Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Measurement of the separation dependence of the resonant energy transfer between CdSe nanocrystals FARBOD SHAFIEI, RICARDO S. DECCA, Department of Physics, Indiana University Purdue University Indianapolis — We have developed an apparatus to study the separation dependence of the interaction between quantum dots (QD). Our measurement scheme is based on depositing isolated QDs on the flat surface of a solid immersion lens (SIL). The photoluminescence (PL) of these dots (around 615 nm) is collected by the SIL and spectroscopically analyzed. The most novel part of our work resides in exciting these QDs by means of resonant energy transfer from smaller ones (emission at 590 nm). The smaller QDs cover the apex of an aperture probe near-field scanning optical microscope, after dipping it on a colloidal suspension. The combination of spectral and positional filtering allows us to measure the interaction between only one of the smaller dots and one of the larger dots at a time. From the analysis of the PL signal as a function of z(separation between two QDs), we expect to obtain what part of the energy transfer is dipole induced (Förster interaction), and what part is associated with higher order terms (dipole-quadrupole and quadrupole-quadrupole interactions). Results on the progress of resonant energy transfer will be shown. These results improve our knowledge of the QD's wave function and understanding of decoherence phenomena in QDs

Farbod Shafiei
Department of Physics, Indianauniversity Purdue University Indianapolis

Date submitted: 03 Dec 2004 Electronic form version 1.4