Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Emission in Mn-Doped Quantum Dot QUE HUONG NGUYEN, Marshall University, JOSEPH L. BIRMAN, City College, CUNY — We theoretically investigate the magneto-PL of Mn2+doped semiconductor core-shell colloidal quantum dot to explain the experiment result from a recent magnetophotoluminescence study of strongly confined diluted magnetic semiconductor (DMS) in Mn2+-doped ZnSe/CdSe core-shell colloidal nanocrystals. The yellow emission characterized for in Mn2+-which is associated with the d-d internal transition 4T1-6A1, was reported not suppressed in an applied B //z magnetic field and unpolarized as usual and instead, a Mn PL circular polarization has been observed. The in Mn2+- photoluminescence has been found to have a large splitting between σ^+ and σ^- components which depends on the applied field. We show that this behavior, which has not been found in characteristics of the Mn2+ PL in bulks and other conventional DMS materials, is the result of the strong confinement of the nanocrystal and its properties. Our theory and calculation show that the reasons the yellow Mn2+ PL band in quantum dots is not suppressed under applied magnetic field originate due to the existence of the internal piezoelectric dipole moment and the Coulomb exchange interaction of the impurity ions with the confined electrons inside the dot.

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Date submitted: 09 Nov 2012 Electronic form version 1.4