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Holographic Imaging in Carbon Nanotube and Dye-Doped Liquid Crystal SAUNAB GHOSH, MIKAIL ABBASOV, West Texas A&M University, GENE CARLISLE, DEPARTMENT OF PHYSICS TEAM — Without application of electric field, we recorded permanent holographic images in the nematic liquid crystal E7, doped with 0.6% Methyl Red (MR) *and* 0.002% single-wall carbon nanotubes (CNTs). The images were recorded using a 488-nm laser and reconstructed using 488-nm, 532-nm and 633-nm probe beams. Multi-order diffraction patterns were observed, during image recording and reconstruction, for thin films having thicknesses of 15 μm. The quality and diffraction efficiency were higher for cells containing both CNTs and MR than for cells doped only with MR. Average first-order diffraction efficiencies of 7.1% and 3.7% were found for the (CNT+MR)-cells and MR-only cells, respectively. The primary objective of this study was to utilize the molecular properties of MR and CNTs to produce a liquid crystal material with improved holographic properties. Dynamics of image formation and a proposed CNT-enhancement mechanism are presented. The holograms are robust and have remained stable for over two years.

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