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Ensemble Behavior of Magnetic Nanoparticles Dispersed in a Liquid Crystalline Matrix JACKY WAN, J. JUSSI AMARAL, SAYANTANI GHOSH, MAKIKO QUINT, ANDREA RODARTE, School of Natural Science, University of California, Merced — We are investigating the ensemble behavior of magnetic nanoparticles (MNPs) when dispersed in an electro-optically active liquid crystalline (LC) matrix. Using high-resolution scanning magneto-optical Kerr effect (MOKE), we characterize the spatial distribution of 10 nm Fe₃O₄ MNPs in a room temperature nematic LC, 5CB. Our results show that the presence of MNPs in the LC material affects the host itself, by changing the threshold magnetic field required for molecular re-orientation. In addition, as the LC material is cooled from the isotropic to the nematic phase, it also allows clustering of the MNPs suspended in it. We are following up on this part by using quantum dots (QDs) in conjunction with MNPs in LC and using the emission from QDs as spatial labels of MNP cluster positions. Our studies indicate the possibilities of modulation of both LC and MNP properties in the composite samples.

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