Helical Structure dynamics in confined geometry of ferroelectric liquid crystals

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I. Abstract

Ferroelectricity in liquid crystal materials occurs due to the tilt angle and helical structure of the molecular director, which further results in the appearance of spontaneous polarization. Therefore, tilt angle is the first order parameter and spontaneous polarization is a second order parameter. If one of the parameters, either tilt or helix is absent, one does not get ferroelectricity in liquid crystals due to the symmetry considerations. So, helix attributes as an important parameter in the characteristics of collective dielectric processes in the ferroelectric phase of LC. Recently, we have observed a dielectric mode other than two already known dielectric modes (Goldstone mode and soft mode), related to the helix of the material called partially unwound helical mode (*p*-UHM). This mode appears at a frequency just below phason mode (Goldstone mode), which appears at the appropriate amplitude of probing alternating current (ac) field. The *p*-UHM process is related to the Goldstone mode. However, *p*-UHM process has a definite threshold field, whereas Goldstone mode is independent of probing field. The *p*-UHM process is dependent of ac field and merges with phason mode at high ac field. The helical mode has also been confirmed by electro-optical method. Based on our results we included *p*-UHM process as one of the collective dielectric processes other than Goldstone and soft mode in FLC materials.

II. Biography

Ms. Ambika Bawa studied Physics at the Delhi University, India and graduated as MS in 2012. She then joined the research group of Dr. A. M. Biradar at the CSIR-National Physical Laborotary, India. She is currently pursuing her PhD degree at the same institution. Her research interests are in the development of nematic, ferroelectric liquid crystal and nanoparticles composite systems for display and non-display applications.

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