

Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Quantum Dots and Nematic Liquid Crystal Mediated Interactions RAJRATAN BASU, DANIEL FINKENSTADT, PETER BRERETON, US Naval Academy — A small quantity of CdSe quantum dots (QDs) was dispersed in a nematic liquid crystal (LC) media and the QDs were found to exhibit self-assembled asymmetric structures, most likely QD-chains. The LC+QD system shows an asymmetric photoluminescence (PL) band in the nematic phase and a symmetric PL band in the isotropic phase, indicating a nematic mediated arrangement of the QDs. A simple model is proposed to explain the asymmetric behavior of the PL band as an effective chain of coupled or coalesced quantum dots. The effect of the liquid crystals is to provide an entropic force that attracts dots to minimize the excluded volume. The dielectric reorientation dynamics, immediately following the removal of an applied field, appears as a one-step exponential decay for the LC and a two-step exponential decay with a slower process for the LC+QD system. The results suggest that anisotropic chain-like QD-assemblies are formed in the nematic platform.

Rajratan Basu
US Naval Academy

Date submitted: 15 Nov 2013

Electronic form version 1.4