

**SINGLE PLASMONS GENERATION IN NANOWIRES COUPLED TO  
QUANTUM DOTS**

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Control over the interaction between single photons and individual optical emitters is an outstanding problem in quantum science and engineering. It is of interest for the ultimate control over light quanta, as well as for potential applications such as efficient photon collection, single-photon switching and long-range optical coupling of quantum bits.

Recently, remarkable advances have been made towards these goals, based on modifying photon fields around an emitter using high-finesse optical cavities. Here we demonstrate a new, broadband approach for engineering photon-emitter interactions via sub-wavelength confinement of optical fields near metallic nanostructures. When a single CdSe quantum dot is optically excited in close proximity to a silver nanowire, emission from the quantum dot couples directly to guided surface plasmons in the nanowire, causing the wire's ends to light up. Non-classical photon correlations between the emission from the quantum dot and the ends of the nanowire demonstrate that the latter stems from single plasmons scattering off the wire end. Results from a large number of devices show that the efficient coupling is accompanied by more than 2.5-fold enhancement of the quantum dot spontaneous emission.