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Chiral liquid crystalline nanocomposites MICHAEL KOHLIOS, JOHN MURRAY, ANTHONY TANTILLO, KATHRYN REDDY, PETR SHIBAEV, Fordham University, Department of Physics — Chiral liquid crystalline nanocomposites based on mixtures of low molar mass chiral liquid crystals, polymers and ferromagnetic nanoparticles were designed and their optical properties were studied in different configurations of external magnetic fields, at different concentrations of nanoparticles and for a variety of viscosities of liquid crystalline matrix. It was found that chiral liquid crystals can serve as color changing sensors of submicron deformations. Liquid crystalline films with nanoparticles display changes in selective reflection that can be altered by applying external magnetic field. Sensitivity of composites to external magnetic field and deformation is analyzed in the framework of a simple model for different viscosities of the material. It is shown that shear deformations of thin films with amplitude as low as 10nm can be detected. The applications of this method of measuring submicron and nano-scale deformations are discussed.

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