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Biography

Yasuhiko Arakawa received the B.E., M.E., and Ph.D. degrees in electrical engineering from The University of Tokyo, Tokyo, Japan, 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 now Professor Emeritus and a Specially-Appointed Professor at the Institute for Nano Quantum Information Electronics, The University of Tokyo. He received numerous awards, such as the ISCS Quantum Devices Award in 2002, the Leo Esaki Award in 2004, the IEEE/LEOS William Streifer Award in 2004, the Fujiwara Award in 2007, the Prime Minister Award in 2007, the Medal with Purple Ribbon in 2009, the IEEE David Sarnoff Award in 2009, the C&C Award in 2010, the Heinrich Welker Award in 2011, the OSA Nick Holonyak Jr. Award in 2011, the JSAP Isamu Akasaki Award in 2012, the JSAP Achievement Award in 2014. the Japan Academy Prize in 2017, and the IEEE Jun-ichi Nishizawa Medal in 2019. He was selected as a Foreign Member of the US National Academy of Engineering (NAE) in 2017. He is a Life Fellow of IEEE and Fellows of OSA, JSAP, and IEICE.

Abstract - Advances in quantum dot light sources

Since the first proposal of semiconductor quantum dot by Arakawa and Sakaki in 1982, the quantum dots have been intensively studied for both solid-state physics and advanced device applications. The full quantum-mechanical confinement of electrons has enabled the realization of high performance quantum lasers, high-sensitivity quantum dot infrared detectors, and quantum information devices such as single photon sources. In addition, a single quantum dot embedded into a photonic nanocavity has provided a fascinating platform for studying solid-state cavity quantum electronics.
In this presentation, after brief introduction of research activities of the Institute of Industrial Science (IIS), recent progress in quantum dot photonics is discussed. We show successful commercialization of the quantum dot lasers by academia-industry collaboration. Moreover, advanced technologies of hybrid quantum dot lasers on silicon for optical interconnect application as are presented, as well as quantum dot single photon sources operating above room temperature.