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Progress in quantum dots for lasers and single photon sources

Since the first proposal of the concept of the quantum dot by Arakawa et al., in 1982, the quantum dots have been intensively investigated for both fundamental solid state physics and device applications. Advances of self-assembling crystal growth technology of quantum dots enabled realization of high performance semiconductor lasers and quantum information devices such as single photon sources. The quantum dots can also be applied to solar cells with a predicted conversion efficiency over 75%. Moreover, implementing a single quantum dot within an optical nanocavity provides a new platform for solid-state cavity quantum electronics (QED).

In this presentation, we discuss progress in quantum dot photonics such as quantum dot lasers and single photon sources. Recent advances in quantum dot cavity-QED are also reviewed.

Biography

Yasuhiko Arakawa received his B.S. and PhD degree in E.E. from The University of Tokyo in 1975 and 1980, respectively, and became a full professor at the University of Tokyo in 1993. He is now Director of both the Institute for Nano Quantum Information Electronics and the IIS-Center for Photonics and Electronics Convergence at the University of Tokyo. He has received several major honores, including Leo Esaki Award, IEEE/LEOS William Streifer Award, Prime Minister Award, Medal with Purple Ribbon, IEEE David Sarnoff Award, C&C Award, Heinrich Welker Award, OSA Nick Holonyak Jr. Award, and Japan Academy Prize. He is a foreign member of U.S. National Academy of Engineering (NAE).