Abstract Submitted
for the OSF14 Meeting of
The American Physical Society

Exciton Generation in Semiconductor Nanocrystals *via* Near-Field Plasmon Coupling AMIT ACHARYA, Bowling Green State University — We demonstrate that contrary to the classical electrodynamics standpoint, the phonon-driven decay of surface plasmons (SP) in small-diameter metal nanoparticles can be suppressed through efficient coupling of SP modes to excitons in the external environment. Such near-field energy exchange was manifested here through the generation of excitons in CdSe nanocrystals (NCs) that were coupled to 5-nm Au nanoparticles. A unique signature of the energy transfer process was observed in photoexcitation measurements that unambiguously correlate the increase in the CdSe exciton population with the excitation of SP modes in Au. To enhance the efficiency of plasmon to exciton energy transfer, the backwards flow of photoinduced charges into metal was suppressed by embedding Au and CdSe nanoparticles into insulating matrices. The observed generation of semiconductor excitons through near-field energy transfer from small-diameter Au nanoparticles presents an excellent opportunity for converting the energy of strongly confined (near field) radiation into long-lived excitations, which could be utilized by photovoltaic or photocatalytic applications.

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Date submitted: 26 Sep 2014 Electronic form version 1.4