESRF Director General: "*Over the years the ESRF has become a world reference. By means of the Upgrade Programme and thanks to the enthusiastic and collective support of the ESRF's Members and Associate Countries, the ESRF is preparing for the future by constructing the first in a new generation of synchrotrons. The ESRF will lead the way in pushing back the boundaries of scientific exploration of matter. Sustaining its world-class user programme will contribute to answering the great technological, economical, societal and environmental challenges confronting our world. The construction of this new lightsource, deeply rooted in the existing infrastructure, will allow Europe to strengthen its strategic position in this area of science with an exceptional return on investment and minimal disruption of the ongoing programme: this is possible and conceivable only thanks to the twenty years of experience and unique concentration of skills and expertise of the ESRF staff. I am confident that with the support of its scientific community and the motivation of its staff, this is a new era for the ESRF, for the history of synchrotrons and for the science that is now being written!*"

About the ESRF:
The ESRF – the European Synchrotron – is a large scale international research instrument. It is the world's most intense source of X-rays. The extremely bright light that the ESRF provides to scientists from around the globe enables them to explore matter in many disciplines: chemistry, material physics, archaeology and cultural heritage, structural biology and medical applications, environmental sciences, information science and nanotechnologies.
Founded in 1988, the ESRF is a model of European and International cooperation with 21 partner countries, of which 13 are Members, and 8 are Scientific Associates. In 2009, the ESRF embarked upon an ambitious renovation programme worth 330 M€, the Upgrade Programme phases I and II. This programme has devised a new generation of synchrotrons and will enable its users to push the limits of scientific exploration of matter.

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