SHAPING SOFT MATTER WITH LIGHT

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Liquid crystal mesophases represent a particular kind of soft matter due to their optical and material properties. Their high birefringence and low elasticity indeed make them easy to be reshaped by external fields of various nature. In particular, light is well-known for its ability to induce static or dynamic orientational structures, with or without a threshold regarding the optical intensity. The richness of the interaction between light and liquid crystals makes the various degrees of freedom of light as many parameters to imprint an optical information of a structural nature into liquid crystals.

Here we will present recent experiments illustrating how the polarization state of light and its spatial degrees of freedom can be used to engineer elastic distortions in liquid crystals. These results highlight the chirality of light and that of matter as essential ingredients that are mutually interacting, and offer an original approach for the analysis of nonparaxial light fields their spin-orbit optical angular momentum content.