

Abstract Submitted  
for the MAR14 Meeting of  
The American Physical Society

**Long range emission enhancement and anisotropy in coupled quantum dots induced by aligned elongated and proximal gold nanoantenna** JAYDEEP BASU, LAXMINARAYAN TRIPATHI, PRAVEENA M, PRANAY VALSON, Department of Physics Indian Institute of Science — Metal nanoparticles have been shown to considerably modify the optical properties of quantum emitters like quantum dots and molecules when they are in close proximity to each other. Understanding the microscopic nature of such interactions requires studying the optical properties in the near field. Here, we discuss experimental results on non-local long range emission intensity enhancement and anisotropy in quantum dot assemblies induced by isolated and partially aligned gold nanoantennas overlaid on the quantum dots. Sub-diffraction and near field, spatially resolved, photoluminescence spectroscopy of these hybrid films, clearly demonstrate that the effect is maximum when the longitudinal surface plasmon resonance of the nanoantenna is resonant with the emission maxima of the quantum dots. Numerical simulations qualitatively captures the near field behavior of the nanorods but fails to match the experimentally observed non-local effects. We have suggested how collective excitations of quantum dots in the close packed assemblies, mediated by the nanoantennas, could lead to such observed behavior.

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Date submitted: 15 Nov 2013

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