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Quantum plasmonics: a nanoscale interface between photons and atoms ALEXEY AKIMOV, ARYESH MUKHERJEE, CHUN YU, DARRICK CHANG, FRANK KOPPENS, ALEXANDER ZIBROV, Harvard University, PHILIP ZIBROV, Texas A&M University, HONGKUN PARK, MIKHAIL LUKIN, Harvard University — We discuss recent theoretical and experimental developments towards a new, broadband approach for engineering photon-emitter interactions via subwavelength confinement of optical fields near metallic nanostructures. The tight confinement of guided excitations in these nanostructures, known as "surface plasmons", results in large interactions between single photons and single optical emitters without the use of a cavity, which can further be manipulated using quantum optical techniques. We report on recent experimental work demonstrating strong coupling between an individual CdSe quantum dot and a single surface plasmon in a proximal nanowire. Prospects towards single-photon nonlinear optics in such systems and robust, nanoscale atomic traps using surface plasmons are also discussed.

Darrick Chang
Harvard University

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