Invited speaker

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SACLA: An X-ray free-electron laser in Japan

Abstract

A free-electron laser was proposed in the 1970s. In principle, it should have no wavelength limit, but in practice, the wavelength was limited by the reflectivity of the resonator mirrors. However, the SASE principle, discovered in the 1980s, removed the wavelength limitation, raising expectations for coherent light sources in the shorter-wavelength region. A SASE free electron laser uses a low emittance electron beam accelerated by a linear accelerator with a long undulator as the emitter. It generates coherent light due to the interaction between electrons and light. As for the light source in the X-ray region, the LCLS project was completed in 2009 by diverting the linear accelerator used for elementary particle research at the Stanford Linear Accelerator Center in the United States to make it an X-ray free-electron laser. Japan's SACLA was completed in 2011 as a compact XFEL using a different technology.

Here, we will introduce SACLA and the progress of XFEL in the world over the last ten years.

About the Author

Tetsuya Ishikawa received a doctorate in engineering from the University of Tokyo in 1982. Then he joined Photon Factory in KEK as a research associate to develop precision X-ray optics. He moved back to the University of Tokyo as an associate professor in 1989. He was appointed to a Chief Scientist of RIKEN in 1995 to oversee the construction of SPring-8 beamlines. After he almost finished constructing SPring-8 beamlines, he launched the SACLA (SPring-8 Angstrom Compact FEL) project and completed it in 2011 as a user facility. He has been the director of RIKEN SPring-8 Center since 2006.