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Light sensitive liquid crystals: Focusing on surface and bulk transitions PETR SHIBAEV, SETH BOURG, SHANNON ROSARIO, DANIEL BATEMAN, Fordham University, Department of Physics, ANDREY ILJIN, National Academy of Sciences of Ukraine — The study of transitions in liquid crystalline matrix resulting from light-induced conformational changes in newly synthesized light sensitive molecules are studied and discussed. Light sensitive molecules (novel chiral and non-chiral azo dyes, spiropyrans) were either embedded in a polymer film serving as a container for liquid crystals or dissolved in a bulk of liquid crystals. In both cases light-induced re-orientation of director was observed in nematic liquid crystals. In chiral liquid crystals the family of regular domains with a different helical pitch was formed. One of the most ordered representatives of this family was observed earlier in [1]. Interestingly, the shape and structural characteristics of the domains were different in liquid crystalline droplets and in the films contained between glass plates. It is possible to freeze the regular structure of the domains in highly viscoelastic liquid crystals and obtain free standing films. The role of viscosity is discussed and a simple theoretical model of observed effects is presented. The studied films can be used in photonic devices and also as detectors of environmental changes.

[1] P. Shibaev. R. Sanford, D. Chiappetta, A. Genack and A. Bobrovsky Optics Express, Vol. 13, Issue 7, pp. 2358-2363 (2005)

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