Abstract Submitted for the DAMOP09 Meeting of The American Physical Society

Quantum Optics With Integrated Plasmonic/Optical Systems BRENDAN SHIELDS, ALEXEY AKIMOV, FRANK KOPPENS, CHUN YU, PARAG DEOTARE, DARRICK CHANG, PHILLIP HEMMER, ALEXANDER ZIBROV, MARKO LONCAR, HONGKUN PARK, MIKHAIL LUKIN — We present an experimental observation of strong optical coupling between individual, nanocrystal CdSe/ZnS quantum dots, and the guided surface plasmon modes of a proximal silver nanowire. The plasmonic excitation is then evanescently coupled to the modes of an adjacent Si₃N₄ waveguide aligned parallel to the wire, resulting in high collection efficiency. The strong coupling between emitter and field is enabled by the unique properties of the plasmon modes on the nanowires. In particular, due to the small size of the nanowires (~100nm in diameter), the surface plasmons are localized transversely to dimensions well below the diffraction limit. Efficient outcoupling of the plasmon-enhanced quantum dot emission and photon correlations consistent with a single-photon source are observed.

Brendan Shields

Date submitted: 22 Jan 2009 Electronic form version 1.4