Abstract Submitted
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Smectic Phase Formed by DNA Dimers[1] MIROSLAW SALAMONCZYK, Liquid Crystal Institute, Kent State University, JAMES GLEESON, Department of Physics, Kent State University, ANTAL JAKLI, Liquid Crystal Institute, Kent State University, SAMUEL SPRUNT, Department of Physics, Kent State University, JAN DHONT, EMMANUEL STIAKAKIS, Forschungszentrum Julich, Julich, Germany — h $-abstract-$\pard The rapidly expanding bio market is driving the development and characterization of new multifunctional materials. In particular, nucleic acids are under intense study for gene therapy, drug delivery and other bio-safe applications [1,2,3]. DNA is well-known to form a cholesteric nematic liquid crystal in its native form; however, much recent research has focused on self-assembly and mesomorphic behavior in concentrated solutions of short DNA helices [4]. Our work focuses on DNA dimers, consisting of 48 base-pair double-stranded helices connected by a 5 to 20 base flexible single strand, and suspended in a natural buffer. Depending on temperature, concentration and length of the flexible spacer, polarizing optical microscopy and small angle x-ray scattering reveal cholesteric nematic and, remarkably, smectic liquid crystalline phases. A model for smectic phase formation in this system will be presented.1] J.-L. Lim et al., Int. J. of. Pharm. 490 (2015) 2652] D.-H. Kim et al., Nature Biotech. 23 (2005) 2223] K. Liu et al., Chem. Eur. J. 21 (2015) 48984] M. Nakata et al., Science 318 (2007) 1276\pard-/abstract-\

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