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Electro-optical properties of CdSe quantum dots dispersed in a chiral nematic liquid crystal[1] J. KIRCHHOFF, Florida State University, R.H. INMAN, S. GHOSH, L.S. HIRST, University of California Merced — The electro-optical properties of quantum dots can be significantly altered if they are assembled in close proximity to each other. The partial ordering of liquid crystal molecules can be utilized to form directed quantum dot assemblies. Typically, this results in a red shift in the emission spectrum of the dots as the induced order leads to enhanced dipolar interactions, resulting in electronically coupled states. Spherical cadmium selenide quantum dots of different diameters are dispersed in various concentrations in a chiral nematic liquid crystal phase. The quantum dots are seen to aggregate, the sizes of the aggregates depend on the size, concentration, and mixing time of the dots, and the aggregates in turn form defects in the liquid crystal texture. The effect of the dots on the electro-optical response of the liquid crystal is studied, with a decrease in a threshold electric field transition attributed to the quantum dots. Quantum dots with emission peaks ranging from 490 nm to 640 nm were studied using polarized optical microscopy, fluorescence microscopy, and scanning microscopy photoluminescence measurements.

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