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Utilizing Phase Front Propagation in Liquid Crystal Droplets to Control Quantum Dot Self-Assembly CHARLES MELTON, LINDA HIRST, University of California Merced — Topological defects in nematic liquid crystals are known to drive the assembly of included particles. For example, large colloids have been seen to interact and assemble at defect locations and into colloidal crystals via elastic forces. Similar effects have been observed with nano-sized particles, in particular gold particles and quantum dots. Anchoring conditions affect how the liquid crystal orders around the particle, so using specially designed surface ligands is important. Recently, our research group showed that mesogenic surface ligands allow for self-assembly of well defined structures at the isotropic – nematic phase boundary. For liquid crystals in spherical geometries that possess a well known bipolar configuration we demonstrate that quantum dots co-assemble with the formation of defects upon cooling from the isotropic phase. Spatial and size controlled patterning of quantum dot clusters could be important in photonic applications such as developing a liquid crystal laser.

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