Influence of flexoelectricity on the structural transformations in cholesteric liquid crystals.

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In this talk there will be presented the results of investigation of changes in the orientational structure of cholesteric liquid crystal (CLC) in the plane-parallel cell driven by the external electric field. Main features are taking into account the electric field distortion inside the cell as well as the free energy term provided by the flexoelectricity.

Both cases of positive and negative CLC dielectric anisotropy are considered. It is shown that the Fréedericksz transition can occur even if dielectric anisotropy is negative. “Phase diagrams” are plotted for the both cases.

The case of large averaged flexoelectric coefficient and relatively high voltage at the boundaries (hence the elastic Frank energy terms can be neglected) is investigated analytically. Different scenarios of the CLC orientational structure transformation with the change of the applied voltage were analyzed. The actual scenario, which takes place, depends on the material parameters of the CLC cell.