Yasuhiko Arakawa

Current Position:

Director, Institute for Nano Quantum Information Electronics, The University of Tokyo
Professor, Director, Center for Photonics Electronics Convergence at Institute of Industrial Science, The University of Tokyo

Careers:

1975	B.S. in Electronics Engineering from the University of Tokyo
1977	M.S. in Electrical Engineering from the University of Tokyo
1980	Ph.D. in Electrical Engineering from the University of Tokyo
1980	Assistant Professor, The University of Tokyo
1981	Associate Professor, The University of Tokyo
1993	Full Professor, Institute of Industrial Science, The University of Tokyo
2006	Director, Institute for Nano Quantum Information Electronics, The University of Tokyo
2009	Visiting Professor, Technical University of Munich
2014	President, International Commission for Optics (ICO) , Term 2014-17

Ten Major Awards:

2004	Leo Esaki Award
2004	IEEE/LEOS William Streifer Award
2007	Fujiwara Award
2007	Prime Minister Award
2009	Medal with Purple Ribbon
2009	IEEE David Sarnoff Award
2010	C&C Award
2011	Heinrich Welker Award
2011	OSA Nick Holonyak Jr. Award
2013	JSAP Achieveement Award

Yasuhiko Arakawa received the B.E., M.E., and Ph.D. degrees in electronics and electrical engineering from the University of Tokyo in 1975, 1977, and 1980, respectively. In 1980, he joined the University of Tokyo as an Assistant Professor and became a Full Professor in 1993. He is currently Professor and the Director of the Research Center for Photonics Electronics Convergence (CPEC) at the Institute of Industrial Science, and also the Director of Institute for Nano Quantum Information Electronics (Nano-Quine), The University of Tokyo.

Dr. Arakawa proposed the concept of the quantum dot and its laser application in 1982. A lot of theoretical predictions that Dr. Arakawa made about the superior characteristics of the quantum dot laser were proven one after another in 1990 or later, showing his outstanding foresight. He developed quantum dot lasers with high temperature-stability and high-speed direct modulation in 2004 in cooperation with industrial partners, which was led to their commercialization by a venture company in 2010. The quantum dot laser is now considered to be an innovative technology that equals the invention of the double hetero-diode laser in the history of semiconductor laser developments. The paper published in APL in 1982 on the proposal of the quantum dots has been cited 2,500times.

Dr. Arakawa achieved the highest operating temperature of 200 K in an all-solid system with a high-quality gallium-nitride quantum dot in 2006 as well as operation at telecommunications wavelength in 2004 on indispensable single-photon source technologies for quantum communications. In addition, Dr. Arakawa succeeded in realizing an artificial single-atom laser with a single-dot-photonic-crystal-nanocavity coupled system in 2010.

Moreover, Dr. Arakawa gave a significant contribution to cavity quantum electrodynamics. He discovered the cavity-polariton effect in semiconductors in 1992 by realizing strong coupling of a two-dimensional exciton with photons in a semiconductor microcavity. This achievement became the actual beginning of cavity-polariton physics and polariton laser research afterwards. The paper published in PRL in 1992 has been cited 1,400 times.

Dr. Arakawa is aiming at the blossoming of quantum dot science and technology, both as a director of the Institute for Nano Quantum Information Electronics at the University of Tokyo and as a principal investigator in the Funding Program for World-Leading Innovative R&D on Science and Technology (FIRST) under Japan's Cabinet Office for silicon photonics research. He is also internationally contributing to academic photonics research activities and has just elected as the President of International Commission of Optics (ICO) for the term of 2014-17.

In summary, Dr. Yasuhiko Arakawa achieved pioneering work on semiconductor quantum dot lasers including the original concept, theoretical prediction, and demonstration of high-performance quantum dot lasers. Moreover, his fundamental achievement of a single artificial atom laser and discovery of the cavity polariton effect as well as development of single photon emitters operating at telecom wavelength are significantly important. These achievements contribute to progress in nanophotonics based on compound semiconductors.