

Abstract Submitted
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Edge effects and surface patterns in a quenched lamella forming block copolymer ANDREW B. CROLL, PEGGY WILLENBRING, ALEXANDER WAGNER, North Dakota State Univ — Thin lamellar systems are well known to form surface structures when cast in a thickness that is not commensurate with a lamellar spacing. The structures have often been considered an ideal two dimensional system and much has been learned of the patterns dynamics. This early work considered a uniform isotropic film in a region infinitely far from a boundary. Here we specifically consider the influence of a pre-existing boundary on the pattern formation process, and identify the emergence of a unique new lengthscale in the problem. Our work combines an idealized experimental system (polystyrene-poly2vinylpyridine diblock near the order-to-disorder transition point) with precise numerical computation (a Lattice-Boltzmann model) in order to develop an understanding of the relative importance of the key physical phenomena underlying the results. The new lengthscale is found to be inversely proportional to both total film thickness and quench depth and offers unique opportunities to engineer structures extending beyond the 2D layer into the 3rd dimension.

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