Abstract Submitted for the MAR15 Meeting of The American Physical Society

Optimizing the Morphology Characterization of Block Copolymer Directed Self-Assembly Thin Films using Inverse Genetic Algorithms ADAM HANNON, DANIEL SUNDAY, DONALD WINDOVER, CHRISTOPHER LIMAN, NIST - Natl Inst of Stds & Tech, JUAN DE PABLO, University of Chicago, JOSEPH KLINE, NIST - Natl Inst of Stds & Tech — Block copolymer (BCP) directed self-assembly (DSA) is one of the leading candidate methods for nanopattern transfer needed in the next generation of integrated circuit and memory storage devices. Much research has gone into precisely controlling the morphology of BCP thin films, making the development and application of metrology methods to BCPs a critical area. In particular, methods for determining the real space structure of the BCP DSA films are needed. Recently, resonant soft X-ray scattering experiments have shown promise as such a method by inversely calculating the real space structure from the scattered intensity profile [Sunday et. al. ACS Nano 2014, 8 (8), 8426-8437]. These inverse methods are limited in application by their computation speed. Here we present recent work in using genetic algorithms to determine the real space structure of PS-PMMA thin films. The calculated results are compared with the structure found in self-consistent field theory simulations using boundary conditions analogous to the experimental DSA templates.

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Date submitted: 13 Nov 2014

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