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Formation and Characterization of Quantum Dot Clusters formed via Phase Front Propagation in Liquid Crystal Droplets CHARLES MELTON, LINDA HIRST, University of California Merced — Liquid crystal nanocomposites are materials in which suspended nanoparticle organization can be tuned via an anisotropic fluid matrix. The use of a liquid crystal as a host phase allows for unique self-assembly methods that use topological defects and elastic deformation of the nematic director to sort and organize nano-scale particles. A current challenge, however, is controlling formation location in a continuous medium. Liquid crystal droplets pose a solution to this challenge, as topological defects are formed at defined location in spherical geometries. We explore the competition between cluster location at ground state defect locations and cluster location via phase change dynamics. We show that these two location control parameters form quantum dot cluster and quantum dot hollow shells at repeatable locations in the droplet. We also use the droplet geometry to study how the quantum dot clusters are packing in 3D space.

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