

Abstract Submitted
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Island Formation on Nano-membranes KEN ELDER, Oakland University, ZHI-FENG HUANG, Wayne State University — Recent experimental studies of strained island formation on Si nano-membranes have yielded interesting results [1]. As the islands grow strain in the islands can be partially relieved by deforming the nano-membranes. The amount of strain relieved increases with decreasing Si membrane thickness. This phenomena allows the islands to grow coherently to larger sizes for thinner membranes, before dislocations nucleate. Perhaps more interestingly the strain field produced by an island on one side of membrane creates preferential locations for the nucleation of islands on the opposite side. This leads to local periodic ordering of the islands, giving rise to novel electronic properties. In this talk a binary phase field crystal model will be used to examine this phenomena. Predictions for the relationship between maximum island size, flux rate and nano-membrane thickness as well as a study of island ordering will be presented.

[1] H.-J. Kim et al., Phys. Rev. Lett. 102, 226103 (2009); M.-H. Huang et al., ACS Nano 3, 721 (2009).

Ken Elder
Oakland University

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