

Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Optical Investigation of the Phases of Liquid Crystals of Nanoscale Duplex DNA GIULIANO ZANCHETTA, U. of Milano, Italy, MICHI NAKATA, U. of Colorado, TOMMASO BELLINI, U. of Milano, Italy, NOEL CLARK, U. of Colorado — Polymeric DNA chains are known to exhibit chiral nematic and hexagonal columnar LC phases. Recently we found that even very short duplex DNA oligomers 6-basepairs (bp) to 20-bp in length also form nematic and columnar phases depending on the concentration of DNA. To investigate the structure of those phases, we used depolarized transmission light microscopy (DTLM) to probe texture and measure birefringence, and optical interferometry to measure DNA concentration. These observations show a chiral nematic and two distinct columnar phases in the short oligomer duplexes. We will discuss the structure of these phases and present data correlating their occurrence with solution conditions and with the detailed base pair configuration and the ends of the oligomers, showing that, for example, unpaired bases at the ends of the oligomers tend to suppress the LC phases. Work supported by NSF MRSEC Grant DMR 0213918 and NSF Grant 0072989.

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Date submitted: 30 Nov 2005

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