Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Dynamics of director relaxation in nanoconfined liquid crystal: dynamic light scattering investigation SARMISTHA BASU, FOUAD ALIEV, University of Puerto Rico — Dynamic light scattering was applied to study the boundary conditions (planar-axial and homeotropic-radial) and layer thickness (at nanoscale) of 8CB confined to cylindrical pores influence on phase transitions and relaxation of director orientational fluctuations. For confined 8CB in the nematic phase two well-defined relaxation processes were observed for both axial and radial orientations of the liquid crystal. The first process is qualitatively associated with bulk-like nematic director fluctuations. The second relaxation process (with relaxation time slower than the first one) is most likely due to the fluctuations in layers nearest the wall surface. In samples with homeotropic boundary conditions we observed the onset of smectic-A phase order forming on the pore wall even though the rest of the liquid crystal could be in the nematic phase. We found that for homeotropic boundary conditions of confined liquid crystal, the pore wall-liquid crystal interactions influence on the properties of the surface layer is stronger than in the case of axial orientation, particularly, and the influence of boundary conditions on N-Sm-A phase transition in confined 8CB is stronger than on isotropic- nematic phase transition. The separation between the first and the second (slow) process is clearer for thinner layers and the amplitude of slow process is greater for thinner layers. This suggests that the slow process is surface related relaxation.

Fouad Aliev
University of Puerto Rico

Date submitted: 22 Nov 2004 Electronic form version 1.4