Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Bent-core fiber structure: Experimental and theoretical studies of fiber stability C. BAILEY, Liquid Crystal Institute, E. GARTLAND, Dept. of Mathematical Sciences, Kent State Univ., A. JAKLI, Liquid Crystal Institute — Recent studies have shown that bent core liquid crystals in the B7 and B2 phases can form stable freestanding fibers with a so called "jelly-roll" layer configuration, which means that the smectic layers would be arranged in concentric cylindrical shells. This configuration shows layer curvature is necessary for fiber stability. Classically this effect would destabilize the fiber configuration because of the energy cost of layer distortions and surface tension. We propose a model that can predict fiber stability in the experimentally observed range of a few micrometers, by assuming that layer curvature can be stabilized by including a term dealing with the linear divergence of the polarization direction if the polarization is allowed to have a component normal to the smectic layers. We show that this term can stabilize the fiber configuration if its strength is larger than the surface tension. We also propose an entropic model to explain the strength of this term by considering steric effects. Finally we will take results from this model and apply them to better understand experimental findings of bent-core fibers. Financial support by NSF FRG under contract DMS-0456221. Prof. Daniel Phillips, Particia Bauman and Jie Shen at Purdue Univ., Prof. Maria Carme Calderer at Univ. of Minnesota, and Prof. Jonathan Selinger at Kent State Univ. Liou Qiu and Dr. O.D. Lavrentovich, Characterization Facilities, Liquid Crystal Institute, Kent State Univ. Julie Kim and Dr. Quan Li, Chemical Synthesis Facilities, Liquid Crystal Institute, Kent State Univ.

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Date submitted: 03 Dec 2006 Electronic form version 1.4