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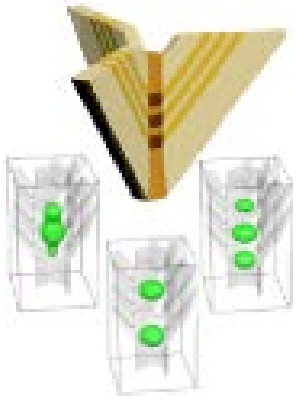
Light-Matter Interaction in Quantum Photonic Nanostructures



The fundamental processes of light-matter interaction depend on the quantum structure of the system involved and its electromagnetic (photonic) environment. Both aspects can be tailored in artificial nanostructures using modern nanoscience and nanotechnology tools, yielding new ways of controlling light-matter interaction for various applications. A particular implementation of such tailoring is presented, using unique semiconductor quantum dots (QDs) integrated in photonic crystal (PhC) cavities. Control of QD wavefunctions, polarization states of single photons, and cavity quantum electrodynamics are illustrated with such systems. Applications in integrated quantum photonics for on-chip processing of quantum light are proposed and demonstrated.

Eli Kapon- Biography

Eli Kapon received his Ph.D. in physics from *Tel Aviv University*, Israel in 1982. He then spent two years at the *California Institute of Technology*, Pasadena, as a Chaim Weizmann Research Fellow, followed by nine years at *Bellcore*, New Jersey, as member of technical staff and District Manager. Since 1993 he has been Professor of Physics at the *Swiss Federal Institute of Technology in Lausanne (EPFL)*, where he heads the Laboratory of Physics of Nanostructures. In 1999-2000 he was a *Sackler Scholar* at the Mortimer and Raymond Sackler Institute of Advanced Studies in Tel Aviv University, Israel. During that period he helped establishing the *Tel Aviv University Center for Nanoscience and Nanotechnology* and served as its first Director from 2000 to 2002. In 2001 he founded the start up *BeamExpress*, serving as its Chief Scientist. His research interests include quantum- and nano-photonics, low-dimensional semiconductors, and vertical cavity semiconductor lasers. Prof. Kapon is *Fellow* of the Optical Society of America, the Institute of Electrical and Electronics Engineers, and the American Physical Society of America, a recipient of a 2007 *Humboldt Research Award*, and a *Photonics Society Distinguished Lecturer* for 2105-2017.