Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Twist-bend nematic liquid crystals in high magnetic fields[1] ANTAL JAKLI, Liquid Crystal Institute, Kent State University, Kent. OH 44240, PAVAN CHALLA, Department of Physics, Kent State University, Kent, OH 44240, VOLODIMYR BORSHCH, Liquid Crystal Institute, Kent State University, Kent. OH 44240, OWAIN PARRI, Merck Chemicals Ltd., Chilworth Technical Centre, University Parkway, Southampton SO16 7QD, UK, SAMUEL SPRUNT, Department of Physics, Kent State University, Kent, OH 44240, OLEG D. LAVRENTOVICH, Liquid Crystal Institute, Kent State University, Kent. OH 44240, JAMES T. GLEESON, Department of Physics, Kent State University, Kent, OH 44240 —
We present magneto-optic measurements on two odd-numbered dimer molecules that form the recently discovered twist-bend nematic (N_{TB}) phase, which represents a new type of 3-dimensional anisotropic fluid with about 10 nm periodicity and accompanied optical stripes. We show that B = 25T shifts downward the N-N_{TB} phase transitions by almost 1°C, and explain it quantitatively. We also show that the optical stripes can be unwound by a temperature and material dependent magnetic induction in the range of B = 5-25T. Finally, we propose a Helfrich-Hurault type mechanism for the optical stripe formation. Based on this model we calculate the unwinding magnetic field, and find agreement with our experimental results.

[1]National Science Foundation (NSF) supported this work under grants DMR 0964765, 1104805, 1121288 and 1307674, as well as the DOE grant DE-FG02-06ER 46331. We thank to C. T. Imrie and Georg Mehl for providing us the material CB7CB.

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Date submitted: 15 Nov 2013 Electronic form version 1.4