Abstract Submitted
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Laterally Confined Block Copolymer Cylinder Monolayers: Smectic, Nematic, and Isotropic Ordering[1] M.R. HAMMOND, E.J. KRAMER, UCSB — We investigate the temperature dependence of nanodomain ordering in laterally confined, monolayer films of a cylinder-forming block copolymer. The lateral confinement (in channels up to 3 μm wide) aligns the cylinders, providing long range orientational order of the nanodomains over the entire channel width at annealing temperatures T well below the bulk ODT. As T is progressively increased, an increasing density of dislocations and disclinations is observed and the orientation correlation function $g_2(r)$ decreases with r, eventually exponentially above a T_c $<$ ODT. We compare these results to theory(1), which predicts that a 2-D smectic film at 0 K is, as T increases, transformed to a "nematic" phase, in which the local cylinder normal acts as the nematic director, by phonons and thermally generated dislocations. As the system is heated through T_c, we examine whether it is indeed the unbinding of disclinations that produces the observed isotropic (yet still microphase-separated) phase, as suggested by theory. (1) J. Toner and D. R. Nelson, Phys. Rev. B, **23**, 316, (1981)

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