

Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Spontaneous emission enhancement in a plasmonic nanocavity¹ KASEY RUSSELL, TSUNG-LI LIU, SHANYING CUI, EVELYN HU, Harvard University School of Engineering and Applied Sciences — Recently, metallic optical cavities containing coupled emitters have been fabricated that operate at visible frequencies. These cavities are capable of tightly confining light, greatly modifying the electromagnetic density of states in the location of the optical emitters. Here, we present measurements from a metal-based optical cavity that greatly modifies both the spectral and temporal characteristics of the coupled emitters. Our design is based on plasmonic coupling between a silver nanowire and a planar silver substrate, with a layer of optical emitters within the gap between the two silver components. The field confinement of the structure results in a 1000-fold enhancement of the spontaneous emission rate of the coupled emitters. These results suggest that metal-based optical cavities can allow quantum cavity electrodynamics of emitters such as colloidal quantum dots and organic dyes.

¹Supported by NSF/NSEC under NSF/PHY-06-46094

Kasey Russell
Harvard University School of Engineering and Applied Sciences

Date submitted: 11 Nov 2011

Electronic form version 1.4