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Directed assembly of CdSe/ZnS quantum dots in cholesteric liquid crystal matrix ANDREA RODARTE, LINDA S. HIRST, SAYANTANI GHOSH, University of California, Merced — Controlled self assembly of quantum dots (QDs) over macroscopic scales is important to realizing the potential for new applications such as photovoltaic devices and sensors. Here, we suspend CdSe/ZnS core/shell QDs in a cholesteric liquid crystal (LC) and investigate the dispersion and collective emission of the QDs when loaded into a Grandjean-Cano wedge cell. We use polarized optical microscopy and scanning photoluminescence microscopy to generate spatial and spectral maps of the QD-liquid crystal samples. We find that the LC forms Grandjean steps approximately 200um in width and the spectral effects of the QD emission correlate to the stripe formation. We also find that the cholesteric LC modulates the spectral emission of the QDs, creating a wavelength gradient dependant on the orientation of the collection polarizer with the director axis of the liquid crystal molecules.

Andrea Rodarte
University of California, Merced

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