## Abstract

- The influence of the flow on the alignment dynamics of nematic liquid crystals (LCs) on Langmuir-Blodgett (LB) monolayers has been studied by polarizing microscopy, nonlinear optics and electro-optics. During flow, the LB chains are bent in the flow direction and the LC bulk is quasi-planarly aligned. Once the flow has ceased they relax to their equilibrium orientation which induces homeotropic alignment in the LC bulk. The speed of the relaxation and the anchoring strength of the LC to the LB film were found both to decrease linearly as the length of the LB chains increases. Two sensitive methods for estimating the anchoring strength are proposed.

- Most nematic liquid crystals are non-amphiphilic and thus do not form stable monolayers at the air/water interface, and, as a consequence, they cannot be deposited with the Langmuir-Blodgett technique. However, they can be incorporated into host monolayers of amphiphilic compounds.

- Thin films of crosslinkable ferroelectric liquid crystals have been used for the fabrication of an efficient second-order nonlinear optical structure. These materials can be oriented by an electric field and then polymerized to give a thermally stable polymer network that fulfills the criteria required for efficient phase-matched second-harmonic generation. The structure has the potential to achieve practical levels of performance and can be seen as a first step towards second-harmonic and all-optical devices.