

Abstract Submitted  
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**Dielectric relaxation in confined liquid crystal: molecular and collective modes** MANUEL RIVERA, FOUAD ALIEV, University of Puerto Rico — Dielectric spectroscopy was used to investigate the influence of confinement of the liquid crystals on phase transitions and the dynamics of molecular reorientations via rotation of molecules around their short axis. The pore size was varied from 200 nm then the system shows behavior close to the behavior of three-dimensional (3D) bulk liquid crystal - to extreme narrow confinement that may be considered a quasi-one-dimensional (1D) system. We did not observe either the N-I or nematic-solid crystal phase transition under quasi-1D-confinement: in contrast, in pores of larger pore sizes, these transitions are observed with a shift and broadening of the phase transition as compared to bulk LC. We observed that, instead of undergoing the N-I phase transition in the quasi-1D-system, liquid crystal inside the narrow pores solidifies. Relaxation of molecular origin freezes out upon cooling the sample from the isotropic phase. Molecular reorientations were dielectrically active at temperatures much above the bulk N-I transition temperature but with the relaxation rate much slower and dielectric spectrum much broader than in the bulk. The relaxation due to cooperative dynamics of fluctuations of director orientations (investigated in complementary dynamic light scattering experiments) was not observed in quasi-1D-system. We suggest that the slowing down of the mode, which is molecular in the bulk material, is may be due to enhancement of the effective viscosity liquid crystal under such narrow confinement and resulting glass-like dynamics.

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