Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Cross-over from collective strong coupling to quenching in quantum dot-metal nanoparticles assemblies[1] PRAVEENA MULLAPUDI, Indian Institute of Science, ARNAB MUKHERJEE, SAI SREESH V, student, J.K. BASU, Associate professor — The optical properties for the hybrid structures consisting of gold nanoparticles and CdSe Quantum Dots (QDs) have been widely studied. Compact hybrid monolayer films of gold nano particles (Au NPs) and cadmium selenide (CdSe QDs) with different ratios are prepared using LB method. Suitable tuning of the ratio of QDs and Au NPs at different surface densities leads to enhancement and attenuation of the emission of QDs which acts like a quantum emitters. The net emission enhancement of QDs is maximum, particularly in the case of 0.143 Au NP number fractio (φ_{Au}) for both OFF - resonant and ON-resonant cases, and it is even more enhanced in the case of OFF- resonance i.e., when the SPR (surface Plasmon resonance) is not spectrally overlapping with the quantum dot PL maxima.We suggest that this behavior is indicative of a crossover from single particle to collective emission from quantum dots mediated by gold nanoparticles. The ability to control the radiative and non-radiative decay rates and the emission intensity from such assemblies using spectrally and spatially tuned plasmonic sources would be very crucial in the applications of photovoltaic's and nano photonics.

[1]DST grant

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Date submitted: 14 Nov 2014 Electronic form version 1.4