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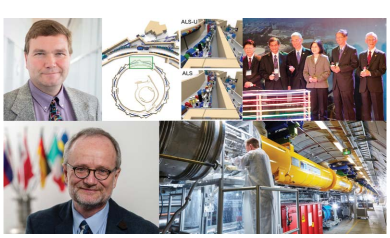


Current events

1. Jonathan Lang named Division Director of APS X-ray Science Division

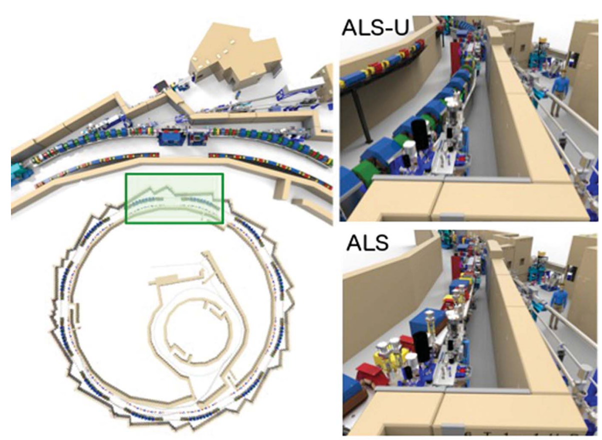
In September, Jonathan Lang was appointed Division Director of the Advanced Photon Source (APS) X-ray Science Division (XSD), to lead the experimental programs in the Argonne Photon Sciences (PSC) Directorate. As part of the senior management team of the PSC Directorate, Lang will be responsible for leading the division that provides critical expertise and support for the APS user community, as well as mentoring the next generation of X-ray scientists and fostering a vibrant research environment. Since 2013, Lang has been Associate Division Director of XSD, and had previously served as Group Leader of the Magnetic Materials Group in XSD. Lang earned his PhD in condensed matter physics at Iowa State University and his bachelor's degree in astronomy from the University of Nebraska, and has expertise in X-ray magnetic spectroscopy and diffraction.

Jonathan Lang, APS X-ray Science Division Director.

2. Advanced Light Source Upgrade project receives DOE approval to proceed

The US Department of Energy (DOE) has confirmed the need for a unique source of X-ray light that would produce beams up to 1000 times brighter than are now possible at Lawrence Berkeley National Laboratory's (Berkeley Lab) current Advanced Light Source (ALS). The proposed Advanced Light Source Upgrade project, also known as ALS-U, has now cleared the first step in the DOE approval process when it received 'critical decision zero', also known as CD-0, which approves the scientific need for the project. This initial step sets in motion a process of additional planning and reviews, and the laboratory will now begin the upgrade's conceptual design.

The upgrade would replace the current ALS storage ring with a multibend achromat (MBA) lattice that would produce far brighter, more stable beams of soft, low-energy X-ray light. The upgrade would incorporate most of the 40 beamlines and supporting equipment that now allow experiments across a wide range of scientific disciplines. Also, three new



A planned upgrade, ALS-U (left and upper right), would replace this storage ring with a denser array of magnets, known as an MBA lattice, that would produce far brighter, steadier beams of so-called 'soft' X-ray light. A unique secondary ring along the ALS's inner wall, called an 'accumulator' ring, would rapidly replenish the energy in the main ring. (Credit: Berkeley Lab.)

beamlines are planned that will be optimized for the new capabilities of ALS-U.

"This upgrade project is a very high priority for the laboratory and builds upon the lab's long legacy of building and operating particle accelerators", said Berkeley Lab Director Michael Witherell. "The ALS-U project will benefit from our expertise in many disciplines here, from engineering to accelerator and beam physics, and computer modeling and simulation". Roger Falcone, the ALS Facility Director added that "for over 20 years the ALS has grown in its number of users and the breadth of publications; this upgrade will ensure that in the next 20 years we will continue on that growth path, serving even more scientists and doing more science at emerging frontiers."

3. Inauguration of the Taiwanese Photon Source

The Taiwan Photon Source (TPS) experimental facility was inaugurated in September by Taiwanese President Tsai Ing-wen. The TPS, located at National Synchrotron Radiation Research Center in northern Taiwan's Hsinchu City, is now one of the brightest synchrotron X-ray sources in the world. Backed by the Ministry of Science and Technology, the multidisciplinary facility is the largest of its kind in Taiwan and illustrates the nation's capabilities in high-tech R&D and producing large-scale industrial precision systems.

