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The development of order in ultra-thin PS-PMMA diblock copolymer films. WARD LOPES, HAI QIAN, GENE MAZENKO, HEINRICH JAEGER, James Franck Institute, The University of Chicago — Knowledge of how two dimensional systems order is important for techniques like hierarchical self-assembly or diblock copolymer lithography. The applicability of these techniques can be limited by the defects which influence the late stage of ordering. Further, one would like to know whether or not the qualitative features of ordering depend only on the symmetry of the system. We address these concerns by studying the growth of order in weakly-segregated, cylindrical-phase, PS-PMMA diblock copolymer films. Our samples have smectic (striped) symmetry and form a single layer of half-cylinders with more than 10^5 repeat spacings. We have found qualitative differences between our results and results reported on strongly segregated cylindrical-phase diblock copolymer films(1) . We find, for example, that the number of dislocations and disclinations are approximately equal and that grain boundaries persist for long times. We are using time lapse atomic force microscopy to track disclination dipole, tripole, and quadrupole annihilations and will report on the relative frequency of each. We will compare our results with numerical simulations of the Swift-Hohenberg Model. (1) Harrison et. al. Science, **290**, 1558 (2000); Harrison et. al. Phys. Rev. E, **66**, 11706 (2002).

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