

## ■ Symposium chair

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## Advanced light sources and their applications to frontier science and technology

### Abstract

Recent rapid advances in the high-power ultrashort-pulsed laser technology as well as the high-energy free-electron laser technology have enabled us to explore new frontiers in science and technology, which we did not envisage until several years ago. Indeed, at ELI-ALPS, a variety of phenomena occurring in the attosecond time domain have been investigated using the high peak power and ultrashort laser pulses supplied to users, and non-linear phenomena occurring in the XUV wavelength range are now being one of the promising research themes. At CoReLS and SURF, multi-PW laser systems have been built, designed for promoting research areas in strong light-field physics. At CoReLS, by tight focusing of multi-PW power laser system, the light field intensity of the order of  $10^{23}$  W/cm<sup>2</sup> was achieved and a multi-GeV electron beam was generated by the laser wake-field acceleration. At SURF, a 10 PW laser system was implemented, and an effort has been made to achieve 100 PW. On the other hand, at HiLASE, high-power diode pumped laser systems have been developed for a variety of industrial and scientific applications such as laser micro/nanomachining and laser shock peening. The recent progress in the X-ray free-electron laser technologies is also noteworthy. At SACLA, ultrashort intense X-ray pulses at 1 Å have been used in a variety of research projects in physics, chemistry, biology, and industries. In iSAP 2022, we will learn the cutting-edge research and development achieved at the world-leading advanced light source facilities in the past several years and discuss next frontiers in science and technology to be explored from now by such advanced light sources.

### About the Author

Prof. Kaoru Yamanouchi has been Professor of Chemistry at the University of Tokyo since April 1997. His research fields are in physical chemistry and AMO physics, especially gas phase laser spectroscopy, chemical reaction dynamics, and intense laser science. Born in Tokyo, Japan in 1957, he received Doctor's Degree from Graduate School of Chemistry, The University of Tokyo in 1986. He was appointed as Research Associate at Department of Pure and Applied Sciences of the University of Tokyo in 1985, was promoted to Associate Professor in 1990, and had been in the position for seven years until he became Professor of Chemistry in 1997. He is International Advisory Committee Member of Journal of Physics B: Atomic, Molecular and Optical Physics, Series Editor of Springer's Series in Chemical Physics, Series Editor of Springer's Series in Topics in Applied Physics, Chief Editor of Springer's Sub-series, "Progress in Ultrafast Intense Laser Science" and Editorial Board member of Chemical Physics (Elsevier). He has organized a series of international symposia on ultrafast intense laser science. He received Morino Fellowship endowed by Morino Foundation (1987), Spectroscopical Society of Japan Award for High-Quality Papers (1989), Chemical Society of Japan Award for Young Scientists (1991), Japan IBM Prize (2000), The Best Paper Award of the Laser Society of Japan (2008), and the 67th Chemical Society of Japan (CSJ) Award (2015), The 7th Japan Society for Molecular Science Award (2016), The Japanese Photochemistry Association Lectureship Award (2017), and Medal of Honor with Purple Ribbon (2020).