Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Liquid Crystal Phase Transition driven three-dimensional Quantum Dot Organization[1] ANDREA L. RODARTE, R.J. PANDOLFI, S. GHOSH, L.S. HIRST, University of California, Merced — We use a nematic liquid crystal (LC) to create organized assemblies of CdSe/ZnS core/shell quantum dots (QDs). At the isotropic-nematic LC phase transition, ordered domains of nematic LC expel the majority of dispersed QDs into the isotropic domains. The final LC phase produces a series of three dimensional columnar QD assemblies that are situated at defect points in the LC volume. Within each assembly the QD emission is spectrally-red-shifted due to resonant energy transfer. We use this spectral shift as a measure of the inter-dot separation and find that the QDs are packed uniformly in these assemblies over distances of microns between the glass plates of a standard LC cell. In addition, because the QD clusters form at defects, we can deterministically control the location of the assemblies by seeding the LC cell with defect nucleation points.

[1]Funding provided by NSF, UC MERI and UC MEXUS.

Andrea L. Rodarte
University of California, Merced

Date submitted: 27 Dec 2012 Electronic form version 1.4