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DPG

Scientific Evening Talk

Tuesday, August 7, 18.30 h
Magnus-Haus Berlin, Am Kupfergraben 7, 10117 Berlin

The Light Fantastic: Birth of the X-Ray Laser and a New Era of Science

Prof. Dr. Joachim Stöhr
SLAC National Accelerator Laboratory Stanford, California, USA

The discussion will be chaired by
Prof. Dr. Wolfgang Eberhardt
Scientific Director Magnus-Haus

'Nachsitzung' with food and drinks in the 'Remise', sponsored by the WE-Heraeus-Foundation
RSVP:
http://www.dpg-physik.de/dpg/magnus/formulare/formular_2012-08-07/anmeldung-2012-08-07.html

Prof. Stöhr received his Ph.D. in Physics from the Technical University of Munich, Germany. He worked at EXXON and IBM Research Labs for nearly 20 years before joining Stanford University in January 2000 as Professor of Photon Science. He was the Director of the Stanford Synchrotron Radiation Lightsource (SSRL) from 2005 to 2009 before becoming Director of the world's first x-ray laser, the Linac Coherent Light Source or LCLS. Over the years he pioneered several soft x-ray techniques for exploring the structure and electronic and magnetic properties of surfaces and thin films. He authored two books and was awarded the Davisson-Germer Prize of the American Physical Society for his work in 2011.

Abstract: The talk will describe the evolution of modern x-ray sources, culminating in the construction of the world's first x-ray laser, the Linac Coherent Light Source or LCLS at SLAC. I will describe how this project, proposed in 1992, succeeded in 2009, creating x-ray beams of unprecedented brilliance and coherence with pulse lengths down to a femtosecond and enough x-rays to do an experiment in a single shot. LCLS began operation in October 2009. The first experiments focused on exploring the interactions of high-field ultrashort x-ray pulses with atoms and molecules. Other experiments explored how to extend the present speed of electronic devices used for data storage to the limits sets by the laws of nature, solve the structure and function of chemical reaction centers triggered by sunlight, such as the life-enabling creation of oxygen by photosynthesis, and determine the unknown structures of certain classes of proteins, the worker molecules of life, that are notoriously difficult to crystallize. More generally, LCLS constitutes a new tool for addressing scientific grand challenges by its ability to probe matter on its fundamental atomic length scale and the intrinsic time scales of motion of its atomic and electronic building blocks.