The 3 GeV TPS storage ring comprises 24 double-bend achromat cells, with six straight sections of 12 m and eighteen straight sections of 7 m in length. The TPS uses two sets of KEKB-type superconducting RF cavities to achieve an electron current of 500 mA in a top-up injection mode and to diminish the high-order-mode instability excited by the electron beam. In Phase 1, the experimental capabilities include Protein Microcrystallography, Coherent X-ray Diffraction, X-ray Nanodiffraction, X-ray Nanoprobe, Coherent X-ray Scattering, Soft X-ray Scattering and Submicron Soft X-ray Spectroscopy. Second and third phases are planned for 2020 and 2023, respectively, to provide 12 additional beamline capabilities.

President Tsai Ing-wen (fourth from left) attends the inauguration of the Taiwan Photon Source facility at National Synchrotron Radiation Research Center in Hsinchu City. (CNA.)

4. Robert Feidenhans'l appointed Chairman of the European XFEL Management Board

Professor Robert K. Feidenhans'l has been appointed as the new Chairman of the Management Board of the European XFEL GmbH. The X-ray physicist, aged 58, is currently head of the Niels Bohr Institute at the University of Copenhagen, Denmark. He is also a member of the European XFEL Council, the supreme organ of the company, for which he served as chairman from 2010 to 2014. Feidenhans'l will join European XFEL as of 1 January 2017. His predecessor, Professor Massimo Altarelli, who has been at the head of the non-profit company since it was founded in 2009, will retire at the age of 68 at the end of the year.

Robert Feidenhans'l, Chairman of the European XFEL Management Board as of 1 January 2017.

Robert Feidenhans'l studied at Aarhus University and holds a PhD in surface physics, a field which has since evolved into nanophysics. Starting in 1983, he worked at the Risø National Laboratory in different scientific and leading positions, until joining the Niels Bohr Institute in 2005. As a researcher, he is an expert in new groundbreaking X-ray technologies and research at large-scale X-ray synchrotron research facilities, such as ESRF in France, PSI in Switzerland, and DESY in Hamburg.

The European XFEL Management Board is composed of two managing directors, the Chairman as well as the Administrative Director, Dr Claudia Burger, and three scientific directors, Professor Serguei Molodtsov, Dr Thomas Tschentscher and Dr Andreas S. Schwarz.

5. Superconducting part of the European XFEL accelerator ready

An important milestone in the construction of the X-ray laser European XFEL was reached on 26 September 2016: the 1.7 km-long superconducting accelerator has been installed in the tunnel. The linear accelerator will accelerate bunches of free electrons to an energy of 17.5 GeV. The bunches are accelerated in resonators cooled to a temperature of 2 K. The accelerator will be put into operation step by step in the weeks following this milestone. On 6 October, European XFEL will officially initiate the commissioning of the X-ray laser, including the accelerator. User operation is anticipated to begin in mid-2017.

European XFEL Managing Director and Chairman of the Management Board Massimo Altarelli said, “This is an important step on the way to user operation next year. On this path there were numerous challenges that, in the past months and years, we faced together successfully. I thank DESY and our European partners for their enormous effort, and we look together with excitement towards the next weeks and months, when the accelerator goes into operation.” The French project partner CEA in Saclay assembled the modules. Colleagues from the Polish partner institute IFJ-PAN in Kraków performed comprehensive tests of each individual module at DESY before it was installed in the 2 km-long accelerator tunnel. Magnets for focusing and steering the electron beam inside the modules came from the Spanish research centre CIEMAT in Madrid. The niobium resonators were manufactured by companies in Germany and Italy, supervised by research centres DESY and INFN in Rome. Russian project partners such as the Efremov Institute in St Petersburg and the Budker Institute in Novosibirsk delivered the different parts for vacuum components for the accelerator, within which the electron beam will be directed and focused in the non-superconducting portions of the facility at room temperature. Many other components were manufactured by DESY and their partners, including diagnostics and electron beam stabilization mechanisms, among others.

Technicians connect two accelerator modules in the European XFEL tunnel. (Courtesy of Heiner Müller-Elsner, European XFEL.)